Assessment of Children as Effective Communicators in Early Childhood Education and Care: Literature Review

Victorian Early Years Learning and Development Framework

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Contents

The Victorian Early Years Learning and Development Framework (VEYLDF) includes eight Practice Principles to guide evidence-based practice across the early years. The VEYLDF identifies five Outcomes (as agreed by the Council of Australian Governments (COAG) in July 2009) for children from birth and extends these to include all Victorian children from birth to eight years.

The five Learning and Development Outcomes assist professionals to plan for and assess all children's learning and development and provide a common language to support collaborative approaches between early childhood professionals and families. The Learning and Development Outcomes are:

- Children have a strong sense of identity.
- Children are connected with and contribute to their worlds.
- Children have a strong sense of wellbeing.
- Children are confident and involved learners.
- Children are effective communicators.

Supporting children to progress toward these outcomes is the core of the VEYLDF.

This literature review documents the research that underpins and defines communication for children from birth to eight years, and outlines children's trajectory of communication development and the different modes and components of language. The Glossary defines terms used in this review to strengthen a shared understanding across early years services and settings.

The content of this literature review has been used to inform the *Communication Practice Guide* to improve the quality of engagement between early childhood professionals and children and families and other early childhood professionals. It identifies principles for assessing communication in practice and profiles existing tools to support the assessment of children's communication. The *Communication Practice Guide* will promote a deeper understanding of Outcome 5: *Children are effective communicators* and provide practical support for early childhood professionals.

Executive summary

The VEYLDF describes five Learning and Development Outcomes. This literature review focuses on the VEYLDF Outcome: *Children are effective communicators*.

The development of communication skills begins at birth and is integral to a child's self-expression, wellbeing, identity, sense of agency and capacity to make friends (Department of Education and Training 2016). Communication skills are essential for the development of confident and creative individuals who effectively navigate and participate in society.

The following seven principles for assessing communicative competence have been identified in this review to inform early childhood professional practice:

1. Effective assessment of communication requires a clearly defined purpose.
2. Communication is multifaceted and each element may require specific assessment.
3. Communication assessment may include both formal (standardised tests) and informal (observation) methods.
4. Assessment of communication considers the multiple languages and communication systems that a child may use, to gain a holistic understanding of communicative competence.
5. Assessment of communication includes children's own reports, evidence from families and multiple sources of information in a range of settings.
6. Assessment of communication considers a child's functional use of language and participation in daily life as a communicator.
7. Assessment of communication is an opportunity for multidisciplinary collaboration.

This literature review identifies a range of tools available to support early childhood professionals in their assessment of children's communication. The tools were selected to address each of the key components of the Communication Outcome across the full range of communicative skills that children develop from birth to eight years:

- Australian Council for Educational Research (ACER) Progressive Achievement Tests (PAT) in Early Years
- Ages and Stages Questionnaire – Third Edition (ASQ-3)
- Assessment, Evaluation and Programming System for Infants and Children (AEPS)
- Communication and Symbolic Behavior Scales (CSBS) Developmental Profile Infant-Toddler Checklist
- Focus on the Outcomes of Communication Under Six (FOCUS©)
- Infant-Toddler Social and Emotional Assessment (ITSEA)
- Intelligibility in Context Scale (ICS)
- MacArthur-Bates Communicative Development Inventories (CDI)
- Parents' Evaluation of Developmental Status (PEDS)
- Record of Oral Language.

The tools selected have been validated and are accessible for administration by a range of early childhood professionals. To further support those in leadership roles, a Glossary of specialist terms has been included.

The purpose of this literature review is to provide a comprehensive resource for early childhood professionals seeking to assess the communication of the children they work with. It has been designed to equip early childhood professionals with the knowledge to identify and assess children's communication.

The literature review:

- identifies appropriate communication assessment tools for use by early childhood professionals
- outlines the areas of communication development that are addressed by each of the specific tools
- provides an overview of the purpose and features of each tool and a discussion of its usefulness in assessing children's communication.

Early identification of communication capabilities and challenges is essential to support children's long-term social and educational outcomes.

Introduction

The early years of childhood are the most significant time in a person's life for cognitive and social development; experiences during this time shape a child's sense of belonging, being and becoming. The VEYLDF outlines comprehensive approaches to children's learning and development, and sets out outcomes and practices to guide early childhood professionals. High-quality early childhood education, along with other early childhood services, builds on the early learning in families to provide children with the best start in life.

Investment in early childhood not only benefits the individual, but society as a whole. The Mitchell Institute states that 'early education is one of the most significant investments in education and productivity that governments make' (O'Connell et al. 2016, p. 5).

Early childhood education is important for overcoming disadvantage and creating more equitable opportunities for children to become confident and competent lifelong learners. Children who attend early childhood education are less likely to be identified as developmentally vulnerable on the Australian Early Development Census (AEDC; O'Connell et al. 2016). A well-connected, accessible and effective service system supports families to raise happy and healthy children who can achieve their potential (O'Connell et al. 2016).

