Research Conference 2023

Becoming lifelong learners

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Acknowledgement of Country
In the spirit of reconciliation, ACER acknowledges the Traditional Custodians of country throughout Australia and their connections to land, sea and community. We pay our respect to their elders past and present and extend that respect to all Aboriginal and Torres Strait Islander peoples today. ACER acknowledges the Aboriginal and Torres Strait Islander people who continue to contribute to our work to improve learning, education and research.

CONTENTS

Masterclass

Conference program

FOREWORD

Becoming lifelong learners

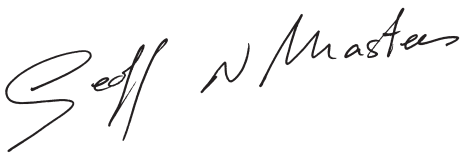
Improving the continuity of learning from birth to 12 years

A key to ensuring that every child makes excellent ongoing progress in their learning and development is recognition that individuals are on very different timelines and trajectories. Children of the same age are at markedly different points in their learning. In areas such as reading and mathematics, some children are 6 or more years ahead of their peers.

The implications of this are that, if every child is to be supported to make excellent further progress, it is important to establish and understand where they are in their learning. This enables teaching and learning opportunities to be tailored to each child's needs to stretch and extend them beyond the points they have already reached.

All of this requires an appreciation that learning from birth to 12 years is cumulative and ongoing. Establishing where children are in their learning depends on a frame of reference for doing this—a map of what long-term progress looks like. It also depends on quality observations that can be used to draw conclusions about individuals and to identify best next steps for their learning—whatever their age or year level.

The research being presented at Research Conference 2023 is focused on understanding the continuity of learning across early childhood and the primary years for the purposes of better meeting the needs of individual learners and ensuring that every child makes excellent ongoing progress.



Professor Geoff Masters AO
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KEYNOTE

Assessment is coming and the early childhood sector must lead the way

Dr Dan Cloney
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Dr Dan Cloney is a Senior Research Fellow in the Education Policy and Practice Program and a Member of the Centre for Global Education Monitoring at ACER. His expertise is in early education, cognitive development and academic achievement. Dan's research program focuses on the potential for high-quality early childhood education and care programs to support all children to flourish and to reduce development gaps caused by inequality. Current studies include the Overcoming Disadvantage in Early Childhood study (in partnership with the Australian Literacy & Numeracy Foundation) evaluating the effectiveness of the Early Language & Literacy program in New South Wales. Dan is an invited member of the Preschool Outcomes Measure Expert Advisory Group providing advice on development of a preschool outcomes measure to the Australian Government Minister for Education and Youth. He is also an Honorary Research Associate at the Murdoch Children's Research Institute (MCRI) and the Melbourne Graduate School of Education (MGSE).

Abstract

Assessment is a core component of quality early childhood practice. It is explicitly highlighted in the new Early Years Leaning Framework V2.0 and is a standard within Quality Area 1 of the National Quality Standard. In everyday early childhood education and care (ECEC) settings, and in initial teacher education, assessment is often limited to observational and narrative-driven approaches. Recent reviews of the literature highlight that there are few other assessment tools readily available to educators. What assessment looks like in early childhood is changing. The Commonwealth, as part of the Preschool Reform Funding Agreement, is developing, trialling, and implementing a preschool outcomes measure. The jurisdictions, too, are driving change: the Victorian Early Years Assessment and Learning Tool is an assessment designed to make consistent observations and assessments of children's learning in preschool settings. The current state of assessment practices in early childhood settings, and the coming reforms, are provoking a debate about the purpose of assessment and the time invested in conducting assessment. Typically, distinctions are made between formative and summative assessments, as well as population measurement or reporting. Different tools are used for each – educators may imagine soon writing learning stories, completing a transition statement, and undertaking a new preschool outcome assessment for each child in their preschool setting. This paper highlights the latest trends and research in assessment in the early years and discusses a new model of assessment that is embedded in a cycle of practice that includes:

- using assessment to locate students on a measure
- using learning progressions that are aligned with measures to understand what learning looks like, and what typically comes next, and to understand that learning is independent of the education system – no matter whether children are in long daycare, preschool or school settings

- using learning progressions to design and implement interactions, to select pedagogical strategies and curriculum materials that are evidence-informed and aligned at different levels of learning
- compiling evidence of growth (or lack of) using assessment or observation, and updating planning and practice
- facilitating professional discussions across transitions to support continuity of learning, and using assessments that are calibrated on a common scale, so that leaning is visible from the first years of life, until the end of primary school and beyond.

This framework for assessment is one that educators and the sector must lead themselves. The sector can lead change to end the unhelpful stratification of assessment types and tools. Instead, we must develop excellent quality measures that have cutting-edge technical rigour, along with authentic administration embedded in familiar interactions and experience. By putting such assessments in the hands of educators, it is possible to develop a common understanding of what learning looks like from the early emergence of skills and abilities through to the development of more advanced skills. Importantly, such measures must be embedded in practice – supporting educators to plan and to intervene. From such assessments, we can develop new ways to translate between assessments, decoupling the specific tool chosen from knowledge about learning domains, and to aggregate-up findings to the community and population level, removing the burden of multiple, separate assessments to deliver on the needs of external stakeholders.

KEYNOTE

A call to action on teaching and learning through play

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Dr Bo Stjerne Thomsen is the Chair of Learning through Play for the LEGO Foundation. As Chair and senior expert on how children and adults learn through play, he leads the research and learning agenda of the LEGO Foundation, and provides consultation at a bilateral, regional and multilateral level to international partners and leaders. Bo Stjerne has published widely on creativity, play and learning, most recently on the integrated role of technologies in everyday life, and the systems-change needed in schools and education to achieve equitable outcomes with learning through play. He is a frequent contributor and advisor to international governments and forums such as the OECD, the United Nations General Assembly and the World Economic Forum. Bo Stjerne completed his masters degree in design, architecture and engineering, and his PhD on performative technologies and learning environments. He has been a visiting scholar at the MIT Media Lab, Harvard University and Tufts University, studied research management and leadership at Copenhagen Business School and IMD in Switzerland, and is an advisor to various international research organisations.

Rachel Parker is a Senior Research Fellow at the Australian Council for Educational Research. In recent years she has led 2 major longitudinal studies – the first, on the impact of learning through play on primary school teachers and students for the LEGO Foundation, Ukraine; and the second, on the factors that impact achievement and growth in the first 5 years of school for UNICEF, Philippines. Rachel draws on 20 years' experience leading educational research and development programs in more than 15 countries for a range of partners. These experiences inform her understanding of education quality in different contexts.

Abstract

Learning through play has emerged as an important strategy to promote student engagement, inclusion and holistic skills development beyond the preschool years. If we want to build an education system preparing children for lifelong learning, we can use these strategies and achieve a balance of academic growth, holistic skills and a joy of learning. This presentation addresses the disconnect between policy, research and practice by summarising 5 key findings from international studies and 4 challenges to connecting policy and practice. The evidence that play supports learning is considerable, and a new framework can create continuity between the early years learning contexts and implementation in schools.

Introduction

Learning through play at school is at risk of demise, due to an increased global focus on catching up on the 'lost learning' of 'core skills', attributed to extended school closures during the COVID-19 pandemic. Multilateral organisations are endorsing accelerated learning programs that prioritise 'teaching the fundamentals' such as literacy and numeracy via structured pedagogies, tutoring and expanded learning time (World Bank et al., 2022, p. 65). Education stakeholders acknowledge the impact of COVID-19 on teacher and student wellbeing and social-emotional learning (World Bank et al., 2022); however, intervention strategies lack detail and appropriate measures, and are often peripheral to the classroom (UNICEF, 2022). In the rush to address the problem – a significant learning gap that in fact predates the pandemic – international frameworks and policies appear to sideline social-emotional learning (and other so-called 21st-century skills) from classrooms as 'non-core'.

Social-emotional skills are, however, the foundations for learning. Before a child can learn; that is, demonstrate the resilience required to try something new, they must feel mentally and physically well, safe, secure, and have a sense of belonging (Merritt et al., 2012). Social-emotional skills are significant predictors of achievement across a range of age cohorts and subjects (Organisation For Economic Co-operation and Development [OECD], 2021). Research points to learning through play as an appropriate pedagogy to foster social-emotional skills in the classroom (Parker & Thomsen, 2019). Playful approaches to teaching and learning prioritise the whole child, and view education holistically (Bubikova-Moan et al., 2019). A single playful classroom activity can be leveraged to foster a range of skills including literacy, numeracy, *and also* prosocial skills such as perspective and turn-taking, relating to others, playing fairly and regulating emotions.

Multilateral donors are proposing that systems narrow their focus on a small set of skills when the circumstances after COVID-19 – and beyond – call for broader skill sets and applied ways of thinking and doing to meet children's needs for a future where they are safe and well, are employable with skills reflecting the future of work (World Economic Forum [WEF], 2023), and live on a habitable planet.

Instead of confining our vision for education, we must expand our view to include the whole picture.

We call on all education systems and policymakers to consider the evidence on the value and benefits of learning through play for children, teachers, schools, systems and communities.

What is learning through play?

Learning through play is a pedagogy where play is the context for learning via a range of meaningful, joyful and engaging interactions and experiences in pursuit of holistic learning outcomes (Parker et al., 2022). Learning through play is not leaving children alone to discover for themselves, nor is it always directed by teachers; both approaches have been proven solely ineffective for learning (Marbina et al., 2011; Mayer, 2004). Playful learning in primary school is often called active, experiential, inquiry or problem-based learning, which are seen as more palatable terms for the 'serious business of school'; however, these strategies have much in common with learning through play considering their foundations in constructivism, holistic outcomes and markers of quality (Parker & Thomsen, 2019).

Children of all ages benefit from learning through play

In our white paper (Parker & Thomsen, 2019), we established that playful teaching and learning is relevant to and occurs in primary schools in many countries, to a significant extent, and can be highly effective in fostering literacy, mathematics, social-emotional, creative and physical skills. Effectiveness is predicated on certain conditions, and these include teacher, school, system and community factors such as skills, confidence, time, resources, support and understanding, and valuing playful teaching and learning. Contextual factors must be considered when attempting to scale-up success.

Children who learn through play achieve highly in both 'core' and 21st-century skills

Children who learn through play have enhanced problem-solving, communication, decision-making and creative skills (Zosh et al., 2022). They have positive relationships with their teachers and peers (Vancraeyveldt et al., 2022), and they are resourceful, critical, and inventive users of information and materials (OECD, 2023). Studies have shown that children learning through play achieve as highly as children in traditional learning environments on writing skills such as spelling and punctuation, but higher in creativity of responses (Lillard & Else-Quest, 2006). Further, children learning mathematics through play were able to solve more difficult problems than children in non-playful contexts (Cotič & Zuljan, 2009) and were able to transfer their newly acquired mathematical skills to novel problems (Purpura et al., 2016).

These findings may suggest that integrating playful learning is a good value-for- money investment considering the quality and range of outcomes.

Children themselves associate quality teaching with guided play. Subjects that are 'exciting' to children are experiential and embed social-emotional learning and opportunities to practise and develop communication skills (OECD, 2021). Children who participated in the 2023 Mandag Morgen & LEGO Foundation study The Good Life – According to Children, said:

> A good teacher is someone who helps you, whose lessons are fun and interesting, and if anyone gets angry, the teacher helps them to become friends again. Ebbe, [age] 11 (p. 57)

> Last Friday we had a social studies subject which the whole class thought was really exciting. Especially as we didn't just sit and write notes, but everyone was able to speak and contribute their views.' Cecilie, [age] 13 (p. 58)

However, as children grow, play declines, with 47% of children in grades 7–10 reporting that they no longer play compared with only 5% in grades 4–6 (Mandag Morgen & LEGO Foundation, 2023). Furthermore, for girls, play declines sooner with fewer girls reporting playing in grades 8 and 9 compared with boys (Mandag Morgen & LEGO Foundation, 2023). These trends align with children's enjoyment of school, with younger children enjoying school most, and the older cohorts enjoying school the least (Mandag Morgen & LEGO Foundation, 2023). Zhao and Gibson (2022) found play to be a protective factor against later emotional, peer and conduct problems, providing further evidence regarding the value of play to learning, achievement and development.

An opportunity exists to support children to learn through play at school for longer, promoting improved social-emotional learning, and mental health and wellbeing.

Autonomous teachers foster agentic empowered students

When we place demands and constraints on our teachers, we also apply them to our students.

We know that what teachers do matters most for student learning (Hattie, 2008), but our efforts to capitalise on teachers' influence has put them under greater pressure than ever before. Requirements for planning, differentiation, reporting and assessment have increased substantially over time, ever expanding teachers' roles and responsibilities (Appel, 2020). Teachers around the world are reeling from the impact of the global pandemic on their profession and students. They have been tasked with addressing the great learning loss 'casualty' (Patrinos et al., 2023), and are leaving or planning to leave the profession in unprecedented numbers (Dilberti et al., 2021).

One key stressor for teachers is low job autonomy, a factor associated with emotional exhaustion and burnout (Schonert-Reichl, 2017; Skaalvik & Skaalvik, 2020). Teachers experience high levels of stress when circumstances change, and they have no control or power to influence decisions (Schonert-Reichl, 2017). Conversely, teachers in higher autonomy teaching and learning environments report higher job satisfaction and self-efficacy (Skaalvik & Skaalvik, 2020; Worth & Van den Brande, 2020). Further, teaching practice autonomy was a wellbeing protective factor during COVID-19 (Chan et al., 2021).

The benefits of choice and agency for teachers extend to students

When systems support teachers to choose their teaching methods and practices, they in turn foster high-choice learning environments for students (Henriksen, 2012). In Parker and Thomsen (2019), student agency is typified by learners having a say in what they do, and how they do it, and is associated with increased motivation and engagement in learning. Student agency has been described a 'critical requirement' for learning through play (Zosh et al., 2017, p. 14), based on constructivist learning theories that emphasise an active mind as optimal for the creation of knowledge (Piaget, 1954). Parker and Thomsen (2019) identify 9 features of highly effective playful pedagogies relating to learner agency, clearly establishing the connection between these factors.

On autonomy and agency, teachers say:

> I am glad that I have been given the opportunity to give ideas on school decision-making. I feel proud that my idea was recognized. (Teacher, Malaysia, in Khun-inkeeree et al., 2021, p. 567)
>
> My team and I created the best thing possible for our students [during the pandemic]. I think we needed the freedom to make that happen. (Teacher, United States, in Chan et al., 2021, p. 537)
>
> … I work to promote autonomy as I provide activities to challenge children and encourage them to be risk-takers in their own learning. (Teacher, United States, in Castle, 2006, p. 1102)

When teachers are part of the decisions that impact them, benefits include improved job satisfaction, wellbeing, higher retention, improved student behaviour and improved student agentic skills such as creativity, decision-making and problem-solving.

Teachers need time and support to experiment with playful pedagogies

Australian teachers of Kindergarten (Foundation) to grade 3 have said that play-based teaching is a top or the most important priority in the early years (91%), and there should be more play-based learning in class; however expectations for assessment and the National Assessment Program – Literacy and Numeracy (NAPLAN) affect decisions around increasing or improving play-based learning. In addition, teachers reported that pedagogical decisions were largely out of their control (Hesterman, 2019). Teachers need time and support to make pedagogical choices that are appropriate for their students, and opportunities to trial, reflect on and evaluate the success of their learning through play practice.

Changes to knowledge, behaviours and practices takes time; there are no 'quick fixes' in education. Researchers have found that more impactful teacher professional learning programs are sustained over time, allowing for ongoing professional experimentation and a cyclical model of reflective professional inquiry (Borko et al., 2010). Short-term training might result in 'temporary compliance', but enduring changes require long-term support (Kennedy, 2016, p. 951). Another key quality feature of high-quality professional learning is collaboration (Borko et al., 2010). When teachers are supported by colleagues and leaders in professional learning communities, shared understandings, interpretations and applications of new knowledge are more consistent and cohesive (Darling-Hammond et al., 2017).

Commitment to investing in learning through play must be evidence informed, sustained over time, oriented in practice, and supported by communities of practice.

Schools can foster play-supportive environments

When school leaders and teaching teams dedicate sufficient time and resources to playful teaching and learning via school-wide approaches, benefits include improved student behaviour, staff retention and learner growth across a range of areas (Grissom et al., 2021). These results were seen at East Derwent Primary School (EDPS), Tasmania, a school with 80% of its students from the bottom quarter of socio-educational disadvantage (ACARA, 2023), where leaders and teachers adopted a play- and inquiry-based, student-centred, and needs-responsive approach to teaching and learning. Features included unconditional positive regard for learners as capable and confident, capitalising on support staff and teaching assistants to differentiate and support all learners, and time; 'holding the line' over the *years* that cultural change takes (Russell, 2020).

Lindfield Learning Village (LLV) in New South Wales takes a similar approach. The government-funded newly created school adopted an unconventional flexible and individualised model with an ambitious vision to 'create a school which changes the educational landscape and influences global educational thinking' (Lindfield Learning Village, n.d). Features of the educational model include 'stage not age' learning, which is supported by evidence about the wide distribution of ability in classes (Masters, 2021). It also includes flexible timetables, transdisciplinary learning, and fostering collaboration, creativity, empathy and resilience. Importantly, LLV's Strategic Improvement Plan includes improvement measures for literacy and numeracy, and also fostering an adaptive culture of optimism and improvement (Lindfield Learning Village, n.d.).

Key to the success of these schools is focusing on what matters. EDPS staff consistently describe a shift to focusing on learning (Russell, 2020). Further, some researchers have argued that doing fewer things and doing them well and 'de-implementing' – that is, discontinuing – the initiatives or programs that no longer meet the needs of schools and students is one solution to reduce workload, cost and time pressures (Wang et al., 2018; DeWitt, 2022). School leaders occupy an influential position when leading playful learning at school. Both schools described are led by dedicated,

knowledgeable, skilled and experienced principals. School leaders can positively influence student learning, instructional quality, staff retention and job satisfaction, and school culture (Grissom et al., 2021).

School leaders can cultivate a culture of high-quality learning through play within their school communities by fostering a shared language and focusing on what matters.