The ability to communicate effectively is at the core of children's social and cognitive success. Effective communication is the foundation for lifelong autonomy and engagement in society (Johnson, Beitchman & Brownlie 2010). Early childhood is a vital time for communication development as children learn not only the sounds, letters and words of the language(s) around them, but also how to use these tools to be understood and to describe their learning, ideas and interests. *Children are effective communicators* has been identified as one of the five Learning and Development Outcomes of the VEYLDF (Department of Education and Training 2016). The VEYLDF identifies five key components for the Communication Outcome:

1. Children interact verbally and non-verbally with others for a range of purposes.
2. Children engage with a range of texts and get meaning from these texts.
3. Children express ideas and make meaning using a range of media.
4. Children begin to understand how symbols and pattern systems work.
5. Children use information and communication technologies to access information, investigate ideas and represent their thinking.

Many children across the world learn to speak more than one language and communicate effectively in these languages. In Australia, 72.7 per cent of families speak English at home (Australian Bureau of Statistics [ABS] 2017). The most commonly spoken languages other than English are Mandarin, Arabic, Cantonese, Italian and Vietnamese (ABS 2017). In total, there are more than 300 languages spoken in Australia, including 120 Indigenous languages spoken by the traditional custodians of this land, the Aboriginal and Torres Strait Islander people (ABS 2017; Marmion, Obata & Troy 2014).

The Early Years Learning Framework for Australia recognises the importance of supporting children to maintain their home languages: 'Children's use of their home languages underpins their sense of identity and their conceptual development' (Department of Education, Employment and Workplace Relations [DEEWR] 2009, p. 38). Home language maintenance shapes identity, language and cognitive development (Clarke 2009) and can be facilitated by partnership with families and interpreters (Clarke 2011). When children have difficulty communicating in their first language, this can have a lifelong impact on their academic, social, emotional, occupational and economic outcomes.

The presence of speech and language difficulties in early childhood has been found to significantly impact long-term educational outcomes over and above other predictive factors such as IQ and maternal education (Conti-Ramsden et al. 2009). A large body of international research has found that children who experience communication difficulties in early childhood are more likely to have ongoing difficulties with learning to read and write, behaviour, attention, spelling, calculating, communication, mobility, self-care, mental health, forming and maintaining relationships (with peers, parents, siblings and partners) and acquiring, keeping and terminating employment (Clegg et al. 2005; Felsenfeld, Broen & McGue 1994; Harrison et al. 2009; Lewis et al. 2000; Lindsay, Dockrell & Strand 2007; McCormack et al 2009; Snowling et al. 2006; St Clair et al. 2011). Furthermore, researchers have found a strong association between childhood communication difficulties and youth incarceration (Snow & Powell 2008, 2012).

While communication difficulties are a highly prevalent condition among young children (Law et al. 2000; McLeod & Harrison 2009; McLeod & McKinnon 2007), many communication difficulties, such as speech sound disorders, are highly responsive to intervention (Baker & McLeod 2011; Law, Garrett & Nye 2003). Early detection and intervention in communication difficulties can reduce the longevity of these difficulties and their impact upon children's education and socialisation (Schwarz & Nippold

2002). From an economic perspective, the presence of communication difficulties in childhood has been associated with significantly increased costs for both families and governments (Cronin et al. 2017; Le et al. 2017). Early detection and intervention for communication difficulties is a cost-effective investment for society (Law et al. 2006).

This literature review was commissioned by the Victorian Curriculum and Assessment Authority (VCAA) to identify and review a range of assessment tools that early childhood professionals can use to assess how effectively children use communication for a variety of purposes in the period from birth to eight years.

Section 1 explores the trajectory of children's learning and the five key components of learning in the VEYLDF Communication Outcome.

In Section 2, seven principles for assessing children's communication are identified and explained. The principles acknowledge that assessment of children's communication provides an opportunity for collaboration across disciplines. A list of tools used by specialist professionals such as speech pathologists and occupational therapists is included in the Appendix. This list has been included only as a reference; in some cases, educators may be asked to participate in their administration.

In Section 3, a summary matrix table identifies: appropriate tools for particular ages; who can administer the assessment; the domain each assessment addresses; and whether the tool was normed and/or developed in Australia.

Section 4 evaluates each of the tools selected for early childhood professionals to assess the five key components of the Communication Outcome. The selected tools cover the full range of communicative competencies that children develop from birth to eight years. An overview of each tool's purpose and administration is provided.

Section 1: How are children defined as effective communicators from birth to eight years of age?

In its broadest sense, communication is defined as a process by which information is exchanged between individuals through a common system of language, symbols, signs or behaviour. Communication involves speaking, hearing, listening, understanding, social skills, reading, writing and using voice and gesture (Speech Pathology Australia 2017).

Communication can take place using single modes such as oral, written or gestural communication, or may be multimodal with several single modes combined. Communication is multifaceted and can be classified as either receptive (information is received) or expressive (information is expressed). Each of the modes of communication considered in this report is outlined in Table 1.