Systems can support playful teaching and learning

System transformation to enhance playful teaching and learning for 21st-century learning is based on alignment of purpose, pedagogy and position (Sengeh & Winthrop, 2022). Systems can provide aligned and targeted support to schools and teachers to meet their strategic goals to foster inquiry-based learning, as was the case for EDPS. As a participating school in the Education Department's Refocus Teaching and Learning Initiative, Tasmania, EDPS was supported to strengthen early years pedagogical practice in accordance with the Tasmanian Education Act. Experienced coaches worked alongside teachers to foster a culture of play and inquiry, with associated targets and measures (Russell, 2020).

Education systems have an important role to play in promoting curricula that prioritise a breadth of skills over narrow conceptualisations of learning. They can create policy and frameworks that articulate how, where, why and when holistic skills development is prioritised at school. They can actively support deep learning, take a developmental view of learning, and provide guidance on ways to implement and measure the impact of playful approaches to teaching and learning.

Systems and researchers can support schools and teachers with empirical evidence and frameworks that describe how to implement and measure learning-through-play outcomes, experiences, facilitation and design, which can be adapted to their setting.

Recommendations

We maintain that playful approaches can be integrated into and complement current teaching practices to an extent appropriate for the setting, which will enhance holistic learning. We recommend:

1. Children's holistic skills development in the classroom is prioritised, and fostered in ways that are meaningful and enjoyable to them. Further, useful and relevant evidence is gathered in appropriate ways about the impact of learning through play on holistic skills, namely, cognitive, social-emotional, creative and physical skills.
2. Systems strive to prioritise children's voices and preferences to learn through play at school for longer, promoting improved social-emotional learning and mental health and wellbeing, and enjoyment of school.
3. Teachers participate in decisions about pedagogic practice. Professional learning should be characterised by collaboration, not control, and used to 'improve practice and drive change rather than to standardise practice (Sachs, 2016)' (Appel, 2020).
4. Schools and systems work towards increasing teachers' autonomy over their professional development goals (Wiliam, 2016), with a focus on empowering teachers to effectively integrate playful pedagogies to improve student learning.
5. Systems and schools empower and equip teachers to foster a culture, language and practice of differentiated teaching and learning to respond to individual learning needs by balancing instruction with guidance and open-ended inquiry (Parker et al., 2022).

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Navigating the nexus between health and education: Can we bring early children's development and learning together?

Professor Sally Brinkman
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Sally Brinkman is the Professor of Human Development, Education Futures at the University of South Australia. Her research aims to improve the healthy development and early learning of young children, with a focus on those living in highly disadvantaged communities. Her research is conducted across Australia, as well as countries in Asia, the Pacific, Latin America and the Emirates. Sally works in close partnership with international governments and donor organisations, such as the World Bank, UNICEF and UNESCO. Sally's expertise includes population monitoring to determine the prevalence, distribution and magnitude of inequality in child outcomes and pragmatic randomised control trials to evaluate the impact and cost effectiveness of interventions. Brinkman's research has had significant global and local impact and is highly relevant for the disciplines of early education, community development and development economics. Sally regularly advises government and sits on numerous Expert Advisory Groups informing policy and practice. With her track record in achieving highly translatable research, Sally is well recognised nationally and internationally in both academic and policy environments.

Abstract

Early childhood development is important to many different disciplines; however two dominate: early childhood education and health. Each domain adopts distinct approaches when it comes to supporting early childhood development, and while both have their merits, combining them can present challenges, especially when it comes to measurement. This presentation examines the differences in approach between the two, highlighting their respective pros and cons, as well as the difficulties that may arise when attempting to integrate these fields in support of children and families. Bringing together the fields can be complex, especially when it comes to the thorny debates around measurement. Challenges emerge due to differences in philosophy, language, professional training and priorities. Alignment of goals, collaboration and effective communication are crucial in bridging these fields. Overcoming these challenges requires a comprehensive and coordinated approach that recognises the interconnectedness of education and health in early childhood development, while understanding that different aspects of measurement all have their place, if used as intended. This involves creating shared spaces for collaboration, promoting cross-training and professional development opportunities, and implementing integrated policies and programs that prioritise holistic developmental outcomes. The recent policy advances towards universal 3-year-old preschool offers unique opportunities to fostering collaboration, promoting a multidisciplinary approach, and addressing systemic barriers. The presentation will aim to prompt the audience to reflect on their own attitudes and practices, with an aim to create deeper understandings and an openness to a more cohesive and comprehensive system of support for children and families, ensuring optimal early childhood development outcomes.

KEYNOTE

Contributing to continuity: Supporting children to progress in their learning across our education system

Dr Jenny Donovan
Australian Education Research Organisation

Dr Jenny Donovan is the CEO of the Australian Education Research Organisation. Prior to this role, she established and led the Centre for Education Statistics and Evaluation as Executive Director for 8 years. Jenny began her career as a high school teacher in Sydney's western suburbs. She has worked in a number of education roles in operational and policy areas, including some years as Deputy Director of a not-for-profit education assessment agency at the University of New South Wales. Jenny was Managing Director of the National Learning Progressions and Online Formative Assessment Initiative, a national priority project for Australian education ministers.

Abstract

This presentation will discuss the connections between learning continuity and educational outcomes. It will explore ways to more effectively support children's learning progression during their early experiences of moving through different stages of education. Jenny will share evidence-based solutions for removing obstacles and improving continuity in learning that can be used by policymakers, service and school leaders, and educators and teachers.

KEYNOTE

Ensuring a safety net: Supporting low achievers in school contexts

Professor Anne Castles
Australian Catholic University

Anne Castles is an ARC Laureate Professor at the Australian Centre for the Advancement of Literacy at the Australian Catholic University. Anne's research focuses on learning to read and reading disorders. She has a particular interest in variability within the reading-impaired population, and in the causes of different types of reading disorders, including genetic, cognitive and language factors. Anne is a Fellow of the Academy of Social Sciences in Australia and serves on the editorial boards of several journals. She served as President of Learning Difficulties Australia in 2017–18.

Abstract

An ongoing challenge in schools is the early identification of children who are struggling to learn to read, while at the same time not overtesting children who are progressing normally. In this talk, I will use a cognitive model of reading to provide a roadmap for teachers. This provides a safety net for struggling readers and guidelines for a detailed, evidence-based evaluation of their difficulties, while also ensuring that initial screens are not onerous in the broader classroom context.

Community-driven, technology-assisted support for Erub Mer language and early literacy in the Torres Strait: Practice and policy

Sarah Groom and Lala Gutchen
Australian Literacy and Numeracy Foundation

Sarah Groom is an Early Language and Literacy Trainer with the Australian Literacy and Numeracy Foundation (ALNF). Sarah teaches ALNF's Certificate IV in Early Language and Literacy, and oversees the rollout of the ELLDI – a world-first formative assessment for early language and literacy development in the early childhood and early primary years. As a Research Assistant with ALNF, Sarah is passionate about evidence-based programs that take a whole-community approach to children's growth.

Lala Gutchen is of the Meuram tribe from Erub (Darnley) Island, Torres Strait. She is the First Language Programs Facilitator for the Erubmer Language Living First Language project for the Australian Literacy and Numeracy Foundation. Lala is a strong advocate for the revival of her Erubam Buaigiz (Erub People's) first language in her community. She has dedicated her time in delivering language and culture classes at Tagai State College for many years. She also teaches language through digital platforms for Erubam Buaigiz living away from Country. In 2019 she was awarded a Young Champion by First Languages Australia at the Queensland Aboriginal and Torres Strait Islander Languages Forum in Cairns, and Lala regular attends First Nations Language symposiums and Language leadership workshops across the country. In addition to her strong Language advocacy, Lala is a persistent advocate for climate change impacts on her people, Land, and Sea Country and her rights to practise Culture and Language.

Abstract

The United Nations Declaration on the Rights of Indigenous Peoples states that 'Indigenous people have the right to revitalise, use, develop and transmit to future generations their histories, languages, oral traditions, philosophies, writing systems and literatures.' It is also well documented that language and identity are intrinsically linked, and that communities implementing bilingual education programs have reported improvements in wellbeing factors as well as in engagement and learning (Calma & Fillmore, 2020). This paper will focus on the efforts of the Erub community (Darnley Island, Torres Strait) to foster language and literacy teaching and learning in the Erub Mer language. This case study of community-driven development and implementation of First Language resources and teaching with learners of all ages includes a key focus on supporting the intergenerational transmission of Erub Mer for the benefit of children's development. It will examine how the development of a digital language resource, a mobile early literacy game, a draft grammar guide and teaching practices have encouraged engagement with Erub Mer throughout the whole community (within preschool, school, home and community contexts) to the benefit of children. The paper will update previously published work (Fillmore et al., 2019); reflect on resource development and implementation since that time; examine the enabling factors that have assisted the community; any barriers/obstacles; and the direct and indirect outcomes for children and their families; and place this work with the framework of the recent Queensland Indigenous Cultural and Intellectual Property Protocol for the teaching of Aboriginal languages and Torres Strait Islander languages (2022). This case study presents an exemplar of the many circumstances where English is not children's home language, and how formative assessments can shine a light on early language and literacy growth in the early years for such children, in preparation for schooling in English.

Focus on strengthening transitions using the Early Years Assessment and Learning Tool

Pippa Procter
Victorian Government

Pippa Procter has had a range of roles related to education and early childhood strategic policy development and implementation. She has worked at the executive level in ministerial offices and in 2 local government authorities in the United Kingdom and as an early childhood educator in 3- and 4-year-old kindergarten in long-daycare settings. Currently, Pippa is the Executive Director, Early Learning Practice and Participation for the Victorian Government, which supports the learning and development outcomes of Victoria's young children in government-funded early learning programs. Pippa has a strong commitment to working in the public sector in order to improve the educational outcomes for all children and young people in Victoria.

Abstract

Assessment of children's knowledge, understandings, skills and capabilities is an essential ingredient of planning for, and promoting, new learning and development. This is particularly true at points of key transition. Assessment tools must support educators to differentiate their practice for children's learning needs, and to tailor and implement effective teaching strategies. At points of transition, consideration of assessment and how it supports teaching and a child's continuity of learning has been an important element of this work. Victoria has a strong history of driving connections between early childhood and school professionals to effectively support continuity of learning. As part of this process, a Transition Learning and Development Statement that summarises their abilities and effective pedagogical strategies that support that child's learning is shared, and can be crucial for helping primary school teachers to develop and incorporate diverse classroom teaching and learning strategies. In 2023, Victoria commenced the rollout of an Early Years Assessment and Learning Tool (the Tool) to enhance assessment practice in line with the Victorian Early Years Learning and Development Framework (VEYLDF), which supports all professionals who work with children aged 0 to 8. With many kindergarten services gaining access to the Tool from Term 1 2023, teaching teams are being supported to make consistent observations and assessments of children's learning, with one of the key outcomes being to support information sharing between kindergartens and schools. In this presentation, we will explore what is being learnt about the role of information sharing in transition and how the Tool is helping to support children's continuity of learning.

It’s more than words: Supporting young children’s language development

Professor Louise Paatsch
Deakin University

Professor Louise Paatsch is the Deputy Director of Research for Educational Impact strategic research centre at Deakin University. Her background is in oral language development, play and deaf education in early childhood and primary school education. Louise’s research uses mixed methods approaches, including video methodology, to investigate oral language, play and literacy development, as well as teacher talk during intentional oral language teaching, teacher professional learning, and teacher as researcher. Louise also researches pragmatic skill development of children and young people with hearing loss who use spoken language and their hearing peers. Louise has published in many peer-reviewed journals, book chapters and books, and presented at national and international conferences. She has also presented workshops on oral language and pragmatic skill development to teachers, teachers of the deaf, and allied health professionals.

Abstract

The early years of a child’s life are recognised as a critical time for language development. Strong language skills are acquired within rich social environments and are linked to children’s pretend play abilities, literacy development, social skills and theory of mind, and are essential for educational success throughout life. However, research has shown that many young children are entering school with low levels of oral language, which suggests that these children will also experience difficulties with reading comprehension, interacting with peers and making friends, taking turns in conversations, and taking the perspective of others. The role of early years teachers and educators in supporting young children’s oral language abilities is of paramount importance, and even more so since COVID-19 lockdowns where opportunities for children to use language in social contexts were reduced. The Early Years Learning Framework for Australia V2.0 recognises the significance of fostering children’s language, particularly across the 5 learning outcomes and more explicitly in Learning Outcome 5: Children are Effective Communicators. However, it is assumed that early childhood educators and teachers have a strong understanding of language and the link to other learning areas, as well as the ways to assess children’s language use, and the practices that foster all aspects of children’s language. This presentation will outline the components of language and highlight the relationship between the social use of language (pragmatics) and other areas of development. Findings from 3 recent research studies that investigated children’s language and play abilities at school entry; teachers’ talk in supporting children’s language; and the Supporting Oral Language Development (SOLD) professional learning program will also be presented.

Science in the early years: Evidence-based educator resources

Gayl O'Connor
Australian Council for Educational Research

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Gayl O'Connor is a Senior Research Fellow at the Australian Council for Educational Research where she works within the Assessment and Development Division. She has worked on national and international science assessments and curriculum projects and has special interests in supporting the development of inquiry skills, and in the application of digital learning tools for science assessment. Recently, she has contributed to PISA 2025 instrument development for the science domain and to the design of tasks for the innovative domain, Learning in the Digital World, in which students learn to use online tools and apply these to a challenge task. Gayl has conducted item writing and curriculum resource development training workshops for teachers in Australia, Indonesia and Malaysia. Gayl has a background in secondary science teaching, specialising in biology.

Abstract

The *Science in the early years* series was developed to assist preschool and Foundation to year 2 primary educators to incorporate the latest research in science learning into their programs and teaching practice. This paper focuses on the educator resources developed to support early years educators implement activities to assist children to develop science concepts and inquiry skills. The activities are underpinned by evidence-based research that revealed 4 themes in the early years' science literature.

Introduction

Science in the early years (Australian Council for Educational Research [ACER], 2020) is an online series of 4 research papers and 7 associated educator resources. This series provides preschool and early years primary school educators with insights drawn from current research in science learning and monitoring in the early years, and examples of how this research can be incorporated into their programs and teaching practice.

Four themes emerged from a literature review, with each theme providing the focus of a research paper. Educator resources were developed for the themes where it would be most useful in supporting practice based on the research evidence.

This paper describes the key research evidence that underpins the activities in the educator resources in the suite, and their design.

Themes

Paper 1 'Early years science and integration' focuses on the importance and value of science in the early years, how teaching science is supported by the Early Years Learning Framework (EYLF) and the Australian Curriculum Science: Foundation to Year 2 (AC Science F–2), and the value of integrating science in the early years into existing programs to foster science learning. The educator

resources support educators and children to recognise the elements of science in simple, everyday activities used in early years settings.

Paper 2 'Science inquiry skills' focuses on the importance and value of providing learning experiences that support the development of science inquiry skills (SIS) in the early years, as these are integral aspects of both the EYLF and the AC Science F–2. Incorporating science contexts and content in the early years within an inquiry-based approach is emphasised. The educator resources support children to conduct investigations into aspects of the world around them.

Paper 3 'Monitoring children's learning' focuses on the importance and value of monitoring young children's science learning. The educator resources use concept cartoons as monitoring tools, and checklists customised to the EYLF and the AC Science F–2 outcomes.

Paper 4 'Educator facilitation' focuses on the key role of educators in facilitating young children's science learning. It describes strategies found to be effective for facilitating science learning, and practices that support confidence-building for early years educators to incorporate science in their early years' programs. Educator resources were not needed to support this theme.

Educator resources

There are 4 main activities supported by concept cartoons and checklists. The 'Plant treasure hunt' and 'Floating and sinking' activities accompany Paper 1. The treasure hunt is an activity that encourages children to explore ideas about plants in an outdoor environment. They build on their understanding of what a plant is by drawing one, and then go outdoors on a 'treasure hunt' to find examples of plants. 'Floating and sinking' explores the scientific concepts behind floating and sinking. Children complete an activity in small groups to find out whether a range of objects float or sink.

'Exploring mixtures' and 'Light and shadows' accompany Paper 2. The 'Exploring mixtures' activity investigates the behaviour of 2 common household products (oil and water), with the emphasis on supporting children to develop their inquiry skills to describe what they observe when trying to mix these liquids. The activity 'Light and shadows' focuses on observing and explaining (for older children) how shadows form.

'Concept cartoons as monitoring tools' and 'Checklists for EYLF and for AC Science Foundation – Year 2' accompany Paper 3. There are 4 concept cartoons, each customised to one of the activities in the educator resources for Paper 1 and Paper 2. Each concept cartoon provides a monitoring tool for finding out how children's understandings about science concepts are developing. The cartoons provide a simple narrative in which 2 or more characters provide commentary or opinions about a phenomenon.

Checklists provide templates tailored to either the EYLF or AC Science F–2 learning outcomes. The checklists record evidence of children's science learning and monitor this over time. The checklists are customised for the educator resources 'Plant treasure hunt', 'Floating and sinking', 'Exploring mixtures' and 'Light and shadows', but can also be repurposed for educator-created resources.

Evidence base for development of activities

Plant treasure hunt

The Plant treasure hunt activity provides an opportunity for children to explore their immediate natural environment, linking science understanding back to the child's world in a relatable, everyday context. As children are keen and inquisitive learners, activities such as this encourage children to

explore their environment, and also nurture their sense of curiosity about their surroundings (Milford & Tippett, 2015). Supporting and developing natural curiosity is an essential trait for a scientist and for a successful science learner (Conezio & French, 2002; Gallenstein, 2005).

This activity allows children to learn about different examples of plants other than flowers or plants that are grown in a pot. The term 'plant' is used by children to refer most often to flowering plants (Tunnicliffe, 2001). Drawings are a valuable and non-threatening way to identify children's understanding and misconceptions, such as the meaning of a plant, but it is important to discuss the drawing with the child, as the drawing might have a different meaning to the child than to the educator (Chang, 2012).

Floating and sinking

This activity supports children to work together in small groups to test a range of objects and to share their observations. Children use their senses to observe what happens when they drop solid objects into a bucket of water. They sort the objects into two groups: the ones that sink to the bottom of the bucket and the ones that float.

The activity also assists children to become confident and involved learners, using persistence in finding those objects that float. When children are allowed to study the phenomenon of floating and sinking in a playful and creative manner, they develop a positive experience of the concept of density that can be built on later (Andersson & Gullberg, 2014).