Table 1: Modes of communication

Mode	Receptive	Expressive
Oral	Listening/comprehension	• Talking (language, speech sounds, fluency, voice) • Singing
Written	Reading	• Handwriting • Spelling • Typing • Drawing
Multimodal	Looking (for example, receiving sign language or pictures)	• Signing • Gesturing • Representing ideas digitally • Using a voice output device
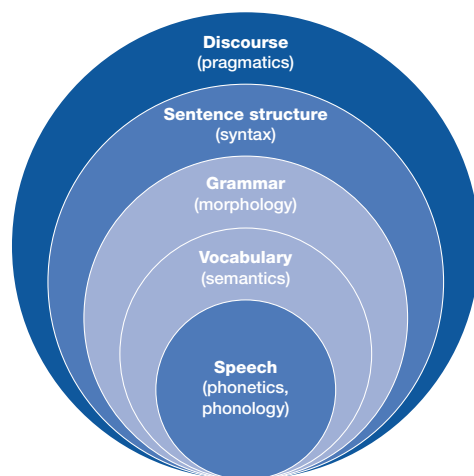
Figure 1: Components of language

In addition to the different modes that communication can take, there are many components that make up communication. These are illustrated in Figure 1 and expanded in McLeod and McCormack (2015). The Glossary has further explanation of each of these terms.

It is important to emphasise that modes and components of communication do not exist in isolation, but rather they overlap, with each one supporting the development of another. For example, the development of phonological awareness impacts on later literacy (National Early Literacy Panel 2008). The interconnected nature of these components should be acknowledged when considering children's communication development.

What are children's trajectories of communication across the early years?

Children's increasing ability to communicate is remarkable. The most rapid period of speech and language acquisition occurs during the first five years of life (McLeod & Baker 2017; Owens 2016). Typically, receptive communication skills develop before expressive communication skills (Paul & Norbury 2011), as children learn to absorb and process communicative information from their environment before then using that information to express themselves.

Children's ability to express ideas through different modes begins in early childhood and extends into the school years. Communication development underpins all academic learning across the full spectrum of subject areas throughout a child's education.

Children's trajectories of communication may not follow a linear process and there can be considerable variation in the time taken to develop particular skills. Furthermore, children simultaneously develop interrelated skills, understandings and abilities across speech, language and literacies. Learning is impacted by contexts (for example, home and early childhood settings), the availability of tools to support learning (for example, books and drawing implements), and children's interactions with more knowledgeable others (adults and older children).

A contemporary approach to understanding literacy recognises that in the 21st century there are multiple sets of abilities required to create and interpret meaning. Some of the interrelated aspects of speech, language and literacies across early childhood are highlighted in Table 2.

Features attributed to positive communication trajectories include: having a more persistent and more sociable temperament; higher levels of maternal wellbeing; and parental support for children's learning at home (Harrison & McLeod 2010; Zubrick et al. 2007).

Identified risk factors for communication difficulties include: being male; having ongoing hearing problems; reactive temperament (Harrison & McLeod 2010); family history of late language emergence; and lower birth weight and prematurity.

Factors that have not been associated with late language emergence include: parental education; socioeconomic resources; parental mental health; parenting practices; and family functioning (Zubrick et al. 2007).

Speech Pathology Australia provides fact sheets that are written for parents and early childhood professionals and provide additional information about children's trajectory of communication: The Sound of Speech: 0–3 years; The Sound of Speech: Preschool and School Aged Children; Helping Your Baby to Talk; and Literacy. Easy English versions are also available.

For the purpose of this document, the five key components of the Communication Outcome are defined and discussed separately.

How do children interact verbally and non-verbally with others for a range of purposes?

Defining communication in the early years requires consideration of verbal communication through spoken language, and non-verbal communication through gesture, facial expression, body language, and non-verbal forms of language (for example, drawing, Australian Sign Language, known as Auslan). Children express their needs, intentions and ideas in both verbal and non-verbal ways. In early childhood, the early development of gestural, non-verbal communication supports children's development of verbal language skills (Rowe, Özçalışkan & Goldin-Meadow 2008) and associated executive functioning (Kuhn et al. 2014). Early childhood professionals can interpret and respond to children's non-verbal communication and pair this with words and sentences to support meaning-making and speech and language acquisition.

Children who communicate verbally may speak one or more languages. They may also speak different dialects of the same language. Multilingual and multidialectal children may switch between languages when communicating (code switching) or mix languages and dialects together during the same communication exchange (code mixing). A strong foundation in the first language supports children to learn English as an additional language.