Exploring mixtures

In this activity, children work in small groups, and are provided with guidance to predict what might happen when trying to mix two liquids. They use inquiry skills to observe what happens, check back to their prediction, and record what they have found out. Children can share what they did and what they observed with other groups of children. Communication is an important part of the scientific process (Conezio & French, 2002; Gallenstein, 2005) and young learners should practise these skills.

Light and shadows

In this activity, children work in small groups to create and explore the requirements for making shadows. Using toys that will block out the light and a torch, they use inquiry skills to make predictions about when a shadow will form, what shape it will have, and how large it will be. They then check their ideas by placing a torch and an object in different positions. Children record their observations and describe what they observed to others. Children can begin to explain behaviour, such as objects must be positioned to block light from a light source to create shadows (Delserieys et al., 2014).

Activity design

Educators play a key role in facilitating young children's science learning. Educators can guide young children so that their natural curiosity is also the beginning of the development of their science inquiry skills (Worth, 2010). The need for an educator to support and scaffold activities is important. For example, it was found that providing materials alone for children to play with independently in the context of mixtures, did not result in the formation of scientific concepts (Fleer, 2009). Science concepts and the development of inquiry skills are interconnected so that by situating science learning within inquiry investigations that are supported by educators (as illustrated by the 4 activities described), overall science understanding is developed (Lind, 1998). Opportunities for young learners to use their senses to demonstrate they are capable of making relevant and creative observations should be provided (Johnston, 2009).

Early years educators do not need to be a 'fount of all knowledge' about science, but instead they can be facilitators who help children make connections and develop their understandings. Educators and children can 'find out together' if necessary (Tu, 2006).

To assist educators to facilitate the 4 activities, the resources are designed using a consistent structure. Each activity includes an activity description, links (mapping) to the EYLF and AC Science F–2 outcomes, and explanations about the concepts to support educators unfamiliar with them. For example, in 'Exploring mixtures', the reason oil floats on water is provided, the action of an emulsifier is described, and 3 types of mixtures are outlined: solutions, suspensions and colloids.

Each scaffolded activity has 4 sections:

- What to provide? (a list of materials required)
- What to do? (step-by-step scaffolding including responses to look for)
- What to record? (suggestions for noting the key ideas and understandings demonstrated by the children
- What comes next? (suggestions for extending the activity to provide further learning opportunities).

The learning intentions of the activity and suggested success criteria are also provided to assist in monitoring children's learning.

The *Science in the early years* series is available for free download from the ACER research repository. Feedback from educators implementing the resources is welcome, and can be emailed to gayl.oconnor@acer.org

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Bringing learning progressions down to 2-year-olds in reading and mathematics

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Prue Anderson is a Principal Research Fellow at the Australian Council for Educational Research. Prue has worked on humanities-based assessments and large-scale international projects. In the last 10 years she has focused on early years' literacy including developing assessments, curricula and teaching materials. Prue was a key author in the development of the ACER Learning Progressions for reading, listening comprehension, sounds and symbols and oral language. These are globally applicable descriptions of how literacy skills develop across these domains. She recently worked with the Queensland Education Department to help develop Kindergarten learning progressions in language, mathematics, executive function, social and emotional skills, and physicality. She has also helped refine the Global Proficiency Framework and led the development of reading text complexity samples and reading item examples from grades 2–9. Prue has a background in lower primary teaching and in teaching undergraduate primary teachers.

Abstract

ACER's learning progressions in reading and mathematics describe growth that is mainly focused on the skills students demonstrate at and beyond school. These progressions have recently been extended down to describe earlier levels of growth so we now have seamless progressions from skills and understandings toddlers might demonstrate up to highly sophisticated skills and concepts. This presentation briefly outlines ACER's work and identifies key implications for educators. The pathways that support early reading development were described in progressions for listening comprehension, and sounds and letters. Along with an early mathematics progression, these were conceptualised as embedded in an oral language progression. Educators need to understand what early growth in reading and mathematics looks like in order to foster key skills and concepts at an appropriate level for the child. This ensures a strong foundation for children to make good ongoing progress.

Background

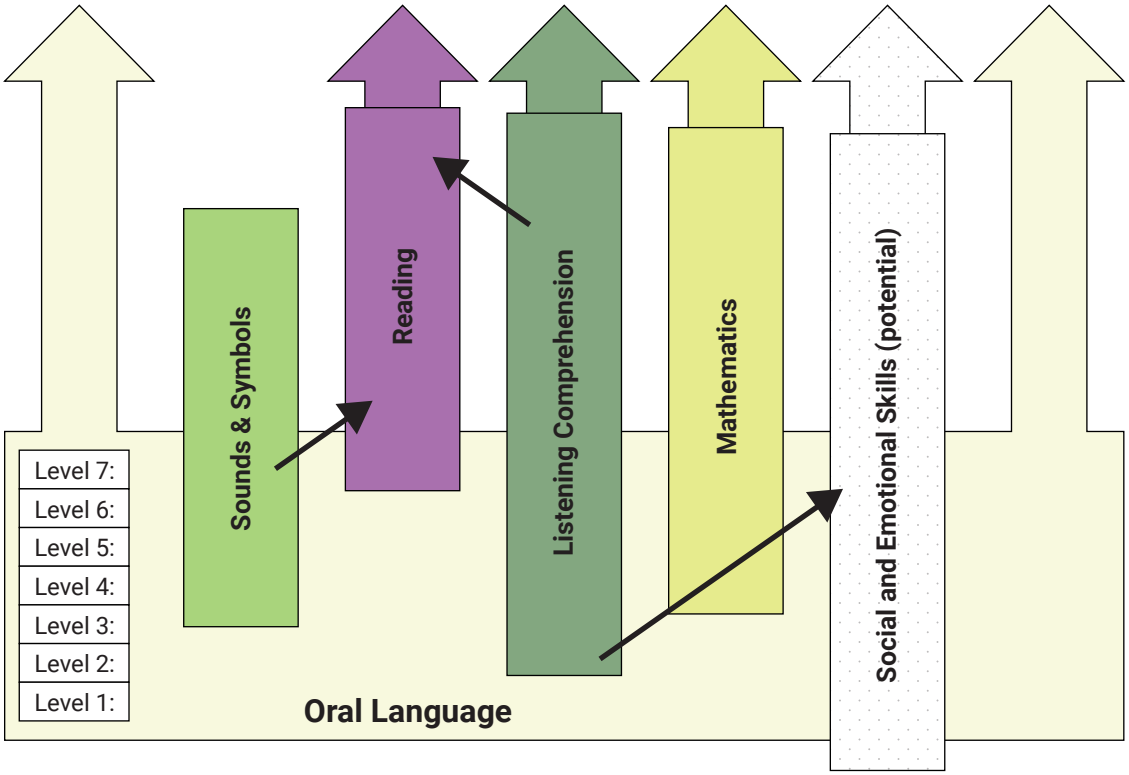
ACER has developed learning progressions (LPs) in reading and mathematics that describe the progressive development of key skills and concepts in these domains across the years of school and beyond. LPs support educators to focus on core skills, interpret their observations of what children can do in the context of a broad understanding of where this observation fits in a learning progression, identify what other skills the child also needs to master before they are ready to progress, and identify what is the most appropriate next step in learning. In recent months we have been focused on extending the ACER LPs downwards to describe developmentally appropriate, conceptually sound, age-appropriate skills and understandings young children can be supported to learn. It is not about starting the school curriculum sooner, rather the lower levels show how to prepare a sound foundation for ongoing cognitive growth. They also show that there is a continuous progression of development in these domains rather than a hiatus between preschool and school.

Oral language

Oral language is foundational

There is extensive research evidence of the critical role of oral language in underpinning early cognitive development. To describe the lower levels of the LPs, we have conceptualised the starting points of the Reading and Mathematics LPs as embedded in an Oral Language LP. This is shown in Figure 1.

Figure 1 ACER LPs embedded in oral language with potential location of a social and emotional skills LP



At the lower levels, where the LPs sit within the Oral Language LP, we have differentiated the development of domain-general oral language skills and domain-specific language and concepts. The main distinction concerns conceptual understanding, which often underpins domain-specific language. Some vocabulary may be commonly used in the child's everyday contexts making it domain general, but it may also have a domain-specific meaning that children can learn. For example, in mathematical spatial language 'on' has a very specific meaning referring to relative position where one object is in contact with and supported by another object, whereas in everyday contexts 'putting your shoes on' means covering most of the foot with a shoe including the soles of the shoes being under your feet. Similarly, 'turning the lights on' means flicking a switch, and 'go on' is an encouragement to try or continue an action. Domain-specific language development is primarily focused on using language to build deep understanding of domain-related concepts with children who also need to understand any differences in domain-general use of the same vocabulary.

In the process of describing lower levels of the Reading LP, we found it necessary to split off Listening Comprehension, and Sounds and Symbols as separate LPs serving as pathways to reading. This is because children's skills in listening comprehension and their understanding of sounds and symbols do not necessarily develop in parallel. Figure 1 also illustrates the potential

placement of a social and emotional skills LP and its close relationship with oral language and listening comprehension, shown with a dotted fill. Social and emotional skill development begins before children can speak as they learn to smile in response to others and to share a common gaze. A Writing LP, currently being drafted, can be added, as this too is embedded in oral language and influenced by skills developed in Sounds and Symbols and Listening Comprehension.

Oral Language LP

The Oral Language LP describe domain-general language skills up to level 7. Level 1 starts with babies' first attempts to vocalise, moving from imitation of sounds and responses to words as they start to talk and understand speech. By level 4, young children can generally make themselves understood and show understanding of most words heard in everyday contexts. At this point they can also begin to develop age-appropriate, domain-specific language and concepts that are described in the lowest levels of some of the respective LPs (embedded in the domain-general Oral Language LP). For example, children who listen to stories learn that print remains constant, and start to learn how to process and understand very simple stories long before they are ready to learn to read themselves. Not all LPs are aligned with level 4 of the Oral Language LP as the starting point; some, such as Reading, require higher levels of general oral language skill.

We recognise that domain-general oral language skills continue to develop but have described this up to level 7 only. This level describes skills a proficient language user might demonstrate at the start of school. We described up to this level only for the purposes of highlighting the general language skills young children also need to support learning domain-specific language skills and concepts before they start school.

Development across the domain-specific skills is not necessarily concurrent. A child may show minimal development in one domain and extensive skill development in another. However, any development is contingent on the child being given opportunities to learn and develop both domain-general and specific language skills and concepts. Children need good language models. They need to interact with more competent language users who also have a clear understanding of what progress looks like and how best to support them to improve.

Why oral language matters

Oral language is pivotal in the early development of literacy and mathematics, and there is a strong reciprocal relationship between the development of oral language and the development of social and emotional skills and executive function. There is also evidence of the reciprocity of executive function skills, and early literacy and mathematical skill development in preschool settings (Fuchs et al., 2010; Welsh et al., 2010) that mirrors evidence of this relationship with primary children (Blair et al., 2015; Kieffer et al., 2013).

Oral language has been described as the 'substrate for literacy' (Christensen, 2016; Snow 2021). The development of all aspects of literacy from speaking and listening through to reading and writing rely on the development of oral language. Low levels of oral language skill in preschool settings predict poor future reading comprehension outcomes (Catts et al., 2006; Elwér et al., 2015; Nation et al., 2010). The impact of early oral language skills on reading proficiency is initially indirect and only evident in the longer term (Castles et al., 2018; Dickenson et al., 2010). Many longitudinal studies have shown that oral language proficiency on school entry predicts later reading comprehension success (Hulme et al., 2015; Lervåg et al., 2017; Storch & Whitehurst, 2002; Walker et al., 1994). Recent research has also highlighted the interdependence of reading and mathematical development (Sarama et al., 2012), with strong relationships apparent as early as preschool and kindergarten (McClelland et al., 2007).

Early mathematical development is supported by language skills that enable children to represent and understand quantities as well as make comparisons of relative magnitude (Miura & Okamoto, 2003). Early parent 'number talk' involving informal conversations about numbers and quantities has a strong relation to children's later understanding of cardinal[1] values of number words (Levine et al., 2010; Mix, 2008; Mix et al., 2005). Knowledge of certain language terms specific to mathematics (for example, more and few) predicts mathematics development (Purpura & Logan, 2015). Counting and the application of simple computational skills (such as combining groups or removing part of a group) appear to correlate with phonological processing skills (Fuchs et al., 2010; Hecht et al., 2001), as both are related to the development of working memory and attention regulation (Moll et al., 2016).

Morgan's longitudinal study of a population-based sample of 8,650 children showed 24-month-old children with larger oral vocabularies displayed greater reading and mathematics achievement, increased behavioural self-regulation, and fewer externalising and internalising problems at kindergarten entry (Corredor et al., 2017; Morgan et al., 2015). There is much evidence of a strong bi-directional, or reciprocal, association between language, and social and emotional development (Morgan et al., 2015; Rojas & Abenavoli, 2021; Salmon et al., 2016; Vitiello & Williford, 2016). The promotion of expressive and receptive language through developing vocabulary, syntax, and early literacy and mathematical concepts also provides a foundation for the executive function skills of reasoning and reflecting on experiences (Blair, 2016).

Effective preschool educational programs and interventions must support comprehensive oral language development (Beitchman & Brownlie, 2010; Cohen, 2010; Morgan et al., 2015; Slot et al., 2020). Children need opportunities to interact with better language users to expand their vocabulary, understanding and use of different language structures (Hart & Risley, 1995; Morrow & Rand, 1991). Neuman (2004) found that children identified as early readers when entering school came from contexts filled with lively, interactive conversation. Preschool teachers and parents can actively develop students' language skills by modelling the use of more sophisticated vocabulary and complex syntax, and engaging them in talk about books as well as conversations about early mathematical concepts.

Lower-level skills in the LPs

The next section summarises the progressive development of some of the key skills and concepts described in the lower levels of the LPs illustrated in Figure 1. These level descriptions help educators working with preschool children to support comprehensive development of children's general and domain-specific oral language.

Early literacy language skills

The Listening Comprehension LP focuses on the development of language skills that allow children to listen to, understand and talk about the ideas in age-appropriate children's stories that are read to them. This starts with simple responses to very simple texts slowly building up to discussing extended texts with more complex language structures, implied ideas and a wide vocabulary. These skills need to be learnt. Written texts are not the same as everyday conversations. Children have to learn how to interpret ideas, make inferences and follow narrative structures in well-crafted, good-quality texts. They also need broad, rich background knowledge to support their understanding. Good-quality children's literature exposes children to more complex sentence constructions and

1 Cardinality means recognising that the final count represents the total number in a collection. Children who have not yet mastered cardinality learn to stop at the final number but they do not trust the count and will recount the same collection repeatedly. Mastering cardinality assumes children already have one-to-one correspondence and stable order in their counting.

syntax and a wider range of vocabulary than an everyday conversation, as well as expanding their general knowledge well beyond the everyday. Developing young children's listening comprehension skills well before they can read for themselves enriches their language proficiency and establishes skills they will need to understand texts once they have mastered decoding.

The lower levels of the Sounds and Symbols LP describe simple concepts of print and the early development of phonological awareness. Phonological awareness, which refers to a conscious awareness of the sounds within words, can be developed in preschool children. Caregivers who sing songs or read stories and rhymes that include extensive alliteration can explicitly draw children's attention to the first sounds in words. Singing or reading rhyming verse to children provides opportunities to draw children's attention to end sounds of words. Creating an awareness of sounds in words also enhances children's pronunciation and articulation, which need to be accurate to support the development of phonemic awareness. Children need to be able to hear the difference in the sounds of the 44 phonemes in English in spoken words, as a foundation for learning to read.

The Sounds and Symbols LP also describes the initial development of concepts of print. Reading books to children reinforces simple concepts about print such as its constancy and the way books are organised. Children who grow up in environments where people write labels, lists, notes and text messages, and draw children's attention to what they are doing, as well as pointing out writing in the books they read aloud, show children how writing can be used to express meaning. As children develop phonological and then phonemic awareness and start to become aware of the relationship between the sounds in spoken words and the symbols used to represent them in writing, they are ready to start learning the names and sounds of letters that interest them, and writing some words, ensuring this is now a meaningful activity rather than rote learning.

Early mathematical and scientific language skills

The lower levels of the Mathematics LP describe domain-specific mathematical and scientific language skills and concepts that preschool children can develop in play-based contexts that build on their interests. Children can be encouraged to engage with their world by asking questions, posing problems, making predictions and looking for answers. These questions are the beginnings of mathematical and scientific explorations.

Understanding and using common positional language such as 'up, down, inside and outside' begin in the lowest levels of the LP as children communicate where they want to be. Expanding this language increases children's awareness of, and ability to accurately describe, positions in space including relative positions. At the lowest levels, children notice obvious differences in size. They are small compared with big adults. Expanding and refining their language about size supports children to differentiate aspects of size such as when things are tall or short, fat or thin, far away or close. They begin to learn comparative language that supports the development of an understanding of measurement, initially of length and mass. Children identify which object is longer or shorter, and which is the longest. They can also learn that length does not have to be straight or lying along the ground. They recognise when things are heavy or light: what they can carry and what they cannot even lift, and that small things are sometimes heavier than big things. They also start to observe and describe when containers, such as their cup, are full or empty. They move on to starting to recognise which shape of container is bigger and holds more. This language gradually builds a sound understanding of the concept of volume as they start to understand the difference between comparing the length of objects and how much they hold. Placing flat covers of different sizes over things, such as a cloth on a table or a mat on the floor, and discussing if some, or all, of the table or floor is covered helps to develop an early understanding of the concept of area and how this differs from length. With support, children can learn to use the language of comparison with increasing understanding of the property they are comparing.

The progression in children's conceptual understanding of counting is also described across the lower levels of the Mathematics LP. Learning how to quantify objects is often driven by an early interest in how many things a child has, or is given, and how this compares with what others have. Children quickly learn the counting song, reciting numbers up to 5 or 10. They need to know this sequence but it is rote learning and needs to be accompanied by a great deal of supported practice counting small collections of objects before they really start to understand the concept of quantity and what the count signifies. Children who are encouraged and supported to count quantities, gradually come to understand that 3 is one more than 2, adding one more to 3 makes 4, and adding 2 more makes 5. They slowly start to understand what small numbers mean before progressing to understanding larger numbers, building on a conceptually sound base so that numbers are meaningful.

Young children can learn to look carefully, observe differences and make comparisons that are initially obvious and gradually become more nuanced and discriminating. Having the language to describe the shape and texture of objects heightens awareness and encourages more detailed observations. Are objects round, square, star-shaped, squeaky, soft, hard, flat, smooth, rough, shiny, wet or dry? What are they made of? How do they feel? Which ones are bigger? Can they be rolled, pushed, squashed, slid or lifted, and do they float or not? Children can also be made aware of familiar repeating patterns starting with something simple like the order of a few daily activities and then being supported and encouraged to find other kinds of patterns. These language skills provide the foundation for mathematical and scientific skills and understandings.

Early social and emotional language skills

Everyday oral language communications require simple language skills and understanding of the pragmatics of familiar interactions to participate in and understand how to manage the social and emotional aspects of communication. This progression is described in the initial levels of the domain-general Oral Language LP.

ACER does not yet have an LP for social and emotional skills. Potential domain-specific content is briefly outlined here because there is extensive research evidence of a strong reciprocal relationship between early language skills, social and emotional development, and literacy and mathematics. Domain-specific social and emotional language skills refer to the more nuanced understanding of emotional states and social interactions that young children can start to develop if provided with appropriate modelling, support and encouragement. As children start to develop a wider vocabulary to describe different emotional states their awareness of these states is raised. Greater sensitivity to differences between emotional states and the signs that might indicate these states is promoted. With support, children can also become more skilled in using simple clues, such as tone of voice, to infer the meaning being communicated as well as recognising the importance of checking meaning. Stories can provide opportunities to talk about how characters communicate. Children can be supported to recognise and talk about simple strategies that might be used to facilitate social interactions using their own words. Children can also start to learn about some of the more obvious strategies and pragmatics of social interactions that they do not typically participate in, but might hear about in stories or see on video. These experiences build children's social and emotional language skills and their social and emotional literacy.

Conclusion

Preschool children who are provided with appropriate opportunities and support in play-based contexts, can enrich their general language skills and start to develop domain-specific language skills and conceptual understanding that will provide a sound foundation for their future learning.

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Mathematical mindsets: Fostering student engagement and positive mindsets through the use of challenging tasks

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This paper will be presented by Greta Rollo from ACER on behalf of Alison Hall.

Abstract

This paper explores the planned use of challenging mathematical tasks. These tasks provide the opportunity for students to improve mathematical thinking by working on problems that they do not yet know how to answer. This research involved a heterogeneous class of year 3 students from a Catholic parish primary school in the northern suburbs of Melbourne. A rubric was also developed to use in conjunction with these tasks, to support discussions with students, broaden their strategies in finding solutions and thereby improve their conceptual understanding. These pedagogical approaches were found to support the improvement of both students' conceptual understanding in mathematics and teachers' reflective practice.

Introduction

This paper examines action research that tested a rubric as a method of identifying different levels of thinking by students working on challenging mathematical tasks. The research explored ways of using challenging tasks to increase the sophistication of students' mathematical strategies and explanations. The study aimed to answer the question: 'To what extent can rubrics be used to support teachers' use of challenging tasks to broaden the sophistication of students' mathematical concepts?'

This study involved the development and use of a rubric as an instrument to support teachers, students and other stakeholders in knowing where students are in their mathematical learning and 'where to next'. The use of rubrics may allow teachers to infer gaps between a student's existing learning and the learning objectives. Francisco and Maher (2011) find that observations made by teachers helps them realise the value of providing students with opportunities to explore ideas and make decisions about their own mathematical reasoning and its development. Teachers need to know how to assess student's reasoning, in addition to assessing mathematical skills, but they must be deliberate in the choice of tasks that ask students to apply both reasoning and mathematical skills.

Research evidence supports the use of challenging tasks in developing students' mathematical reasoning skills. Clark and Clark (2002) recognise 4 qualities that characterise such tasks: they must enable students to produce different solutions; use different strategies; offer diverse final presentations; and fully engage students. Boaler (2019) argues that number sense, which is fundamentally important for students to learn, includes the learning of mathematical facts along with a deep understanding of numbers and the ways they relate to each other. Cheeseman et al. (2013) reflect on practices teachers use with these tasks and identify that students can engage with important mathematical ideas, be encouraged to explain their strategies, justify their thinking, and extend their knowledge in new ways.

Teachers must also consider a range of pedagogical factors when selecting challenging tasks. Kirschner et al. (2006) advocate for guided instruction being superior to minimal or even no guidance with challenging tasks. However, Marshall and Horton, (2011) alongside Russo and Hopkins (2017) agree that the value of exploring concepts, before any direct instruction, is in realising students' abilities to reason and think critically. Sullivan et al. (2012) also acknowledge the importance of matching tasks to curriculum content when selecting tasks. Cheeseman et al. (2016) discuss the importance of how a teacher introduces a task, including preparing students to have persistence, connecting the task with student experiences, providing manipulatives, and clarifying the task without showing how to reach the solution. This paper explores an approach aligned with the views of Russo and Hopkins.

Choosing tasks, structuring lessons around them and then incorporating them successfully into a thematic program of work requires careful thought. Teachers may need support in developing a classroom culture that supports this style of learning (Sullivan et al., 2013). Teachers can, therefore, be disinclined to use challenging tasks (Cheeseman et al., 2013) because they view them as unclear, too demanding or are concerned about low-attaining students. Clarke et al. (2014) highlight the significance of a teacher's interest in a task in influencing its success, as well as teacher confidence in the enthusiasm and ability of their students. Kirschner et al. (2006) suggest that minimising instruction may lead to misunderstandings or piecemeal knowledge, so a teacher's approach needs to be balanced against providing too much information to reduce the level of challenge within the task. Jacobs et al. (2014) notes the dangers of teachers taking over student thinking, controlling available tools and asking closed questions, and removing the agency of students in their learning and development of conceptual understanding. Simon (2017) argues that an understanding of mathematical concepts requires students to learn concepts through mathematical activities in the form of challenging tasks. Rather than students using a sequence of actions already available to them based on their prior knowledge, challenging mathematical tasks support students to build new knowledge. The current study looks at supporting teachers to give sufficient, but not excessive instruction, using an assessment rubric to provide appropriate, timely feedback to students that progresses their conceptual mathematical understanding.

The rubric developed for this study (see Appendix A) drew from Bloom's Taxonomy (Krathwohl, 2002) and Webb's Depth of Knowledge Framework (DoK) (1997). Webb suggests that 'challenge' in learning tasks promotes growth by keeping students engaged and his framework describes the quality of student thinking in various tasks. Krathwohl's update of Bloom's Taxonomy describes the cognitive level students demonstrate during learning, while the DoK focuses more on the context – in this case the challenging task. While Hess et al. (2009) identify some limitations with Bloom's Taxonomy, the current study incorporates both Bloom's and Webb's models into the rubric.

Project Design

Participants

The participants were members of a heterogeneous year 3 classroom in a Catholic parish primary school in the northern part of Melbourne. The researcher was the full-time teacher of the class. A preservice teacher was also working full time in the classroom at the time of the study and was involved in the data collection. There was no requirement for a selection process as a convenience sample was used.

Method and rationale

This study used an instrumental case study approach alongside action research. The action research aspect addressed the need to improve practices and the instrumental case study approach aligned with the observation of a situation. Such approaches provide teachers with opportunities to apply research methods to their teaching (Mills et al., 2010). They can also improve teachers' understanding of classroom practices and raise awareness of student learning that requires further investigation. Teachers can test approaches that may transfer well to similar classrooms (Yin, 2014) and integrate assessments generated by their own research into practice.

The current study used 2 tasks designed by Russo. These were Task 1, The Doughnut Tree task, which explores exponential doubling (Russo, 2006a); and Task 2, The Big (not so) Friendly Giant task, which explores halving (Russo, 2006b). Task 1 was chosen because the class had been working on multiplication using doubling. Russo (2016a) contends that students working in middle primary classrooms are expected to have developed fluency with their doubles facts and should be exploring doubling as a rule. He argues that students would benefit from exploring exponential doubling at a younger age. Task 2 was chosen to meet the needs of a diverse group of students, providing both accessibility and extension using enabling and extending prompts. Both tasks address the mathematically related skill of doubling and its inverse, halving, supporting students to link these 2 concepts. These tasks were conducted and data were collected from one class in term 3 of 2018.

Enabling prompts (see Appendix B) are an integral aspect of challenging task design as they reduce the level of challenge through simplifying the problem, changing how the problem is represented, helping the students connect the problem to prior learning and/or removing a step in the problem (Sullivan et al., 2006). Extending prompts can be used to engage students who finish the main task and may expose students to an additional task that is more challenging, but still requires them to use similar mathematical reasoning, conceptualisations and representations as the main task (Sullivan et al., 2006). The appropriate prompt is selected by the teacher in real time, developed from their analysis of the potential task difficulties based on perceived cognitive load.

Russo and Hopkins (2017), reflecting on cognitive load theory (Sweller, 1998), identify 7 steps to produce challenging mathematical tasks that aim to optimise the cognitive load for each student. These steps are: identify the primary learning objective, develop the task, look for possible other learning objectives, sort any objectives in line with their cognitive load, redesign the task, develop prompts to optimise the cognitive load and propose a lesson summary.

A launch, explore, discuss model (Stein et al., 2008) was used to deliver the lessons. This facilitated more explicit explanations and scaffolded connections, and highlighted big mathematical ideas. In the launch phase, the word 'challenging' was discussed with the students and the word was defined to engage the students in characterising an appropriate mindset. Appendix C provides examples of student's verbal responses. Each problem was introduced in a separate lesson, alongside available materials and recording expectations.

In the explore phase, students worked on the task individually or in pairs. Students were supported in solving the problem in whichever way suited them. Enabling prompts were offered and students had access to counters, number lines, 100 squares and notes about doubling and halving, and were able to ask clarifying questions. While students were working on the solutions, 3 main questions were asked: How would you describe the problem in your own words? Would it help to create a diagram, draw a picture or make a table? Could you try it with different numbers?

In the discuss phase, the teacher presented a summary of what had been observed, referring to specific strategies used by students, some of whom shared their thinking with the class. After looking at work from Task 1, it was noted that although students were solving the problem, their thinking was not clearly shown. Support to assist this was provided in the launch phase for Task 2. Appendix D provides examples of student verbal responses to questioning by the preservice teacher.

In response to observations and discussion with the preservice teacher, a follow-up lesson was proposed based on discussing ways of presenting strategies and solutions, answering questions with detail, revising, editing work and explaining mathematical reasoning. It was felt that the students required more explicit teaching. alongside detailed examples of possible ways of presenting their solutions and reasoning. The lesson was based on a simpler task 'What else belongs' (see Appendix E).

Student work

Student work was assessed against criteria from the rubric rather than being competitively ranked. This approach provides students with feedback regarding how to improve rather than how they compare with others. A process of moderation to provide inter-relater reliability was undertaken. Work was de-identified by the preservice teacher and shared between a team of 3: the researcher, the numeracy leader and the preservice teacher. Any work pieces with uncertain scoring were grouped for further consideration by another member of the team. If there was still uncertainty, the whole team would look at the work. For the purposes of moderation, each team member selected a sample piece for each level of thinking using the DoK stages, and these were compared. For this study, due to ethical requirements, no student work could be reported or presented.

Limitations of the data collection

Student work was collected at the end of each teaching session by the preservice teacher to maintain as much anonymity as possible. Apart from recognising some handwriting the researcher was not aware as to who had completed which work samples. According to Fraser (1997) the concept of a teacher as a researcher enables credible educational research to be undertaken, but the ethical predicaments faced could be more challenging than those met by an external researcher.

Data sources and analysis

The primary data for analysis were generated by scoring student performances using rubrics and was based on expert teacher evaluation of student responses and explanations of their thinking during challenging tasks and student work (artefacts). Artefacts were grouped in terms of similar approaches to the task. These were rated against the rubrics. Scores were then categorised according to the nature of the students' responses. The final analysis involved a final sample size of 15 students selected randomly from those who had completed both tasks.

The approaches used by students reflected varying degrees of sophistication in their application of mathematical strategies. Approaches included the use of drawings, number lines, repeated addition and subtraction, formal algorithms, partitioning numbers to make doubling/halving simple, as well as the direct use of multiplication and division. The use of drawings was the most common strategy followed by partitioning numbers. The use of number lines and repeated addition and subtraction occurred with equal frequency. The direct use of multiplication facts and division was rare in both tasks.

Analysis

Table 1 shows the types of thinking – Problem-solving, Reasoning, Representation and Connection – with a zone of proximal development (ZPD) (Vygotsky & Cole, n.d.) for each task. It appears that in Task 1, students had more problems with Representation whereas Connection was more of an issue in Task 2. Scores for 3 areas – Problem-solving, Reasoning and Representation – increased quite considerably, whereas the Connection score remained very similar. It appears this was an area with which many students struggled and where future explicit teaching needs to be focused. Problem-solving scores had the greatest increase. This could be attributed to greater familiarity with the type of tasks, students acting on discussions and feedback from the Task 1 and/or students finding Task 2 easier to solve.

Table 1 Conditional formatting of rubric elements for analysed work samples to create a ZPD

	Task 1 The Doughnut Tree				Task 2 The Big (not so) Friendly Giant			
	Problem-solving	Reasoning	Representation	Connection	Problem-solving	Reasoning	Representation	Connection
22	1	1	1	1	1	1	1	1
16	1	1	1	1	2	2	2	1
19	1	2	1	1	2	2	2	1
23	1	2	2	2	2	1	1	1
21	1	1	1	1	3	3	3	1
5	1	1	1	2	3	3	2	1
27	2	2	2	2	2	2	2	1
12	2	2	1	1	3	3	3	1
6	2	2	1	1	4	3	2	2
10	2	2	2	2	4	3	2	1
8	2	2	2	2	3	3	3	2
26	2	2	2	2	3	3	3	2
28	3	2	2	2	3	3	3	3
11	3	2	2	2	4	3	4	4
24	3	3	2	1	4	4	4	3

Results and evaluation

The data analysis and results were related back to the initial research question: 'To what extent can rubrics be used to support teachers' use of challenging tasks to broaden the sophistication of students' mathematical concepts?' Concepts analysed included Problem-solving, Representation and Reasoning. Results from the ZPD analysis showed several interesting findings. Nearly all students used a broader range of strategies in the Task 2 compared with Task 1. Students who used broader strategies used them at a more sophisticated level. Most students diversified the way they represented their thinking. About half of the students showed limited development in Connection, indicating an area for targeting teaching strategies. That students were least successful with Connection confirmed the teachers' view that in previous tasks where students focused on solving the problem rather than conceptual understanding. The element of Connection scored low in both tasks. This may have been because these tasks were different from other mathematics tasks undertaken and students viewed them in isolation from their everyday mathematics lessons.

Conclusion

This research was undertaken hoping to identify different levels of thinking by students working on challenging tasks. With all classroom-based research, uncertainty in data is likely, which is especially the case in this small study limited by conducting research in one classroom in one school in a short timeframe. For these reasons, any claims cannot be generalised. However, the findings suggest that students demonstrate many types of thinking when working on challenging tasks. This study suggests that it is possible to assess the depth of thinking that students engage in at that time. It also appears that teachers can support students in refining their thinking and their ability to record strategies and reasoning.

There are implications for the classroom. These include the potential of teacher-developed rubrics that support observation and timely feedback. Feedback may move students from their current level of conceptual understanding, broaden the range of strategies they are comfortable in using and encourage clear explanations of thinking. Teachers could develop a progression of strategies towards a conceptual understanding of multiplication and division that incorporate what they have observed in their students.

This small study could be used to inform a larger study around using evidence-informed practice and formative assessments to improve teaching and learning for a range of different mathematical concepts. Further research could include refining the descriptive sections of the rubric and developing challenging tasks for use in other areas of mathematics. Consideration would need to be given to other elements involved in the successful implementation of challenging tasks, including encouraging persistence, fostering the skills of listening to others, and teachers reflecting on their and students' experiences. Loong et al (2018) published a study after this research was completed and produced an Assessing Mathematical Reasoning rubric. This rubric helped teachers to support their understanding of how to develop reasoning in students and report their progress. Further research is needed to ensure that rubrics such as the one in this study and in Loong et al. (2018) are pragmatic, time efficient and provide appropriate information.

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Appendices

Appendix A

Rubric for levels of thinking used in exploring challenging mathematical tasks

Level of Thinking	Problem Solving	Reasoning	Representation	Connection
Level 1 Recall and reproduction	Did not understand the task. What did the student appear to interpret the task as entailing?	Mathematical thinking is incorrect.	Used no mathematical language and/or notation. Diagrams did not relate to the task.	Did not make any connections to the task or the numbers in the task.
Level 2 Basic application of skills and concepts	Understood part of the task. Needed help to understand the entire task. Their strategy worked for part of the task.	Some mathematical thinking or explanation is correct. Needed help to explain the task.	Used some mathematical language and/or notation. Some diagrams were used to represent the task.	Tried to make some connections to previous learning related to the task.
Level 3 Strategic thinking	Understood the task and the strategy they used worked.	Mathematical thinking and explanation is correct. Some thinking was systematic.	Used clear mathematical language and/ or notation throughout their work. Diagrams clearly related to the task.	Made some mathematical connections to previous learning related to the task and recorded it in some way.
Level 4 Extended thinking	Understood the task. Used an efficient strategy. Extension activities, if available, were completed.	Gave a detailed and accurate explanation of the strategy/ method they used to solve the task. All mathematical thinking was correct and systematic. Extension activities, if available, were completed.	Used a range of specific math language and/ or notation throughout their work. Diagrams related directly to the task and used to explain student thinking. Extension activities were completed.	Recorded mathematical connections to mathematical big ideas and strategies previously used. Extension activities were completed.

Appendix B

- Enabling prompt examples.
- Reducing the starting numbers for the tasks – 'The Doughnut Tree' task; starting with 32 or 64 students in 'The Big (not so) Friendly Giant task.
- Providing concrete materials.
- Altering the task depiction for students – breaking The Doughnut Tree task into one day at a time.
- Reducing the number of steps – just presenting students with Task 1 in each case.
- Altering task presentation expectations – supporting students with recording their ideas.

Appendix C

Whole class and student discussion notes by preservice teacher from launch phase.

Teacher: What do you think the word ‘challenging’ means?

Student 1: I don’t know YET, how to do this but I can learn.

Student 19: Try your best and keep working at it.

Student 5: When you go to university you need to make sure you can teach challenging tasks.

Student 8: You need to have persistence.

Appendix D

Discussion notes made by the PSST, from explore phase.