Children who communicate non-verbally may use multimodal communication systems to convey their message. One mode of non-verbal communication is the use of sign languages (for example, Auslan). Sign languages are unique to countries and communities (for example, Auslan is a different language from British Sign Language and American Sign Language). Therefore, children who use sign languages may also be multilingual, using sign languages and oral communication to communicate depending on their environment and

Table 2: Examples of interrelated aspects of speech, language and literacies across early childhood

Age	Speech and language	Literacies
0–3 years	Crying, smiling, making eye contact, listening, cooing, babbling, pointing, turn-taking, imitating, learning words and their meanings, using short sentences, learning to pronounce words	Noticing and listening to others engaged in literacy tasks (for example, writing, reading). Mark-making, scribbling, engaging with images and books, playing games (for example, peekaboo), singing, rhymes
3–5 years	Expanding vocabulary, understanding conversations, using grammatical rules, using sentences, asking questions, creating conversations, telling stories, learning to pronounce speech sounds and words, being intelligible	Drawing, creating letter and text-like representations, recognising and writing their names (and those of siblings), recognising symbols, creating and reading words/labels, playing with sounds, rhymes and words, understanding texts, imitating book-reading routines (retelling favourite stories as they turn pages, responding to images), engaging with digital tools in playful ways
Early school years	Expanding vocabulary, refining use of grammatical rules, using increasingly complex sentences, creating narratives, using extended discourse, understanding social conventions, pronouncing polysyllabic words	Creating meaningful texts for self and others using a combination of drawings, written and spoken language and both traditional and digital tools. Developing understandings of how to create texts at the text, sentence, word and organisation levels (concepts about print). Learning the relationship between speech sounds and letters (phonetic and phonological awareness) to recognise and write the alphabet, to read and write common words and to make plausible spelling attempts. Reading age-appropriate texts using a range of sources of information (prior experiences, meaning at the text level, language/ grammatical structures, and decoding skills at the word level) with enjoyment, and increasing accuracy and fluency. Continuing to engage in, and learn from, texts read by adults

communication partners (Crowe et al. 2013). Another mode of non-verbal communication occurs when children use augmentative and alternative communication devices (AAC; Binger & Light 2006). These devices may be low tech (for example, picture cards) or high tech (for example, computerised speech output devices). Non-verbal communication includes the use of gesture and body language to convey a message. Children use verbal and non-verbal communication systems, particularly during the early years of childhood.

From their earliest interactions, children learn the fundamental aspects of verbal and non-verbal communication from the primary communication partners in their everyday environments (including parents, siblings, other family members and early childhood professionals). This includes the two-way nature of communication, initiating and responding to communicative turns, learning sounds and words, and the social and cultural rules that govern interactions. Children begin to explore their use of verbal and non-verbal communication by responding to sensory input (such as light, touch, sound and taste) and through play. Children continue to use both verbal and non-verbal communication for a range of increasingly complex social and academic purposes as they progress in acquisition of communicative competence.

How do children engage with a range of texts and get meaning from these texts?

Early childhood texts include, but are not limited to, traditional picture books, ebooks, songs, rhymes, poems, movies, videos, podcasts, audiobooks, drawings, paintings, letters, cards, online educational games and shopping lists. Texts may be officially published or created by children and adults. Children learn the rules of different text forms through ongoing exposure to them. Children's early experiences of texts typically involve interactions with family members, carers, early childhood professionals, siblings and peers. These interactions influence how early literacy experiences lay the foundation for children's later reading achievement (Lonigan et al. 2008 in Baroody & Diamond 2016); therefore, the quality of these interactions is important.

To have impact, texts should be engaging and provide opportunities for children to make connections between the text and their own world. It is also important that texts offer a range of perspectives that give children the knowledge and skills to engage with and better understand their world. The Victorian Curriculum Foundation–10 has cross-curriculum priorities of Aboriginal and Torres Strait Islander histories and cultures, Australia's engagement with Asia, and sustainability (VCAA 2016); these perspectives can be used by early childhood professionals when making text selections. Other texts should be shared with children for pure enjoyment and adults should be wary of turning the sharing of every text into a lesson. Gill (2015) states

'Reading aloud to children has been widely recognised as the single most important activity for preparing children for reading success' (p. 33). This strong correlation between reading aloud to children and later reading success means that providing opportunities for reading aloud to children is an equity issue and should be a priority for adults who work with children of all ages (Layne 2015).

The ways in which children engage with texts depends on their age, stage of learning, the appropriateness of the texts, prior experience with texts and how the texts are shared. Adults play a critical role in teaching children to enjoy reading and to want to engage with texts. As children progress with reading and an understanding of how texts work, they gain greater independence in their learning. Through exposure to texts – either shared or independent reading – children develop a deeper understanding of themselves and the world around them. Engagement with texts can support children to become more self-aware and develop empathy for others. Texts assist children to recognise and express their emotions in socially acceptable ways, thus they have the potential to help them to build resilience and facilitate the development of healthy relationships with peers; texts can also help children understand contexts that are different to their own and appreciate that there can be alternative perspectives. Environments that include literacy activities in appealing ways are more likely to have children with higher rates of engagement (Baroody & Diamond 2016). For early childhood professionals, engagement can be measured through observation of children's enjoyment, their frequency of participation in literacy activities, and through conversations with children about the texts they have engaged with (Baroody & Diamond 2016).