Student 21	Understood how to double numbers. Could demonstrate the number of days that are in the 2 weeks. Struggled in showing the strategies they could use to show how to double larger numbers.
Student 5	Finished the task quickly but the preservice teacher had seen that the student did not read the question properly. Understood that 2 weeks has 14 days. Changed their idea of thinking when the preservice teacher read through the questions with them. The student had assumed they couldn’t use the rule of doubling. When Student 5 read through the question, they changed their answers and began to use the doubling strategy.
Student 26	Doubled every number on the calendar. Knew that in 2 weeks there are 14 days. Drew doughnuts on the page to find out each answer when doubling. Stated, ‘When numbers get large I am going to use a new strategy’. The strategy the student chose was using number lines. They counted up by 10s and then added the remainder.

Appendix E

What else belongs?

Task 1	**Task 2**
What is the same about these numbers? Could these numbers belong together? What are the reasons these numbers might be together in a group? Complete the sentence starter: These numbers belong together because …	Complete these sentence starters: Other numbers that belong in this group are … These numbers also belong in the group because …

EXTENSION: Make your own lists of 3 numbers you could give to someone else for them to decide on reasons for the group.

The journey to becoming a reader: Relationships between home activities, attitudes and reading

Kylie Hillman
Australian Council for Educational Research

Kylie Hillman is a Senior Research Fellow at the Australian Council for Educational Research where she is the Project Director and manager of Australia's participation in the Progress in International Reading Literacy Study (PIRLS). She also contributes to ACER's work on other large-scale assessment projects such as the Programme for International Student Assessment (PISA) and the Trends in International Mathematics and Science Study (TIMSS). Kylie has worked in the area of transitions, particularly with the Longitudinal Surveys of Australian Youth (LSAY) program and the On Track project, and has written or co-authored a number of reports, including those examining the emotional wellbeing of young people; relationship formation, rates of leaving home and home ownership; the experiences of students in their first year of tertiary education; and educational and career pathways of rural youth. She has presented at national and international conferences on the relationships between student attitudes, engagement and ambitions, pathways through secondary school and into further education, training and the workplace, and the emotional wellbeing of young people. Kylie holds a Masters in Educational Psychology from the University of Melbourne and came to ACER from a clinical and educational background, where she worked in a multi-disciplinary clinic for families with Fragile X syndrome, and in special education in schools.

Abstract

The Progress in International Reading Study – PIRLS for short – has been running since 2001, with Australia joining in 2011. Along with a well-researched measure of students' reading comprehension, PIRLS includes a number of questionnaires for students, teachers, principals and parents/guardians that provide background and context for students' performance in the reading assessment. This presentation will provide educators with an introduction to PIRLS and discuss what PIRLS can tell us about various home, attitudinal and behavioural factors that relate to Year 4 students' performance in the PIRLS reading comprehension assessments.

We will discuss relationships between reading scores and factors including:

- early literacy activities at home (such as telling stories, playing word games or reading aloud signs)
- participation in early education programs
- attitudes towards reading (student reports of enjoyment of and confidence in reading, parents' and teachers' enjoyment of and frequency of reading for pleasure)
- current reading behaviours (as reported by students)
- classroom strategies and activities.

Results from multiple cycles of PIRLS and PISA (Programme for International Student Assessment) will be presented to allow exploration of changes in attitudes towards reading, and what this might mean for reading performance. We will discuss strategies for home and in early education that may help set the foundation for young people to become enthusiastic and proficient readers.

Conceptual development: How do early educators and teachers support children's early thinking in STEM?

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Abstract

As national and state-based reforms in early education roll out across Australia, concern for building a well-qualified workforce to meet growing demand has intensified. In parallel with the reforms, teachers and educators are reminded by the recently released 2022 Early Years Learning Framework to design programs that support intentionality in play-based learning. However, the literature shows that despite the concept of intentional teaching being around since 2009, difficulties with how to do this remain. This presentation takes up this challenge, by 1) sharing the collective findings of 6 Australian Research Council–funded research projects into play and learning in STEM; and 2) presenting an evidence-informed model of a Conceptual PlayWorld that resulted from this foundational research. The model is currently being released across Australia (and internationally) to support educators and teachers to create the conditions for conceptual development in children's play. The model will be shared via video recordings alongside findings from a spectrum of research that has been funded through the ARC Laureate Fellowship Scheme over 5 years.

Introduction

As national and state-based reforms in early education roll-out across Australia, concern for building a well-qualified workforce to meet growing demand has intensified. In parallel with the reforms, teachers and educators are reminded by the recently released 2022 Early Years Learning Framework (Australian Children's Education and Care Quality Authority, 2022) to design programs that support intentionality in play-based learning. However, the literature shows that despite the concept of intentional teaching having been around since 2009, difficulties with how to do this remain. This paper takes up this challenge by briefly describing the development of an evidence-informed model called a Conceptual PlayWorld, followed by an explanation of this model as an intervention for amplifying STEM learning. The paper concludes with examples of practices shown in websites across range of platforms and advocates for research-informed teaching.

The development of an evidence-informed model

We know from extensive research into the intentional teaching of concepts in early childhood settings across a broad range of discipline areas, that teachers struggle with how to plan for bringing concepts into play-based settings. This is evident in mathematics (for example, Disney & Li, 2022), in science (for example, Fleer, 2017), and in engineering (for example, Fleer, 2020a). What these studies generally show is that teachers do not feel confident (MacDonald et al., 2021) or competent (Stephenson et al., 2021) in their knowledge of the concepts they wish to intentionally teach. Surprisingly, this problem has been reported in the literature for over 3 decades (Garbett, 2003). However, the central problem remains alive and well within early childhood education practices across countries (Fleer, 2021a; Ma et al., 2023). So why has this problem been so persistent? We suggest that the problem has been conceptualised in relation to the 'person' rather than the system in which the 'teacher' is embedded.

When the problem is conceptualised within a system, the focus moves from the person and their confidence and competence, to an examination of the tools and resources available to teachers to intentionally teach STEM concepts in play-based programs.

With this premise in mind, the problem of how to bring concepts into children's play was tackled through a series of Australian Research Council–funded projects. Table 1 captures a summary of that research over time. Column 1 shows the years and grant type 2005–23; Column 2 shows the study; and Column 3 shows how the outcomes have collectively built an evidence-informed model called a Conceptual PlayWorld for the teaching of STEM in early childhood settings.

This research was funded by the Australian Research Council (ARC), which is Australia's most prestigious research funding body, and where all applications are rigorously peer reviewed and only the highest quality proposals are funded. The Discovery Project (DP) scheme is designed to support blue-sky research and the Linkage Projects (LP) brings researchers and industry partners together to solve pressing problems. The Laureate Fellowship (FL) scheme supports the top researchers in Australia to take ground-breaking research forward.

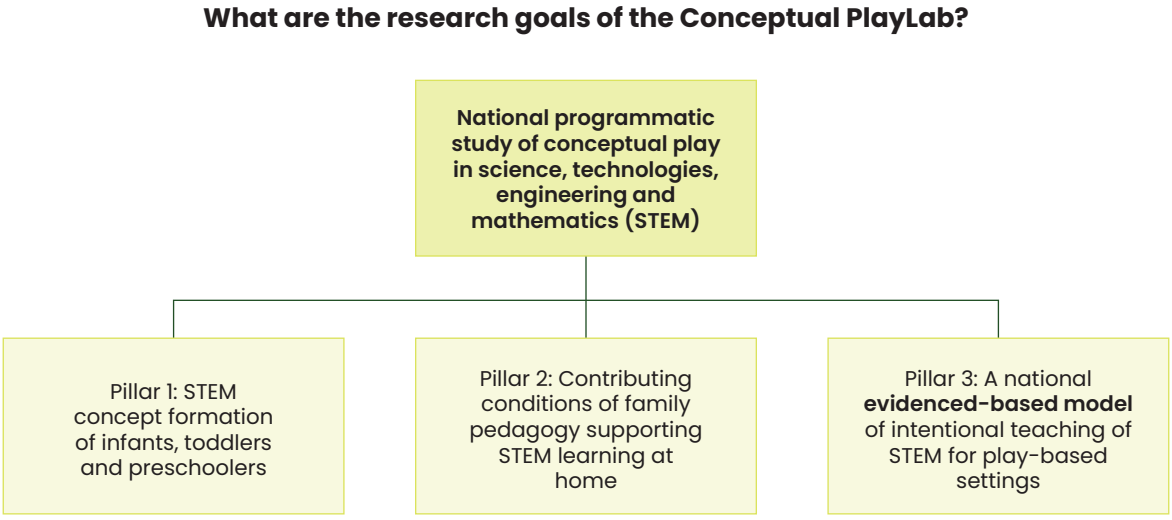
Table 1 Summary of ARC DP programmatic research over time: How to design STEM learning through play

ARC DP	**Programmatic research over time: How to design motivating STEM learning through play**	
DP 5	The sociocultural construction of science learning. Learning of **scientific concepts within situated playful encounters** in early years context	Conceptual play
DP 11	**Conceptual play**: Foregrounding imagination and cognition during concept formation in early years science education	Affective imagination
DP 13	**Affective imagination** in scientific education: Exploring the emotional nature of scientific and technological learning and engaging children and teachers	Digital play
DP 14	An investigation into the relations between **imaginary situations** and scientific abstraction in preschool digital play	Conceptual PlayWorlds
DP 18	**PlayWorlds**: Researching development of executive functions (working memory, emotion regulation, planning and cognitive flexibility)	Motivating conditions for EF
DP 18	**Conceptual PlayWorlds**: Researching play, imagination and science teaching	PD model for multimodal learning of CPW
FL 18–23	This programmatic study is researching imagination in play and imagination in science, engineering and technology. Building a world-class research program and research capacity in science, engineering and technologies education.	Ongoing

DP, Discovery Project; LP, Linkage Projects; FL, Laureate Fellowship

Over the past 5 years, a Conceptual PlayWorld model has been central to the intervention research (Row 7) that is currently being funded by the Australian Research Council Laureate Fellowship scheme. Our team of researchers in the Conceptual PlayLab are tackling the problem of STEM in early childhood through programmatic research. Figure 1 summarises the programmatic research.

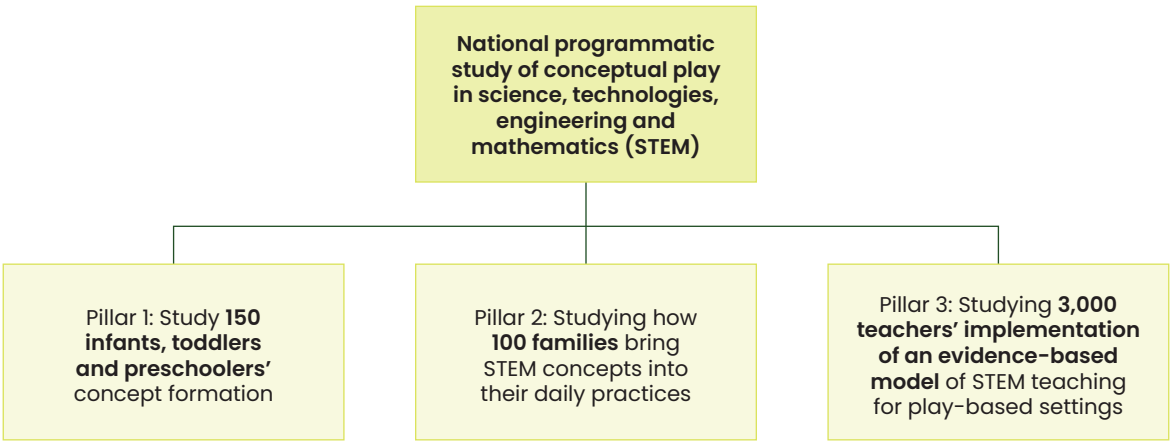
Figure 1 Overview of the goals of the programmatic research of the PlayLab



The programmatic research to date has generated data between 2019 and 2023 and is expected to conclude in 2024.

This paper gives an overview of the programmatic research, the data types and quantities generated to date, and what research has progressively rolled out in relation to the intentional teaching of STEM concepts from birth to 11 years (see Figure 2).

Figure 2 Study design of the programmatic research of the PlayLab



The research was expanded in 2022–23 to include the primary school sector because of demand from practice to bring into schooling playful learning to engage children and excite them to learn STEM concepts.

There are 3 pillars of research that focus on conceptual learning of children (Pillar 1), the engagement of STEM learning by families at home and in the community (Pillar 2), and the teachers' intentional teaching of STEM (Pillar 3).

For Pillar 1, the research has yielded an accumulation of digital data constituting 262.5 hours gathered through more than 85 site visits during 2018–23. Researchers visited 4 sites, 15 rooms (childcare, preschool and school) and 14 teachers . While the total of children is still to be added, we estimate that overall 210 children were involved in this part of the research. This builds on the pre-2019 base research, which gathered 890 hours of digital data. Both teachers and educators used a Conceptual PlayWorld model of teaching to create imaginary play situations for children aged from 0.5 months to 12 years. Data gathering continues through 2023.

For Pillar 2, 79 children and families were involved in the research, which generated an accumulated 117 hours 11 minutes of digital data between 2020 and 2023 across 8 sites (Conceptual PlayWorld live Zoom sessions, family homes, playgroups, the Royal Botanical Gardens). More than 80 Zoom sessions were recorded and over 30 on-site data collection visits were conducted. Additionally, the Makerspace Conceptual PlayWorlds will be implemented in playgroups in late 2023. It is anticipated that there will be 20 sessions with approximately 200 families to generate approximately 30 hours of data. In total there are 150 families and a total of 140 hours of digital data expected.

For Pillar 3, there were 3 kinds of professional development delivery. These involved the completion of pre- and post-surveys associated with intentional teaching of a Conceptual PlayWorld and teacher confidence and competence in STEM. The first approach involved teachers completing a self-paced online professional development set of modules. The second involved Zoom delivery of a one-hour presentation explaining the Conceptual PlayWorld model, followed by one-hour break-out rooms to workshop teacher-designed Conceptual PlayWorlds using a planning proforma, which were then implemented over a 10-week period with support via a private FaceBook group, leading to a recorded interview-oriented sharing session via Zoom. The third approach was a mixed methods on-site delivery of professional development (PD) with follow-up interviews via Zoom. A total of 1773 teachers have participated in one of these delivery modes to date.

Conceptual PlayWorld as an intervention for amplifying STEM learning

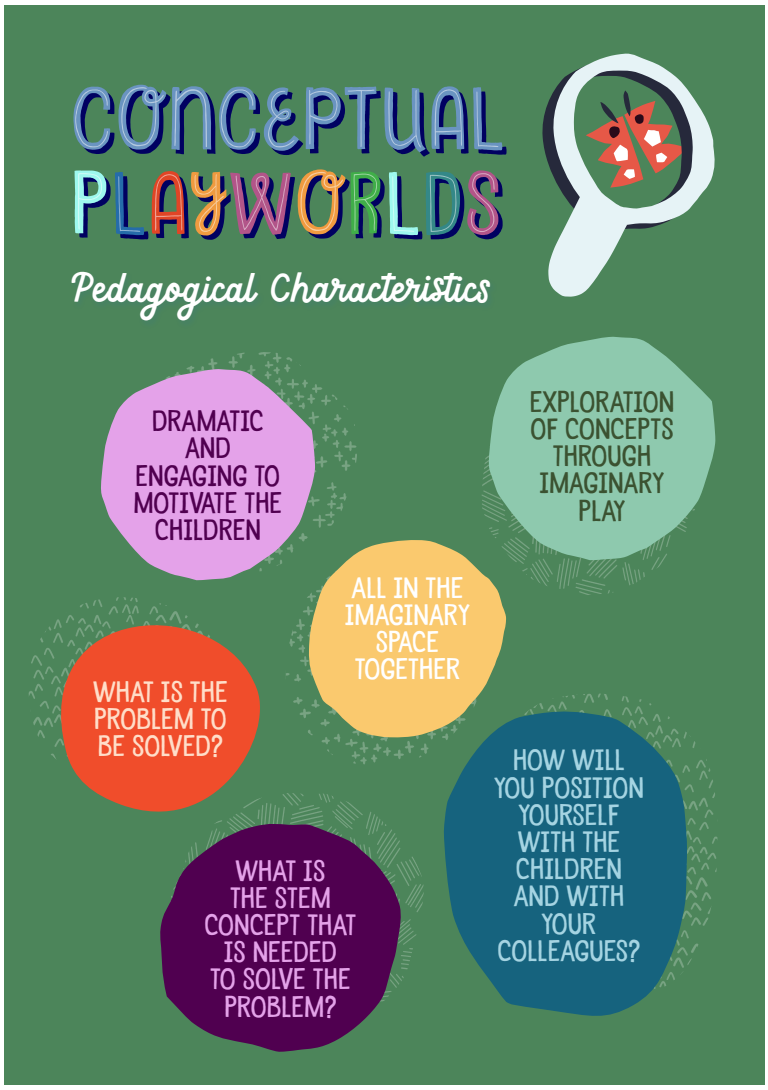
In 2011, a model of play was identified from research (see Table 1) called Conceptual play (Fleer, 2011). This form of play underpins the pedagogical model of practice of the Conceptual PlayWorld (Fleer, 2018). But knowing this was not enough to effect change in the intentional teaching of STEM concepts in play-based settings (Fleer et al., 2021). Further research was undertaken (Fleer, 2019a), which drew upon Vygotsky (1966) and Lindqvist's (1995) cultural-historical model of play for bringing drama and development in children's play. But Lindqvist's model and the foundational research undertaken over a full year of data collection into the aesthetics of play did not focus on concept development (Fleer, 2020b). However, we found that her model was helpful in planning an educational experiment (Hedegaard 2008; Fleer, 2021a) where it was possible to identify the motivating characteristics of imaginary play and the learning of STEM (Fleer, 2019a; 2021b). This ultimately led to the identification of how the 5 key pedagogical characteristics changed teacher practices. Conceptual PlayWorld (Fleer, 2018) became important for subsequent research into the intentional teaching of STEM concepts from birth to 5 years (for example, Fragkiadaki et al., 2021; Stephenson et al., 2021; Utami et al., 2020).

The 5 planning characteristics that acted as our intervention are:

1. selecting an engaging story
2. creating an imaginary Conceptual PlayWorld space
3. teachers and children entering and exiting the Conceptual PlayWorld together
4. problems arise in the Conceptual PlayWorld that need to be solved using concepts
5. teachers take different roles in the Conceptual PlayWorld to actively support children's play development through subject positioning.

When these characteristics are implemented in practice, they are all interconnected as is shown in Figure 3.

Figure 3 The interconnected nature of a Conceptual PlayWorld for the intentional teaching of STEM in the early years (Copyright PlayLab)



The following tables with their website addresses showcase examples of the practices that are unique across different age periods. Collectively, these tables show how the 5 characteristics remain, but when implemented into teachers' practice, they bring forward the unique development of the children.

Table 2 Early years of school

Characteristic	A Conceptual PlayWorld of *Charlotte's web* by E. B. White (Copyright PlayLab)
1. Selecting an engaging story	https://www.youtube.com/watch?v=7OKAHPErmvY
2. Creating an imaginary Conceptual PlayWorld space	https://youtu.be/JxkRG54L4rg
3. Teachers and children entering and exiting the Conceptual PlayWorld together	https://youtu.be/ImKzH02-v1o
4. Problems arise in the Conceptual PlayWorld that need to be solved	https://youtu.be/C6MMblawmJA
5. Teachers take different roles in the Conceptual PlayWorld to actively support children's play development through subject positioning	https://youtu.be/30I_BeqmjYU

Table 3 Preschool period

Characteristic	A Conceptual PlayWorld of *Rosie's walk* by Pat Hutchins (Copyright PlayLab)
1. Selecting an engaging story	https://youtu.be/yRbq7T0W4g4
2. Creating an imaginary Conceptual PlayWorld space	https://youtu.be/ASFU0Itk-Ts
3. Teachers and children entering and exiting the Conceptual PlayWorld together	https://youtu.be/zXgFO7tGWYE
4. Problems arise in the Conceptual PlayWorld that need to be solved	https://youtu.be/XBInamq2FFk
5. Teachers take different roles in the Conceptual PlayWorld to actively support children's play development through subject positioning	https://youtu.be/9ww_xOqZXwI

Table 4 Infants and toddlers

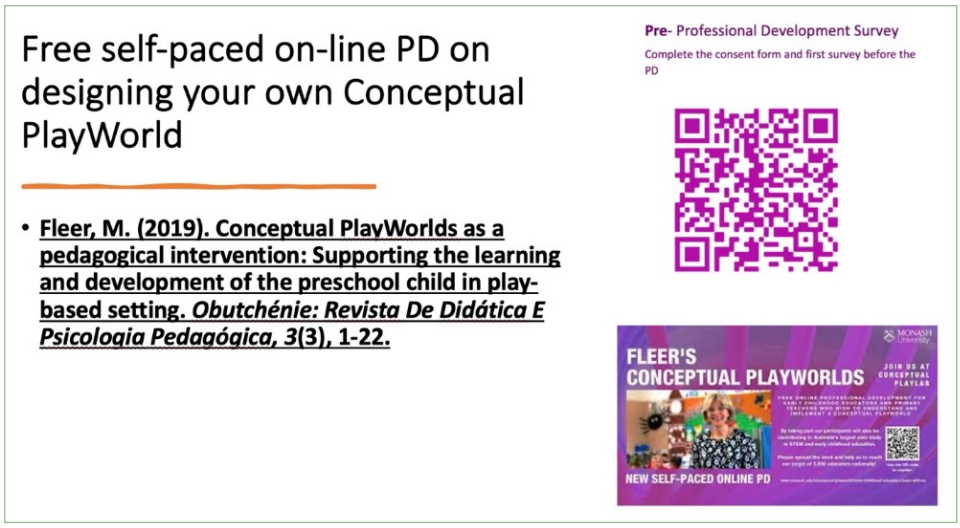
Characteristic	A Conceptual PlayWorld of *March of the ants* by Ursula Dubosarsky (Copyright PlayLab)
1. Selecting an engaging story	https://youtu.be/oeR8kBfQ8SQ
2. Creating an imaginary Conceptual PlayWorld space	https://youtu.be/V9XrP8TCQrQ
3. Teachers and children entering and exiting the Conceptual PlayWorld together	https://youtu.be/1LZoaphpvzk
4. Problems arise in the Conceptual PlayWorld that need to be solved	https://youtu.be/RGFl3sWq91w
5. Teachers take different roles in the Conceptual PlayWorld to actively support children's play development through subject positioning	https://youtu.be/8qne1aC_xSo

Our research showed that when teachers used a Conceptual PlayWorld model to plan and implement their programs, it did not change their practices (Fleer et al., 2021), but the conditions changed dramatically for children (Fleer, 2021b), particularly for girls (Stephenson et al., 2021).

Conclusion

The research is ongoing and as we bring forward the results, the findings will continue to be showcased on our website as a series of working papers. On a continuing basis, the research outcomes will be translated into videos of practices, and these can be found on our YouTube channel. Finally, the self-paced online PD remains available for teachers (Figure 4). In doing this PD, teachers are not just learning about how to plan and implement an evidence-informed model of practice, but they are contributing to generating new knowledge to support other teachers in the intentional teaching of STEM concepts in the early years.

Figure 4 Self-paced professional development



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What do educational leaders need to know to build capacity for inclusive practice?

Dr Jane Jarvis
Australian Council for Educational Research

Dr Jane Jarvis is a Principal Research Fellow at the Australian Council for Educational Research. She holds a PhD from the University of Virginia and has worked as a teacher, school counsellor, behaviour support practitioner and administrator, in both disability and education settings. Before joining ACER, Jane's work at Flinders University helped to establish initial teacher education programs in inclusive and specialised education, developing undergraduate and postgraduate coursework in differentiated instruction, inclusive education, and gifted education and co-directing the Research in Inclusive and Specialised Education (RISE) Initiative. She has worked with many schools throughout Australia and internationally to build their capacity for inclusive practice, and her research has been recognised with an Australian Council for Educational Leaders (ACEL) SA Branch Award for Distinguished Contribution to Research in Educational Leadership.

Abstract

To provide the foundations for lifelong learning, educational environments must be effective for all academically diverse young people. This presentation will synthesise the findings and share lessons learned from 7 Australian research studies that explored leadership and professional learning to improve site-wide inclusive practices for academically diverse learners. Findings highlight common 'sticking points' related to inclusive practice at the classroom and school levels, underscore the importance of contextualised professional learning guided by a shared vision, and identify key priorities for leaders seeking to build site-wide capacity for inclusive practice.

Stacking ‘learning’ interventions to address inequity

Professor Sharon Goldfeld
Royal Children’s Hospital Centre for Community Child Health

Professor Sharon Goldfeld is a paediatrician and Director at the Royal Children’s Hospital Centre for Community Child Health, and Theme Director of Population Health Research at the Murdoch Children’s Research Institute. She has a decade of experience in state government as a senior policymaker in health and education, including holding the role of Principal Medical Advisor in the Victorian Department of Education and Training. Her research program is made up of complementary, synergistic and cross-disciplinary streams of work focused on investigating, testing and translating sustainable policy-relevant solutions that eliminate inequities for Australia’s children. Sharon’s career has seamlessly connected research, policy and practice with her cross-sectoral approach ensuring her research is robust and of high policy and practice utility for greater translation success.

Abstract

Ensuring children have positive and equitable learning and developmental pathways means we need to consider the environments in which they are born, live and play. More recent research is telling us that these outcomes cannot be achieved by any single ‘intervention’ but rather by stacking them over time for mutual benefit. This includes thinking about the child, the parent and the community over time, from the antenatal period onwards, in a way that is mutually reinforcing. While this seems complicated it also offers lots of opportunities to make a difference. One important backbone for this process is the ECEC-to-preschool-to-school universal learning stack. This presentation will focus on how to think about ’stacking‘ and the importance of services (including frontline staff) measuring the quantity, quality and participation triple bottom line for equitable learning and developmental outcomes.

The contribution of learning trajectories to enacting the Early Years Learning Framework V2.0

Professor Caroline Cohrssen
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Caroline Cohrssen is Professor in Early Childhood Education at the University of New England, Armidale. Her research is underpinned by a systems perspective on early learning and development, and focuses on quality within multiple systems. Caroline's research interests include the home learning environment, and early childhood education and care settings. In addition, she has a strong interest in learning trajectories and their contribution to equipping early childhood educators to enact differentiated teaching based on the early years planning cycle.

Abstract

The Early Years Learning Framework for Australia V2.0 (EYLF) guides pedagogy and practice with children aged from birth to 5 years and states that over time, children engage with 'increasingly complex ideas' (p. 29). With 5 learning outcomes and 8 principles of practice, this requires educators to be highly skilled in facilitating children's engagement with increasingly complex knowledge and capabilities. It presupposes that all educators are equipped to recognise children's demonstrations of understanding, know what knowledge (or capabilities) likely preceded this understanding, and what comes next. As a framework, this specific information is not included in the EYLF. The Australian Education Research Organisation (AERO) learning trajectories may assist educators to recognise demonstrations of knowledge and capability and better equip them to plan opportunities for differentiated teaching and learning that are within a child's zone of proximal development. A focus on learning trajectories thus supports formative assessment and planning for learning, as well as reflective practice. This paper draws on the Language and Communication learning trajectory to discuss the contribution of learning trajectories to teaching practice and the continuity of learning from birth.

Background

Concerted efforts are underway in Australia to both increase access and achieve high-quality early childhood education and care (ECEC) provision (Cohrssen et al., 2023). This is important: maximising child learning and development outcomes depends upon sustainable resourcing for early learning that focuses on quality and equity – and not just access – coordinated at multiple levels of the ecological system (Yoshikawa et al., 2018). An important contributor to quality ECEC is the Early Years Learning Framework (EYLF) version 2.0 (Australian Government Department of Education [AGDE], 2022), which informs the practice of ECEC educators and describes 5 key learning outcomes for children. The learning outcomes described in the EYLF include guidelines with valuable suggestions of ways educators can promote learning that is aligned with these overarching outcomes. However, the framework guides learning for children aged from birth to 5 years and the learning of an infant differs from that of a 4-year-old child. Indeed, the learning of one 4-year-old child is likely to differ from that of another 4-year-old child.

Contribution of learning trajectories to the enactment of the EYLF V2.0

AERO has developed a suite of learning trajectories (LTs) that align with the EYLF and describe learning and development in 5 key domains: executive functions, social and emotional learning, mathematical thinking, language and communication, and physical development. These describe increasingly complex concepts and capabilities, thus supporting more nuanced application of the EYLF. The LTs align with many aspects of learning and development measured by the Australian Early Development Census (AEDC) and other tools used to assess learning and development in early childhood (Jackson et al., 2023) and, importantly, address a gap in their inclusion of learning from infancy. Their free availability to all ECEC educators across all states and territories shows the need for distributed accountability for quality at the service provision level. The LTs assist educators to strengthen the learning lens brought to observations and planning for contingent and differentiated teaching and learning (Cohrssen, 2021). Access to this support is of particular benefit to educators in regional and remote areas of Australia who may otherwise struggle to access professional learning opportunities.

While there are multiple models of early childhood LTs, many share common features (Jackson et al., 2023, p. 6):

- All describe distinct but interconnected domains.
- All describe progressions of learning and development within each domain.
- Most are linked to curriculum documents.
- Some identify specific ages and milestones.
- Some identify specific behaviours for each domain.
- Some include suggestions for practice to support each domain.
- Some are used as documentation.

The AERO LTs notably do not identify specific ages and milestones and do not identify specific behaviours for each domain, since children's learning and development trajectories are 'multiple, fluid and complex' (Hedges, 2021, p. 1056) and manifest in individualised ways. In this way, the LTs simultaneously describe learning progressions that add specificity to the EYLF while acknowledging that children's learning is not linear but iterative, as capabilities and knowledge are revisited, rehearsed and consolidated to form the platform on which new capabilities are built.

Learning trajectories and child outcomes

Australian ECEC educators have been looking for or developing their own tools to assess children's learning and progress over time (Harrison et al., 2019; Keary et al., 2022). This lends itself to potential misconceptions of progressions of learning as well as inequities within the sector that may impact on child outcomes, particularly where measures are being taken to address workforce needs that result in educators teaching beyond their level of qualification (Cohrssen et al., 2023).

National data indicate that Element 1.3.1 (Assessment and Planning Cycle) of the National Quality Standard (NQS) is the element most likely to achieve a 'not met' rating (Australian Children's Education and Care Quality Authority [ACECQA], 2022). It is this element of quality that LTs are positioned to support as they are designed to assist educators to recognise demonstrations of knowledge and capability and to plan opportunities for differentiated teaching and learning that are within children's zones of proximal development (Vygotsky, 1978). In so doing, LTs provide momentum that powers the turning of the early years planning cycle (Figure 1). The very notion of a 'trajectory' indicates a path or a progression and the extent to which educational programs 'support all children to progress towards the learning outcomes' is provided in the Guide to the National Quality Standard to guide reflection on practice for Standard 1.1 (ACECQA, 2023, p. 103).

Figure 1 Early Years Learning Framework planning cycle, AGDE, 2022, p. 27

Children learn from birth, and learning is cumulative: building on the foundations of existing capabilities, children enhance existing capabilities and acquire new skills (Duncan et al., 2007). Attuned educators who draw on LTs to notice and document evidence of individual children's learning – whatever form that evidence may take – are supporting children's LTs. This busts the myth that LTs are prescriptive and narrow: when applied by educators attuned to the interests of children and their communities, curriculum planning remains grounded in community goals and values.

Evidence of evolving understanding and capability is also relevant to supporting child transitions from ECEC into primary school. Sometimes referred to as 'vertical transitions', focus is often paid to structural features of this process (such as enrolment forms, transition statements, etc) while less attention may be paid to the pedagogical alignment of ECEC and school (Kagan et al., 2006). Play is a critical vehicle for children's brain development (Hassinger-Das et al., 2017) and occurs along a continuum with free play (entirely child-led) at one end and direct instruction (play that is adult designed/controlled) (Zosh et al., 2017) at the other. LTs, through their focus on progressions within the context of play-based learning, may facilitate the pedagogical alignment of learning in the contexts of ECEC and primary school and thus support the transition into formal school education.

Using learning trajectories within an informal curriculum

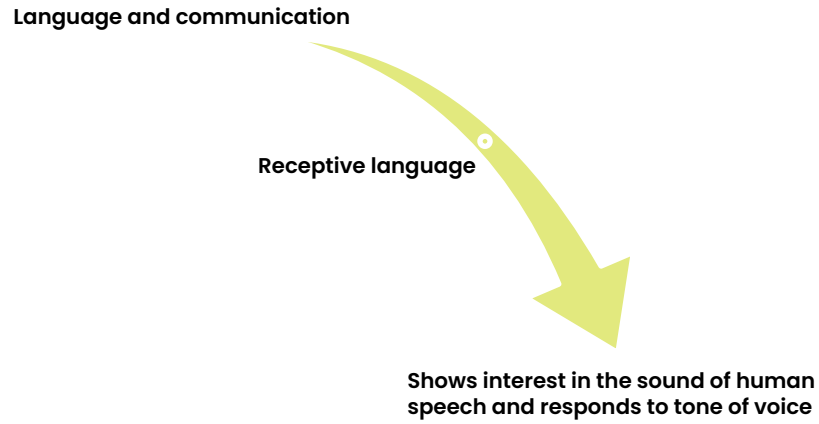
Assessment *of* learning (also known as summative assessment) determines the achievement of specific objectives or standards at a particular point in time. Assessment *as* learning actively involves the learner in the assessment as children monitor their progress towards goals that they may have set themselves. Assessment *for* learning draws on assessment to inform planning for learning and is also known as formative assessment. Formative assessment is a key component of the planning cycle described in the EYLF (AGDE, 2022).

Application of the LTs to focus on children's evolving language and communication skills equips the educator to narrow this focus to one of 4 domains: *receptive language*, *expressive language*, *emergent reading* or *emergent writing*, noting the explicit reminder that many Australian children develop language and communication skills in a language other than English and the importance of partnerships with families in this regard.

The educator may decide to focus on the domain, *receptive language*. Here, one subdomain of receptive language is, *Understands the words and phrases of their language/s* and thus the educator is equipped to look specifically for evidence of understanding of words and phrases.

The first indicator of this subdomain is, *Shows interest in the sound of human speech and responds to tone of voice*. An educator who sets out to observe an infant's communication skills is thus equipped to recognise evidence of the child showing interest in the sound of human speech and responding to the tone of voice.

Figure 2 Arrow indicates how learning trajectories support improved specificity of observations



During play, a child may be observed to respond to a particular word (for example, 'dog') spoken by an educator by pointing to a picture of a dog, pretending to bark, or looking for a toy dog. From these behaviours, it may be inferred that the child discerns specific meaning from this particular word. This may prompt the educator to pay close attention to whether the child discerns specific meaning from other words too. The provision of indicators within subdomains assists educators to recognise – and plan for – progression along LTs. Here, an educator may plan to consolidate the child's knowledge of 'dog' and extend this capability, implementing this by intentionally drawing the child's attention to additional object names during play, shared book reading and routines. Evaluating whether the child discerns the specific meaning from additional words, phrases and gestures over time, is indicative of the efficacy of the implementation of this strategy and sets up opportunities for the educator to reflect on their teaching practice. As the child's learning progresses within this particular subdomain, the child is likely to be observed to *understand speech of increasing length and different grammatical patterns*. How soon this capability is observed will vary from child to child.

No age has been mentioned in this example: LTs take into account that the educator and the primary caregiver have expert knowledge of the child that provides context to the observed behaviours. For example, the child may be learning to communicate, or the child may possess a broader linguistic repertoire and be learning to use English as an additional language or dialect.

Conclusion

Rather than placing responsibility for high quality solely on the shoulders of educators, the development of the LTs acknowledges the need for distributed responsibility for the quality of ECEC across multiple systems within the ECEC ecology (Cohrssen et al., 2023). By supporting the alignment of structural elements of quality in the form of the EYLF and the National Quality Standard (ACECQA, n.d.) and providing an optional research-informed tool to support focused observations and evidence-based planning for learning, LTs may enhance educators' professional learning and encourage professional conversations within and across education sectors. The provision of research-informed tools to support the achievement of Element 1.3.1 of the NQS is also likely to enhance child outcomes as educators are provided with support to facilitate children's engagement with increasingly complex ideas. Systematic research is needed to evaluate the contribution of the LTs to early childhood educators' self-efficacy, the quality of pedagogical practice enacted with children aged from birth to 5 years, and their impact on child outcomes.