Learning to read is a strong focus of literacy in the early years of schooling and one of the most important academic achievements for children (Irwin et al. 2012). Children who are exposed to texts for a variety of purposes in their home or early childhood settings rehearse the reading process and understand how texts work, behaving as readers long before they learn letters or words (McNaughton 2014). Children turn the pages, make up their own stories to go with the pictures, and recite parts of texts they have committed to memory. The same process occurs when children engage with digital technology and online reading (Kervin & Mantei 2016). When children are learning to read they benefit from texts that scaffold this process by providing familiar situations, language, pictures and vocabulary to build on prior knowledge. It is important for adults (family and early childhood professionals) to continue to share texts that are beyond the current reading ability of their young learners.

The process of making meaning from texts is complex. The construction of meaning can occur individually or in groups; children construct knowledge collaboratively

when they engage in discussions about texts and ask questions, share ideas and describe personal interpretations to others. This type of collaboration is referred to as a 'dialogic space' and it assists children to co-construct shared understandings of texts (Maine 2013). Regular experiences of collaboratively processing complex texts in the early years of childhood helps children learn how to approach texts as early readers, and later, as independent readers (Hoffmann, Teale & Yokota 2015).

How do children express ideas and make meaning using a range of media?

Children's early methods of self-expression include mark-making (for example, drawing and painting) and verbal texts (for example, conversations and role play). This ability to express ideas in spoken, written and multimodal ways is critical to a child's success in becoming literate. Early childhood literacy is 'the single best investment for enabling children to develop skills that will likely benefit them for a lifetime' (Dickinson & Neuman 2006, p. 1).

Meaning-making and storytelling in contemporary Australia involve a range of expressive modes and media. Children use a range of semiotic systems (linguistic, audio, visual, gestural and spatial) and resources to create meaning for themselves and to communicate with others. According to Brandt (2015), 'working or living with others who write, invites cognisance about other people's writing processes and the conditions in which they write' (p. 15).

While conventional written language is still central to many texts, the tools (traditional and digital) and modes used to create texts vary. Mackenzie (2011) has argued for building on children's existing meaning-making processes (drawing and talking). Such an approach respects children's early experimentation with mark-making as well as their oral language. Multimodal text creation 'acknowledges and leverages the playful ways children create meaningful stories through their voices, their actions, images they draw, and props they construct as well as printed words they may compose on a page' (Wessel-Powell, Kargin & Wohlwend 2016, p. 167). The growing range of 'representational forms that are becoming increasingly significant in the overall communications environment' (New London Group 2000, p. 9) gives us further opportunities to reconceptualise meaning-making for young learners as more than just the printed word. The important role of families and the home environment in providing children with opportunities to explore self-expression are well researched (see for example, Bindman et al. 2014). However, as young children engage in a range of practices to 'connect, interact and communicate' (McLachlan et al. 2013, p. 66) there may be differences between their experiences at home and their experiences at school (Hopkins, Green & Brookes 2013).

How do children begin to understand the ways symbols and pattern systems work?

Children use symbols and pattern systems to both receive and convey information. Children learn that there is 'a relationship between oral, written and visual representations' (DEEWR 2009, p. 43). They learn that symbols and patterns are found in speech, language, letters, numbers, time, money and music. Patterns are identified by children as they begin to categorise colours, shapes, animals, foods and concepts. Children use patterns to compare and predict. At times, they overgeneralise patterns while they learn exceptions to the rules. For example, young children may learn the grammatical rule that we add 's' to indicate plurals; however, they may overgeneralise the rule when using irregular plurals (for example, 'foots' instead of 'feet', and 'tooths' instead of 'teeth'). Children are active information processors who attempt 'to make sense of and derive meaning from experience by means of classifying, categorising and ordering new information and relating it to what is already known' (Whitebread & Coltman 2015, p. 11).

During early childhood, children learn to associate symbols and pictures with meaning. Children learn that pattern systems, such as letters, can be used to communicate in written and visual forms. Children's oral-language competence underpins their development of written language. They draw on their existing knowledge of phonology, morphology, semantics and syntax to inform their writing development. Therefore, supporting early oral-language development will support children's acquisition and understanding of symbols and pattern systems for reading and writing (National Early Literacy Panel 2008).

Children's drawings are expressions of their meaning and understanding and can be used to 'access young children's views and experiences' (Einarsdottir, Dockett & Perry 2009, p. 217). When children have opportunities to create drawings and engage in storytelling related to their drawings, they are practising skills that prepare them to be confident writers.

How do children use information and communication technologies to access information, investigate ideas and represent their thinking?

Computers are 'rapidly becoming the tools of the culture at home, at school, at work, and in the community' (National Association for the Education of Young Children and the Fred Rogers Centre for Early Learning and Children's Media 2012, p. 2). Their increased use in everyday life, together with the 'increasing sophistication of digital technologies' (McPake, Plowman & Stephen 2013), provides the broader cultural context for young children's increasing and diverse experiences of

technology in their homes and communities. Early childhood professionals can help children represent their thinking by using technology to document their non-digital experiences (Chaudron 2015; Marsh 2016).

Social interaction increasingly figures in considerations of children's use of technology (Neumann 2014). This occurs when early childhood professionals and children work together to use technology for learning purposes. It is helpful to think of 'use' as encompassing independent use and shared use with others (children and adults). 'Use' also takes account of peripheral activity such as watching and talking with someone during their use of technology. Holloway, Green and Livingstone (2013) address co-use activities for young children such as videoconferencing with family members, whereby young children may participate in the communication without directly manipulating the technology. Plowman and Stephen (2007) and Plowman, Stephen & McPake (2010) propose guided interaction as an important aspect of young children's productive use of technology through interactions with others. These ways of viewing use of the technology align with understandings of interaction for potential development (McLachlan, Fleer & Edwards 2010) through scaffolding (Yelland & Masters 2007), and with understandings of activities with digital technologies as social and cultural practices (Lankshear & Knobel 2011).

Early childhood settings may provide important opportunities for using and learning about technology. Digital play draws together play-based learning and use of technology (Bird & Edwards 2015; Edwards 2013; Edwards & Bird 2017; Goldstein 2011; Marsh 2010; Wohlwend 2009), particularly through children's independent activity. For example, young children may engage in digital play with apps during free play to explore 'new meanings in the imaginary situation' (Fleer 2017, p. 228). Guided activity that builds on young children's interests enables their participation in internet-connected activity such as accessing information (Spink et al. 2010), communicating through email (Danby et al. 2015) and viewing and responding to digital media such as YouTube videos (Davidson, Danby & Thorpe 2017). In the early years of formal schooling, young children's learning with computers during lessons and activities will encompass new ways of thinking about literacy and numeracy (Yelland 2017).

Documented knowledge continues to grow about young children's use of technology for communicating (Edwards & Bird 2017). However, there is much to be explored and understood: currently there is limited research on children's use of technology to communicate.

Section 2: Principles for assessing children as effective communicators

Effective assessment of communication requires a clearly defined purpose

Effective assessment of communicative competence requires a clearly defined purpose. The need for assessment is often identified through observation of a child's strengths and challenges. If the assessment is isolated to a specific communicative task, such as producing speech sounds, following instructions, reading or writing, a communication assessment will draw upon tools specifically designed to evaluate these areas. However, if concerns are in relation to a child's overall communication, then a comprehensive assessment of global communication skills may be the most appropriate choice. Assessment of communication in the early years context may be undertaken to identify whether specialist support is required (for example, from speech pathologists, audiologists, occupational therapists), particularly when children are exhibiting difficulties in comparison to their same-aged peers. Assessment may also consider a child's communicative environment. Assessments can be formative or summative. They can be based on observations, interactions and work samples collected over time with the objective of providing ongoing feedback to improve learning (formative). They can be a point-in-time evaluation of a child's learning where the results are measured against predetermined outcomes or benchmarks (summative).

Communication is multifaceted and each element may require specific assessment

Communication comprises many elements (for example, speech, language, social communication, literacies), and therefore assessment of communication should target relevant elements depending on the individual needs of the child. Furthermore, it is important to recognise that elements of communicative skills do not exist in isolation; rather, acquisition of one communicative skill often lays the foundation for the development of increasingly complex communicative capabilities. Difficulties in one area can foreshadow difficulties in another. For example, difficulties with speech sound production have been linked with later literacy difficulties if early intervention to support speech is not provided or is not effective (Lewis, Freebairn & Taylor 2000; McLeod et al. 2017).

Some elements of communication that can be considered during an assessment are:

- speech – production and perception of speech sounds and syllables (for example, articulation, phonology)
- language – expressive and receptive vocabulary, grammar, sentence structure, narrative, discourse
- voice – vocal quality
- fluency – stuttering
- pragmatics – social communication
- literacies – mark-making, scribbling, drawing, writing, spelling, reading, engagement with multimedia
- hearing, vision, cognition, fine and gross motor skills.

Communication assessment may include both formal (standardised tests) and informal (observation) methods

There are two main types of assessment tools: formal and informal.

Formal or standardised tools are useful for a range of purposes such as comparing a child's communication to a sample of same-aged peers, identifying areas needing support and providing evidence for funding support applications. These tools are often administered in standardised ways for the purpose of meeting the requirements of the tests. For example, in some formal assessments children cannot be prompted and questions are unable to be repeated. These tests may not capture children's full capabilities as they would be displayed in a more authentic context.

Effective communication is a skill that is acquired and developed through social interactions with others, so it is important to gain information about a child's communication skills in more naturalistic interactions. The tools that provide this type of information are informal assessments, including observations, language samples and guided interactions; they can be useful for describing children's communication and identifying children's specific communication needs.