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Learning through Play at school: Lessons from the Ukraine

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Kellie Picker is a Research Fellow at the Australian Council for Educational Research. Her research concentrates on early childhood education, with a particular focus on language and literacy development, the implementation of effective pedagogies for increased learning, as well as teacher training and professional development. She is currently engaged in two ACER research projects: Overcoming Disadvantage in Early Childhood, a longitudinal study evaluating the effectiveness of the Early Language & Literacy program in New South Wales (in partnership with the Australian Literacy and Numeracy Foundation); and the Learning through Play (LtP) in Schools study, a four-year collaborative project with The LEGO Foundation. The LtP study aims to develop early primary teachers' skills in facilitating quality learning through play in the classroom.

Abstract

Research recognises that children are curious, they have a sense of awe and wonder, and they are eager to grow and learn about the world around them. These understandings about children were at the heart of the Learning through Play at School research study conducted in Ukrainian primary schools. The study was designed to support teachers to shift their classroom practice from a teacher-centred approach to one that incorporated play and the use of playful pedagogies to facilitate meaningful learning experiences. This session reports the experiences of the Ukrainian teachers as they implemented learning through play in their classrooms by highlighting changes to their beliefs and their classroom practice, as well as outlining their thoughts about the enablers and barriers they faced. To remain true to the importance of play in learning, the session will include playful breaks to provide participants with time to connect the lessons from Ukrainian classrooms to their own learning environments.

Understanding early cognitive development: Using PAT Early Years to support student learning

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Sandra Knowles is a Senior Research Fellow and Team Leader of the Humanities team in the Assessment and Reporting division at ACER. She has worked in test development since 2009, specialising in literacy for school-aged children. Sandra's work has primarily involved the development of national and international assessments and teaching resources across the skill areas of reading, speaking and listening, writing, and 21st-century skills. Currently, her work focuses on the development and implementation of learning progressions in reading to inform formative assessment practices and improve teaching and learning in the classroom. Prior to working at ACER, Sandra was an ESL teacher in English for academic preparation and completed a PhD in English at the University of New South Wales.

Abstract

The correlation between early cognitive and psychosocial development is well established. For this reason, some measurement tools, such as UNICEF's Early Childhood Development Index (ECDI2030), provide a single score as an overall indicator of a child's development because performing poorly in one area is likely to mean inadequate development across all areas. While these broad indicators can be useful at a system level, understanding children's development in discrete domain areas is essential for meaningful intervention. This presentation will explore how measurement tools, such as ACER's Progressive Achievement Tests (PAT) for the Early Years, can be used to support targeted intervention across a range of learning areas. PAT Early Years will be situated within the broader context of ACER's early learning descriptions of progress, which establish oral language as a foundational skill and highlight the importance of recognising each child's progress over time regardless of their starting place.

Introduction

In early childhood (0 to 8 years), as in all stages of education, different measurement tools can serve different purposes. Some, such as UNICEF's Early Childhood Development Index (ECDI2030), aggregate many areas of learning into a single indicator to ascertain whether a cohort of children are developmentally on track (UNICEF, 2023). Others, such as Australia's Early Years Toolbox, distinguishes between learning areas and provides scores for each that are set against age expectations (Early Years Toolbox 2013–19). Whether an assessment provides a broad-brush indication of developmental levels or offers a diagnostic approach to different learning areas, an in-depth understanding of foundational skills, and how they progress, is key to supporting further development.

Quality assessment data is most constructive when used to promote a rich and deep understanding of how children learn the skills the instrument claims to measure, and what typical development in these skills looks like. Without the broader context of a developmental progression, there is a risk that isolated skills become the focus of interventions. A 'one size fits all' approach to intervention

ignores the learning needs of children who are not yet ready for these skills or have moved beyond them. Reporting against a developmental progression supports recognition of each child's progress regardless of their starting place. ACER's Progressive Achievement Tests (PAT) for Early Years is an example of an assessment that supports teachers' understanding of the key skills that underpin early cognitive development and how they typically progress. Using PAT Early Years data, interventions can be made that target children at their point of need. While the format of the assessment is important, and there are many considerations to be made on the best assessment methods for young children, developmental progressions are essential to making assessment practices productive and meaningful at all stages of development.

The principles of assessment

In evaluating the role measurement can meaningfully play in early childhood, it is worth considering the principles relating to quality assessment practices. Quality assessments are fit for purpose and have clarity and consistency of purpose. They are objective, transparent, ethical and fair, and demonstrate technical rigour (ACER & UIS, 2017, p. i). While these principles are more commonly associated with standardised assessment, they can be applied more broadly. Even in classroom contexts where assessment practices are much less formal, there is value in incorporating fundamental principles of quality assessment (Bennett, 2011).

The role of assessment in early childhood contexts, in particular early childhood education and care (ECEC, 0 to 5 years), has received significant attention in the recent past. The importance of using psychometrically sound assessment instruments that can identify learning needs, with specific implications for practical pedagogical interventions, is now well established (Care et al., 2010, p. 19). According to this position, assessment validity is key, and leaders would benefit from recognising validity as 'the most fundamental technical consideration in the evaluation of educational assessment systems' (Lane & Moore, 2011, p. 266).

Decontextualised assessments in early childhood have been treated with scepticism. A significant concern relating to decontextualised assessments is that they could lead to the decontextualised teaching of discrete skills at the expense of meaningful application and integration (Invernizzi et al., 2010, p. 439). A focus on discrete skills neglects the complexity of the learning process, coming 'at the expense of the support for multiple aspects of development that has long been the hallmark of high-quality early childhood education' (Casbergue, 2010, p. 13). In response to these arguments, concerns have been raised about the technical rigour of contextualised, or authentic, assessment practices. Moreno and Klute (2011) have argued that well-known, teacher-employed authentic assessments tend to have limited evidentiary support, lacking 'peer-reviewed evidence documenting that they can be reliably and validly employed by the broad swath of caregivers and teachers expected to implement them' (p. 485).

These positions can be at least partially reconciled when the focus is shifted towards a common goal – the meaningful development of children's foundational skills (Snow, 2006, p. 228). An opportunity exists for the development of measures that are technically rigorous across a wide range of early learning skills, and specifically developed with young children in mind. The potential of these measures to improve children's learning is more likely to be realised if considered in terms of their implications for practice; how they can be used to promote teacher's conceptual engagement with the target skills; and the multitude of ways they can be incorporated into their teaching practice. (Raban et al., 2012, pp. 8–9, 17).

This paper proposes 4 criteria for quality assessment practices that are appropriate for young children, and that complement the assessment principles already outlined. These criteria are continuity, self-confidence, feedback and collaboration. PAT Early Years will be used to illustrate how these criteria can be realised in practice. However, in using PAT as a case study, this paper does not

propose that these assessments are used in all early childhood contexts; the assessing of young children, particularly 4 years and younger, is a complex process that requires thoughtful planning (Bradbury & Robert-Holmes, 2017). PAT is an online school-based assessment that has not been designed with ECEC environments in mind. What PAT Early Years demonstrates is the ways in which a progressive achievement approach to assessment can be used to build teacher's understanding of key foundational skills and provide valuable insight into children's learning at all stages of education and development.

Continuity

Continuity refers to an assessment that is based on a continuum of learning and development. When the skills targeted in an assessment are understood in the context of a developmental progression, learners can be separated based on their acquisition of the skills being assessed, and teachers can identify where learners are in their development, as well as the next steps to improvement (Anderson, 2016, p. 108; Förster et al., 2018, p. 98; O'Reilly et al., 2014, p. 404). An understanding of how key skills develop can support teachers in tracking learners' progress over time and in recognising that learners develop at different rates and in individual ways. Developmental progressions can be approached from the point of view of learning theory, as well as from a social and cultural perspective that takes into account children's interests and prior community experiences (Brookhart, 2018). A well-thought-out and evidence-based developmental progression can support assessment development and the interpretation of assessment data, while also informing teaching programs and teaching practices, providing the essential basis for setting strategic aims, planning instructions, and guiding on-the-fly decisions that have to be taken while in the midst of teaching and assessing (Wilson 2018, p. 9; Australian Council for Educational Research [ACER], 2019). It can support teachers' understanding of the key skills that underpin growth and help them to recognise where and how these skills interact.

Continuity and PAT Early Years

PAT Early Years is a suite of tests in reading and mathematics. There are 4 separate assessments for each domain, to be delivered over the first 2 years of formal schooling (at approximately 6- to 9-month intervals). They are tablet-based assessments consisting of a few item (question) types and formats that are designed for young children.[1] They assess a range of key components (called 'strands') in each domain area. In reading, students are assessed in phonics and phonemes, print conventions and environmental print, vocabulary, listening comprehension, and reading comprehension. In mathematics, they are assessed in number, algebra, statistics, measurement and space. A new addition to PAT Early Years Reading is currently underway: a series of assessments in key areas of literacy development that are designed to provide more significant diagnostic feedback.

Rather than receive raw scores indicating which questions students got 'right' or 'wrong', PAT uses Rasch measurement to put student scores on a continuum of learning. Rasch measurement transforms categorical data, such as the encoding of responses to items as 'right' and 'wrong', into linear measures that have interval properties. Rasch measures place items and students on the same measure, so that meaningful comparisons can be made both of the distance between items (how much more easy or difficult an item is compared to another) and the distance between students (how far ahead or behind a student is compared to another). The same can be applied to a single student, telling us how much growth we observe over repeated assessments. In PAT, as in many standardised assessments, each domain area is represented on a single scale. This means

1 The new reading assessments will include embedded practice items and provide clearer guidance that supports young children to navigate independently.

that students can be tracked from beginner to advanced stages of reading and mathematical ability (or development). These skills are described as a student progresses along the scale for each domain area using Achievement Band Descriptions.

Teachers can use the PAT Early Years assessment data and reports to improve their understanding of foundational skills in reading and mathematics. They will gain insights into the independent nature of these skills (for example, how listening comprehension supports reading comprehension) and the way they work as unique learning areas in which a learner's performance differs (for example, the ways in which a student may perform well in decoding but poorly in comprehension). In PAT Early Years Reading, for example, a teacher may find that a student is performing well in phonemic awareness but demonstrating low-level ability in listening comprehension. Using this information, the teacher provides support for the student where they are most in need and can monitor growth through future assessments. Without this information, it could be assumed that a student with strong decoding skills is a strong reader generally. Without early support in comprehension, such a student could struggle as an independent reader and quickly lose engagement.

As part of the progressive achievement approach, the PAT tests are supported by the PAT Teaching Resources Centre (TRC). These resources are aligned to the PAT scale and mapped to individual test items; in other words, they are targeted to students' ability levels as indicated by the PAT data. The TRC provides a way for quality assessment data to be constructively incorporated into teaching practice.

Self-confidence

Self-confidence in assessment relates to both the context in which the assessment takes place and nature of the communication between teacher and learner. Self-confidence is not intrinsic to assessment but rather concerns the facilitation of positive attitudes through practice. Whether an assessment is decontextualised or takes place in an authentic context, the interpretation of the data can contribute to improving communication with the learner and better supporting their confidence. Assessments should consider contexts that are likely to promote a positive experience and, in ECEC environments particularly, should be compatible with warm, responsive relationships and child-centred play-based programs. While young learners should only be assessed in familiar environments that relate to everyday routines, notions of authenticity do not need to be limited to observation-based assessment practices. Authentic contexts can be created within the 'world' of the assessment. This could mean, for decontextualised assessments, delivering test items within a storybook context and/or asking questions grounded in familiar and engaging topics and themes.

PAT Early Years and self-confidence

PAT Early Years is a tablet-based assessment, and as with many tablet-based early childhood products, positive student engagement is an integral consideration in the design. Beautifully drawn illustrations help enliven the test-taking experience. The test items are situated in familiar and engaging contexts. Reading, for example, includes a series of story-based units that reflect the kinds of topics and themes young children commonly encounter, such as family play in the park, talking animals, and imaginative self-play. The Reading assessments currently in development are set in a story context (such as aliens trying to get to their home planet) to encourage students as they go through the items. However, an enjoyable testing experience, while important, is not sufficient to promote positive student learning. The extent to which PAT Early Years promotes self-confidence depends in part on how the data is used. The potential for using the PAT data for positive feedback is explored in the next section.

Feedback

Positivity is further encouraged through assessment data that identifies the learner's achievements and supports the provision of constructive feedback. Feedback is most constructive when it is drawn from evidence of the knowledge and skills the learner has in place, those they are consolidating and those that require more attention. Such evidence allows teachers to communicate the learner's achievements and help them to recognise their own progress. Learners can be encouraged, as they develop, to take ownership of their assessment outcomes and to help drive where they need to go next. Quality assessment data can also help uncover a learner's self-efficacy and the strategies they use spontaneously and with scaffolding. This information can be incorporated into feedback; understanding learner's attitudes and beliefs towards their learning can be essential to overcoming obstacles and supporting further development. Feedback should also not be considered a one-way street. Learners benefit from self-reporting; that is, from the opportunity to inform adults about their skills and learning and to reflect on their own knowledge (Danielson & Phelps, 2003).

PAT Early Years and feedback

A strength of the PAT suite of tests is the rich data sets they provide, offering insights into the performance of students in specific strand areas along a continuum of learning. The PAT Early Years Reports provide opportunities for teachers to improve their understanding of the key skills underpinning reading and mathematics, such as through the skill descriptions attached to each item and the Achievement Band Descriptions that describe progression along a scale. It is, however, up to teachers and educational institutions to decide how this evidence is fed back to the students to promote positive attitudes towards their learning. PAT data can be used to indicate how students have progressed, and feedback can focus as much on the learning they have in place as where they need to go next. This approach is more likely to promote self-confidence and ownership over learning than one that focuses on comparing a student's performance with their peers.

Collaboration

An assessment methodology can foster partnerships, encouraging communication between teachers, families and the wider community. It can support teachers to communicate what a learner's family might do to support the learner's development, identifying an explicit learning pathway that is referenced in the learner's home life, and specifying family support activities. This support depends on constructive interpretation of technically rigorous assessment data. Clear and concise communication of the assessment outcomes needs to be a priority of the reporting design. Collaboration can also be encouraged through knowledge sharing between teachers and other early childhood professionals working outside educational settings (VCAA, 2013, p. 9). Teachers who work in partnership with other professionals can collate and use the evidence of children's prior and current learning and development. This enables them to build continuity in learning and development across services and transition points (VCAA, 2017, p. 16).

PAT Early Years and collaboration

The PAT methodology is centred on a continuum of learning that is domain-specific and detached from age or grade. Quality assessments with evidence-based developmental progressions provide significant opportunities for collaboration. Explicit teaching of reading and mathematical skills begins from the first year of official schooling, but children are building their skills in these areas long before explicit instruction begins. For example, children increase their awareness of the sounds in words through rhyming songs and storybooks that play on repetition and alliteration. They increase

their vocabulary and comprehension by engaging in conversations with parents, carers and teachers about storybooks that are read to them. They recognise numbers and can play boardgames that support the development of counting skills. Assessments based on a continuum of learning can support transition between different stages of schooling. They encourage a shared understanding of key skills and how they develop, and a shared language that can be used in communicating and collaborating with families, learners and other teachers. PAT Early Years data can also be used to encourage collaboration across subject areas; literacy and numeracy are now well acknowledged as interdisciplinary foundational skills that interact with other developmental areas, such as executive function (Fuchs et al., 2010; Welsh et al., 2010). Insight into students' ability in early literacy and numeracy can usefully inform teaching practice in many other areas of student learning.

Conclusion

Principles and methodologies relating to quality assessment practices need to be applied at all stages of learning and development. All assessments can be designed to be fit for purpose, ethical and fair, and technically rigorous. All assessments can promote continuity in learning through the use of developmental progressions, and can prioritise self-confidence, and positive and constructive feedback, and promote collaboration between all parties invested in the learner's ongoing development. Quality, evidence-based measurement tools can build teachers' understanding of foundational skills: the key skills learners need to learn, how they develop and how they interact. Some of these criteria for quality assessment practices take on particular importance in early childhood, where play-based programs dominate teaching, and nurturing relationships are integral to children's development. But these criteria do not need to be prioritised at the expense of others; decontextualised assessments can take place in familiar environments for children, and can be aligned with developmental progressions that contextualise seemingly discrete skill areas. PAT Early Years is built on the premise that learning is continuous, and that quality, evidence-based descriptions of learning can improve our understanding of key skills and guide learners' ongoing development. This methodology can apply equally to ECEC contexts, so long as appropriate methods for assessing young children are worked into the design. ACER is currently conducting research into the development of descriptions of progress through quality assessments designed for ECEC contexts, with the aim of exploring how teachers can best be supported in their understanding and teaching of key foundational skills for young children.

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Partnerships in early childhood education: Engaging families in professional conversations

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Greta Rollo leads the Primary Early Childhood and Inclusive Research team. This team engages policymakers, school leaders and educators in the development of research-informed policies and practices in the early years (birth to 8 years). Greta leads and contributes to domestic and international projects developing tools and approaches that support improved learning (assessment rubrics, learning progressions, observational assessments, and personalised learning and support processes) across critical areas of early development including social and emotional learning, oral language, fundamental movement skills and self-regulation. She has led projects to evaluate educational programs and policy initiatives and is interested in using research to inform personalised learning and support. Greta's current research interests include using music pedagogy to enhance engagement and learning in early years settings.

Abstract

Effective monitoring of learning and development involves integrating multiple perspectives from a child's parents, carers, family, and their educators. A collaborative approach between educators and families not only recognises the family's critical importance in their child's life but it has also been shown to benefit children with learning difficulties, delays and behavioural concerns (Parenting Research Centre, 2012; Prior et al., 2011). Efforts made towards the integration of multiple perspectives can also support stronger inclusion of diverse families into communities of early childhood education and care. However, discussions with parents and carers about issues regarding their children's development can be a challenging part of an educator's role (O'Connor et al., 2018). This paper will reveal both obstacles and enablers when it comes to engaging in conversations with parents and caregivers. Bronfenbrenner's ecological systems theory positions 'mutuality, reciprocity and shared decision-making' (1979, p. 46) at the forefront of planning for conversations about the learning and development of young people. This paper will justify how this lens has informed the development of a tool to support educators and families to move beyond traditional power imbalances to enhanced and balanced relationships that result in improved holistic student support.