Different types of assessments can be used to assess communication for different purposes (see Table 3).

Table 3: Types of assessment

Assessment	Purpose
Screening	Using an assessment tool with the purpose of finding a particular set of conditions
Criterion-referenced	Used to measure a child's performance against a set of criteria or standards
Dynamic	An alternative to standardised testing. It assesses a child's existing ability with their potential ability)
Standardised	An assessment that is standardised across all children being assessed
Norm-referenced	An assessment that measures a child against an average
Progress monitoring	Using assessment tools over set periods of time
Outcome measurement	A summative assessment that is made after a period of time, usually at the end of a program or treatment

Additionally, a relevant intervention approach (Fuchs & Fuchs 2006) could involve:

- universal screening for all children and short-term monitoring of children at risk

- targeted small-group interventions, including assessments to determine children's response to intervention

- multidisciplinary interventions, including individual intervention with regular assessment and progress monitoring.

Assessment of communication considers the multiple languages and communication systems that a child may use, to gain a holistic understanding of communicative competence

Many children have multiple linguistic influences in their lives that contribute to their skills as communicators across all the contexts in which they participate. As a consequence of these multiple influences, many Australian children are multilingual, multidialectal or multimodal communicators (ABS 2017; Crowe et al. 2013; McLeod, Verdon & Bennetts-Kneebone 2014; Verdon, McLeod & Winsler 2014a, b). Maintenance of home languages is important for shaping identity, language development and cognitive development in the early years (Clarke 2009).

When assessing a child's communication it is essential that all of their languages, dialects and communication modes are included in the assessment in order to gain a holistic understanding of their communicative competence (McLeod, Verdon & International Expert Panel on Multilingual Children's Speech 2017). If a genuine disorder of communication is present, it will be present across all of the languages used by a child (Paradis 2010). If a difficulty is only present in one language, it may be a result of a child's limited exposure to that language. This may have limited their ability to reach the level of competence expected for their age (for example, if children are only exposed to English for

the first time at four years of age, their English language competence at school entry does not necessarily point to a communication disorder but rather is more likely a result of a limited exposure to English). It is especially important to note that speaking multiple languages/dialects does not have a detrimental impact on a child's communication, academic and social development (McLeod et al. 2016). There are many social, emotional and academic advantages of multilingualism (Adesope et al. 2010).

Assessment of communication includes children's own reports, evidence from families and multiple sources of information in a range of settings

Children communicate across a range of contexts for a range of purposes. Therefore, effective assessment of children's communicative competence requires an integration of information from a variety of sources. These sources may include but are not limited to parents, siblings, other family members, peers, early childhood professionals and the children themselves. Kennedy, Ridgway and Surman (2006) found that children's outcomes improved when early childhood professionals engaged across family and community contexts to support early development. It is essential to involve families in the assessment process as they provide invaluable insights into their children's communicative behaviour.

Furthermore, Kennedy, Ridgway and Surman (2006) found that children themselves are valuable resources for collecting information about their own understandings and skills in relation to communication. Article 12 of the United Nations Convention on the Rights of the Child (United Nations 1989) attests that children have the right to express their views in relation to matters that affect them. Therefore, in addition to those tools that directly assess a child's communicative competence, tools that privilege the voice of the child in relation to their communication needs should be incorporated into communication assessment to ensure that the child's views are valued and supported (Roulstone & McLeod 2011).

Assessment of communication considers a child's functional use of language and participation as a communicator in daily life

In order for communication assessment to be relevant to the individual needs of a child, it is necessary to focus on the functionality of their communication rather than simply its adherence to age-appropriate or normative data. This principle is especially relevant when working with children for whom relevant norms are not readily available, including those children who have a communication-related disability (such as autism spectrum disorder or Down syndrome) and children from culturally and linguistically diverse backgrounds. If the assessment is not 'fit for purpose' (the data does not apply to the individual child), then the assessment focus could consider the child's language capabilities in a range of everyday settings.

For example, for children with communication disabilities, functional communication may mean using augmentative and alternative communication (AAC) to convey meaning. Early childhood professionals may wish to assess how effective a child's existing communication skills and aids are in facilitating their participation in daily life, and look for areas in which further support could be provided.

When working with children from culturally and linguistically diverse backgrounds, it is essential to identify whether their communication is appropriate for their unique cultural and linguistic context. The patterns of speech and language acquisition for multilingual children are different to the patterns for monolingual children, and the patterns of the multilingual children may be similar to the features of a communication disorder (McLeod & Goldstein 2012). Therefore, clear distinction between the presence or absence of a communication difficulty is required.