Introduction

Simone Griggs and Greta Rollo offer Masterclass 1, 'Partnerships: A guiding resource to use when approaching professional conversations with families and carers'. The National Quality Framework (NQF) and the Early Years Learning Framework (EYLF) ask educators to form 'respectful supportive relationships' with families (NQS Standard 6.1). This Masterclass uses a workshop-style to focus on developing partnerships between educators and families using a supportive resource that can help educators approach conversations regarding concerns about students learning and development. The workshop is an opportunity to build and explore applied theories, including family-centred care, ecological systems theory, social exchange theory and apply these to practice using integrated tools and approaches to build and maintain trusting partnerships with parents. The following paper forms the theoretical background of Masterclass 1 and informs development of the resources upon which the Masterclass is based.

The enduring impact of early learning experiences

The quality of a child's early experiences in life has a significant and enduring impact on their academic and social-emotional skill development (McCain et al., 2007; National Scientific Council on the Developing Child, 2007). During this extremely important period of development, a child's motivational disposition is formed and if this development is not adequately supported, a child's formal learning and academic achievement may be hindered (Center on the Developing Child at Harvard University, 2011; Shonkoff & Phillips, 2000). A report by the Ministerial Council for Education, Early Childhood Development and Youth Affairs, Australia (2011) highlights the vital role that families play in promoting children's early brain development. Findings from this report conclude that by the time a child is 3 years old, 90% of their brain has already developed – therefore the relationships and environments that a child is exposed to in the early years are of critical neurological importance. The children of families who take an active part in their early learning service — which includes close relationships with educators — achieve greater educational outcomes (McDermott, 2010), irrespective of their socioeconomic level, ethnic or racial background, or their parents schooling level. This indicates that children are much more likely to reach their full potential when their family and early childhood education and care services (ECEC) work together.

Relationships between ECEC educators and families are critical

Research stresses that fostering strong relationships between early childhood educators and families improves education, health and wellbeing outcomes for children (Ashton et al., 2008; Epstein, 2011; Jinnah & Walters, 2008; Knopf & Swick, 2006; Ratcliff & Hunt, 2009; Tayler, 2006). Multiple studies of early years programs designed to promote communication between parents and educators, show that successful partnerships can boost children's academic and social-emotional skill development (Bierman et al., 2017; Fenech, 2013; Lang et al., 2016). Collaborative approaches to early intervention have also been shown to benefit children with learning difficulties, developmental delays and behavioural concerns (Parenting Research Centre, 2012; Prior et al., 2011). Such research demonstrates that partnerships between families and educators in ECEC have the potential to optimise the trajectory of all children's development, resulting in timely referrals to allied health services and more positive holistic outcomes for children.

Teachers' and educators' continuous monitoring of learning and development in these crucial years can allow timely identification and support of young children experiencing developmental challenges (Mozolic-Staunton et al., 2017; Mozolic-Staunton et al., 2021). Such monitoring involves integrating

multiple perspectives from a child's parents, family, friends, health carers and educators (Mozolic-Staunton et al., 2021). By linking observations from their home environments with their education environments (Mozolic-Staunton et al., 2017), it is possible to holistically identify a child's strengths, abilities and learning needs. This research can be used to inform and strengthen partnerships.

An Australian study by Ratcliff and Hunt (2009) explores partnerships between educators and families but identifies that while ECEC educators understand the importance of establishing strong relationships with parents, developing these partnerships can be challenging and complex. This finding is reinforced by Mahmood (2013) who reveals that educators often feel unqualified when asked to respond to sensitive issues such as concerns about a child's learning and development. Comparable evidence in a study by O'Connor et al. (2018) found that discussions with parents about their children's development continued to be a difficult part of an educator's role, even when educators had several years' experience. Despite understanding the importance of partnerships with families, educators can struggle to establish and maintain these relationships and further research in this area is needed.

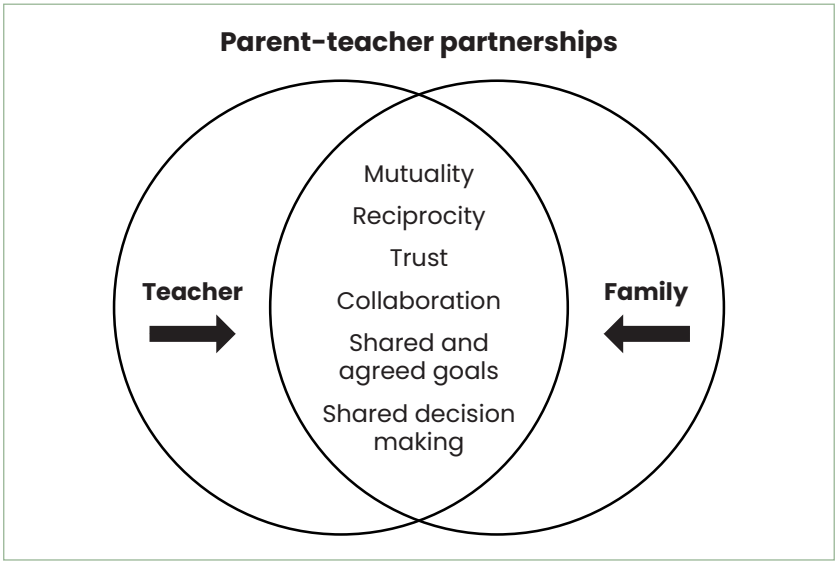
Research into partnerships is needed to support ECEC educators

This paper identifies the gaps in existing research regarding educator and parent partnerships with a particular focus on supporting early childhood educators to collaborate with families. This includes how difficulties in learning and development are identified and how educators raise and respond to families' concerns about a child's learning and development. This paper develops a theoretical grounding for the creation of a tool that supports professional conversations that build and sustain educator and parent partnerships. Partnerships are defined with reference to Bronfenbrenner's ecological systems theory and Homan's social exchange theory. Lastly, current research on the benefits and challenges of collaborative partnerships between educators and families is discussed.

Despite educators understanding the importance of creating strong partnerships with families, there are challenges in forming and maintaining these relationships (Fenech, 2013; Lang et al., 2016; Nitecki, 2015). This may be due to uncertainty in the literature about how educator–parent partnerships can be defined. Literature from educational sources notes that the term 'partnerships' is often used interchangeably with terms such as 'parent involvement' (Berthelsen & Walker, 2008; Zellman & Perlman, 2006) and 'parent engagement' (Douglass, 2011). Driessen et al. (2005) suggests this ambiguity in the definition of partnerships results in ambiguity between families and ECEC educators. For the purposes of this paper, Bronfenbrenner's definition of partnerships will be considered together with key principles of Homan's social exchange theory.

Bronfenbrenner's ecological systems theory recognises 3 environments through which a child's development occurs: the interactions they have with their caregivers, family and friends; their participation in early childhood services; and the cultural values of their community (Bronfenbrenner, 1979). This theory recognises that parents and caregivers should be supported and empowered to engage in decision-making about their child (Bronfenbrenner, 1992). Bronfenbrenner (1979) also identifies 3 critical concepts that contribute to the framework for strong partnerships: 'mutuality, reciprocity and shared decision-making' (Bronfenbrenner, 1979, p.46). He suggests that mutuality assumes a common understanding shared by both parties (Bronfenbrenner, 1979; Rouse, 2014). While Rouse describes reciprocity as a 'two-way process which is both causal and influential on the interactions between the partners' (Rouse, 2014, p.47). Trusting relationships only occur when both mutuality and reciprocity are present (Rouse, 2014) because 'when there is a balance of power in a relationship, reciprocal trust, collaboration and shared decision-making between educators and parents is more likely to occur' (p. 47). The model presented in Figure 1 recognises the critical concepts that contribute to effective partnerships.

Figure 1 Partnerships between educators and families



Source: Bronfenbrenner (1979)

Trust is at the forefront of effective partnerships

While the ecological perspective rationalises the importance of partnerships, it does not explain the motivation for parents and services to work collectively (Halgunseth et al., 2009). Social exchange theory may provide insight into how social partnerships develop and are maintained. According to this theory, relationships develop depending on the exchange of resources between participants and the weighing of costs and benefits (Halgunseth et al., 2009). Halgunseth et al. (2009) also describe how perceived resources or benefits can be tangible (for example, adult education courses) or intangible (for example, warm, welcoming environments). The concept of trust is also at the core of social exchange theory. As mutual trust develops between the family and the educators so will the extent and commitment to the partnership (Early, 1992; Lopez, et al., 2004; Nakonezny & Denton, 2008). If trust is lost, however, the commitment to the relationship will begin to diminish (Early, 1992; Lopez, et al., 2004; Nakonezny & Denton, 2008).

Murphy et al. (2021) sought to understand parents' experiences of collaborative practice within Australian ECEC services and to explore educators' confidence in collaborating with families. Likert scale data was collected through online surveys and focus groups with 318 educators and 265 parents. Results from the study revealed that 90% of parents agreed or strongly agreed that they were 'treated with politeness and courtesy at all times at this service' and that 'staff talk to me in a way I understand at this service' (Murphy et al., 2021, p. 98). However, parents were less satisfied with how educators viewed their input into their child's learning. For example, only 52% of parents agreed with the statement that their 'priorities and interests as a parent are considered when goals are set for their child' (Murphy et al., 2021, p.98). From the same study, 89% of the surveyed educators reported feeling very confident or extremely confident in communicating a child's success or achievements. When asked to report their level of confidence in sharing information about children's learning and progress, 81% of the educators reported feeling very confident or extremely confident. However, only 67% of the educators reported feeling confident to respond to concerns or complaints by parents and only 69% of educators encouraged parental involvement within their child's educational program.

The methodology used by Murphy et al. (2021) does not allow conclusions to be drawn about the viewpoints of male caregivers, parents with a low education level, parents with English as an additional language and those who do not have access to the internet (Murphy et al., 2021). Despite these limitations, useful information was garnered regarding how early childhood centres currently collaborate with families. Although, there was an overall sense of satisfaction among parents, they still felt their needs and expertise were not being drawn upon to support monitoring of their child's learning and development. Evidence from educators involved in the study also revealed that there is a need for more support and guidance in how ECEC staff can effectively respond to parents' concerns.

A study conducted by Almendingen et al. (2016) explores parents' experiences of collaboration with their ECEC service, educators' confidence to work with parents, and educators' training needs. The study found that 98% of educators (n=318) wanted further training in how to work with parents. Most educators reported that they had high confidence in sharing information about a child's progress; however, raising or responding to parent concerns, was more of challenge (Almendingen et al., 2016). Parents who participated in the study reported they felt a sense of belonging at their ECEC service, yet they still desired improvements in how educators shared information about their child's learning and development (Almendingen et al., 2016). Responding to these findings, the Parenting Research Centre developed and trialled an intervention called, Partnering with Parents. This intervention featured three components: 1) Making moments matter; 2) More than moments; and, 3) Working on concerns. Implementation of key concepts and strategies within these components was introduced over a 10-week schedule by a nominated practice coach within each service. A survey was implemented to explore the impact of the Partnering with Parents program following this intervention at 3 time points: before, immediately after and 3 months post the intervention (Petrovic et al., 2019). It is important to note that only parents and educators who raised or responded to a concern about a child in the previous 4 weeks participated in the survey (22.5% of parents; 86.6% of educators and 55.1% of educators respectively).

A qualitative, descriptive approach was used to analyse open-ended responses from this questionnaire and comments were each coded to specific themes. 'Respectful and responsive educators', 'Collaborative problem-solving' and 'Knowing how to communicate concerns' were some of the themes that emerged (Petrovic et al., 2019). Findings from the study suggest that parental characteristics such as the degree of reciprocity they display may affect how educators raise concerns (Petrovic et al., 2019). On the other hand, from the parents' perspectives, the degree of respect and collaboration educators displayed through listening and respecting parents' opinions was highly valued when raising concerns (Petrovic et al., 2019). Positive self-evaluation of educator's experiences also tended to occur when parents agreed with concerns raised and were inclined to be involved with proposed support strategies. Findings further suggest that educators who are actively supported to develop skills in promoting parent–educator relationships report greater confidence in their capacity to address child-related challenges (Petrovic et al., 2019).

When raising concerns with parents, several educators stressed the importance of knowing how to phrase concerns well and deliver information in a respectful and empathetic way (Petrovic et al., 2019). Inviting parents to share their perspective on how concerns can be addressed is a fundamental principle behind Australian ECEC practices (Department of Education and Training, 2016). Indeed, genuine partnership involves both parents and educators identifying and addressing children's needs, particularly when planning and implementing feasible and appropriate supports (Kuhn et al., 2017). Such approaches have been linked to greater parental trust in educators (Rautamies et al., 2019). These approaches allowed educators to gain insights into children's needs from the parent's perspectives, brainstorming support strategies suitable for the family and mutually agreeing with parents about which course of action to take.

Conclusion

This paper investigated possible approaches to partnerships in early childhood education. In children the early years are essential for neurological, social-emotional and educational growth (Tayler, 2012). It is, therefore, imperative that learning and development is continuously monitored to ensure the best outcomes (Mozolic-Staunton et al., 2017; Mozolic-Staunton et al., 2021). As demonstrated in this paper, effective partnerships between parents and educators can have a great impact on these outcomes.

Central to Bronfenbrenner's ecological systems theory is 'mutuality, reciprocity and shared decision-making' between families and educators. Prioritising these concepts allows educators and families to effectively discuss the learning and development of young children. The concept of mutual trust, as defined by social exchange theory, motivates parents and educators to work collectively (Halgunseth et al., 2009). Creating trusting relationships ought to be given high priority to support collaborative partnerships. Therefore, these concepts have informed the development of a resource for educators and parents to use to support collaborative partnerships in ECEC.

Findings from the study by Petrovic et al., (2019) have informed the development of this resource in three ways. First, the resource uses guided questions that aim to gain information about the child from the parents' perspectives. Second, it uses collaborative brainstorming prompts that help to develop suitable strategies for the family and service. Finally, the resource advises that stakeholders mutually agree on next steps to support the child's learning and development. These approaches, as supported by the literature, are all conducive to effective collaboration and improved outcomes for children (Petrovic et al., 2019).

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PROGRAM

Day 1 Sunday 3 September

Masterclasses 9 am – 12 pm

Masterclass 1

Partnerships in early childhood education: Engaging families in professional conversations

Meeting room C2.3

Masterclass 2

Tailored arts programs: Possibilities for classroom wellbeing for teachers and students

Meeting room C2.2

Masterclass 3

Essential for some, good for all: Learning through play and dyscalculia

Meeting room C2.1

Lunch break (Masterclass participants only)

12:00–12:30 pm Pyrmont Theatre Foyer

Main program

Welcome to country

12:30–12:40 pm Parkside Ballroom

Conference opening

12:40–1:00 pm Parkside Ballroom

Keynote

Assessment is coming and the early childhood sector must lead the way

1:00–2:00 pm Parkside Ballroom

Dr Dan Cloney

Showcase and afternoon tea

2:00–2:30 pm Pyrmont Theatre Foyer

PROGRAM

Concurrent sessions 1

2:30–3:30 pm

Community-driven, technology-assisted support for Erub Mer language and early literacy in the Torres Strait: Practice and policy

Sarah Groom & Lala Gutchen

Meeting room C2.3

Focus on strengthening transitions using the Early Years Assessment and Learning Tool

Pippa Procter

Meeting room C2.1

It's more than words: Supporting young children's language development

Professor Louise Paatsch

Meeting room C2.5 & C2.6

Science in the early years: Evidence-based educator resources

Gayl O'Connor

Meeting room C2.2

Keynote

Navigating the nexus between health and education: Can we bring early children's development and learning together?

3:30–4:30 pm Parkside Ballroom

Professor Sally Brinkman

Panel discussion: Strengthening the transitions from early childhood to primary

4:30–5:30 pm Parkside Ballroom

Beth Flatley, Pippa Procter, Rowena Shirtcliff & Dr Dan Cloney

Networking function

5:30–6:30 pm Pyrmont Theatre Foyer

Day 2 Monday 4 September

Keynote

Does play belong in the primary school classroom?

9:00–10:00 am Parkside Ballroom
Dr Bo Stjerne Thomsen & Rachel Parker

Showcase and morning tea

10:00–10:45 am Pyrmont Theatre Foyer

Concurrent sessions 2

10:45–11:45 am

Bringing learning progressions down to 2-year-olds in reading and mathematics

Prue Anderson
Meeting room C2.2

Social and cognitive foundations of emotional competence: Conceptualising development and measuring change

Professor Marc de Rosnay
Meeting room C2.5 & C2.6

Mathematical mindsets: Fostering student engagement and positive mindsets through the use of challenging tasks

Greta Rollo
Meeting room C2.1

The journey to becoming a reader: Relationships between home activities, attitudes and reading

Kylie Hillman
Meeting room C2.3

Keynote

Contributing to continuity: Supporting children to progress in their learning across our education system

11:45 am–12:45 pm Parkside Ballroom
Dr Jenny Donovan

Lunch

12:45–1:30 pm Pyrmont Theatre Foyer

PROGRAM

Concurrent sessions 3

1:30–2:30 pm

Building a Continuity of Learning Framework: What is it and why does it matter?

Professor Larissa McClean Davies

Meeting room C2.2

Conceptual development: How do early educators and teachers support children's early thinking in STEM?

Laureate Professor Marilyn Fleer

Meeting room C2.5 & C2.6

What do educational leaders need to know to build capacity for inclusive practice?

Dr Jane Jarvis

Meeting room C2.1

Stacking 'learning' interventions to address inequity

Professor Sharon Goldfeld

Meeting room C2.3

Afternoon tea

2:30–2:45 pm Pyrmont Theatre Foyer

Concurrent sessions 4

2:45–3:45 pm

The contribution of learning trajectories to enacting the Early Years Learning Framework V2.0

Professor Caroline Cohrssen

Meeting room C2.5 & C2.6

Towards estimating the value-add of preschool programs for 3 year olds

Ben Lodewijks, Robert Cantwell & Laura Bills

Meeting room C2.1

Learning through Play at School: Lessons from the Ukraine

Dr Kellie Picker

Meeting room C2.3

Understanding early cognitive development: Using PAT Early Years to support student learning

Dr Sandra Knowles

Meeting room C2.2

Keynote

Ensuring a safety net: Supporting low achievers in school contexts

3:45–4:45 pm Parkside Ballroom

Professor Anne Castles

Conference summary and close

4:45–5:00 pm Parkside Ballroom