Children from culturally and linguistically diverse backgrounds may use a different style of communication because of differences in social communication norms such as eye contact, body language and rules for engaging with people of different genders or levels of authority (Pesco & Crago 2008; Walsh 1997). Therefore, assessment needs to consider whether the child's communication style is appropriate for the cultural contexts and the child's conversation partners. Consultation with families about their cultural practices and priorities for their children's development can inform this aspect of assessment (Clarke 2011; Verdon, McLeod & Wong 2015). It may also be necessary to work with interpreters to undertake assessments of children's communication (Clarke 2011). Furthermore, conducting communication assessments with children from culturally and linguistically diverse backgrounds requires the assessor to reflect on the way that their own cultural values and experiences influence their interpretation of a child's communicative behaviours (Verdon, McLeod & Wong 2015).

Assessment of communication is an opportunity for multidisciplinary collaboration

The multifaceted nature of communication means that assessment provides an opportunity for multidisciplinary collaboration. Specialists who may provide additional assessment and intervention to support children's communication include speech pathologists (speech, language, literacy), audiologists (hearing), occupational therapists (writing and fine motor skills), psychologists (cognition, behaviour), optometrists (vision), special education teachers, learning support teachers, and teachers of English as an additional language (EAL). There are many tools available that can be used by early childhood professionals to support their assessment of children's communication, as outlined in the summary matrix table (Table 4).

In addition to these tools there is a further range of tools that require specialist knowledge and training in specific areas of communication. Collaboration with a professional who is trained in the use of these tools (speech pathologist or occupational therapist) may be required.

A non-exhaustive list of some of these tools that are administered by specialists and their purpose is included in the Appendix. A specialist may recommend a test that may require input from parents/guardians or early childhood professionals.

Section 3: Summary matrix of tools for assessment of children's communication in early years (0–8 years)

Table 4 presents tools that can be accessed and/or administered by early childhood professionals to assess the communication of children. Some tools can be administered in conjunction with families and/or with children. The administration of the individual tool and the area to be assessed is identified in the matrix. The right-hand column indicates whether the tool has been created or normed in Australia.

Table 4: Communication assessment tools summary

Tool	Age range (years)			Administration			Area assessed											Australian created or normalised
	0–3	4–6	6+	Professional	Parent	Child	Global communication development	Speech	Expressive language	Receptive language	Executive functioning	Reading	Writing	Social communication	Fine motor skills	Non-verbal communication	ICT skills	
Progressive Achievement Tests (PAT) in Early Years (ACER 2017)		●	●	●		●				●		●						●
Ages and Stages Questionnaire 3rd edn (ASQ-3) (Squires et al. 2009)	●	●			●		●		●	●	●			●	●			
Assessment, Evaluation and Programming System for Infants and Children (AEPS) (Bricker, Capt & Pretti-Frontczak 2002)	●	●		●	●		●		●	●	●			●	●			
Communication and Symbolic Behavior Scales (CSBS) Developmental Profile Infant-Toddler Checklist (Wetherby & Prizant 2002)	●			●	●			●	●	●				●		●		
Focus on the Outcomes of Communication Under Six (FOCUS©) (Thomas-Stonell et al. 2012)	●	●		●	●	●	●	●	●	●	●			●	●	●		

Tool	Age range (years)			Administration			Area assessed											
	0–3	4–6	6+	Professional	Parent	Child	Global communication development	Speech	Expressive language	Receptive language	Executive functioning	Reading	Writing	Social communication	Fine motor skills	Non-verbal communication	ICT skills	Australian created or normalised
Infant-Toddler Social and Emotional Assessment (ITSEA) (Briggs-Gowan & Carter 1998)	●			●	●						●			●				
Intelligibility in Context Scale (ICS) (McLeod, Harrison & McCormack 2012a)		●	●		●			●										●
MacArthur-Bates Communicative Development Inventories (CDI) (Fenson et al. 2007)	●				●				●	●						●		●
Parents' Evaluation of Developmental Status (PEDS) (Centre for Community Child Health 2005; Glascoe 2000)	●	●	●	●	●				●	●	●			●	●			●
Record of Oral Language (Clay 2005)		●	●	●					●	●								

Section 4: Evaluation of existing tools for assessing children's communication skills

ACER Progressive Achievement Tests in Early Years (Foundation and Year 1)

Overview

The Progressive Achievement Tests (PAT) in Early Years (ACER 2017) includes a reading test to assess early skills for reading for students in first two years of schooling. This test is designed to complement other methods of early communication assessment.

Instrument description

The Progressive Achievement Tests in Early Years is available online. It includes audio instructions and is designed for tablet delivery with a minimum recommended screen size of 1024 mm (width) by 768 mm (height). The test is also compatible with most computers and laptops. Headphones or earphones are required for each student. Early Years Reading Practice requires 5–10 minutes, followed by the assessment which takes approximately 30–45 minutes. Students complete the tests independently at their own pace.

Discussion

The reading test is based on the ACER Early Years Reading framework. It covers five strands of early reading and aligns to the Australian Curriculum in relation to: Print; Vocabulary; Reading Comprehension; Listening Comprehension; and Phonics.

Ages and Stages Questionnaire, Third Edition

Overview

The Ages and Stages Questionnaire (3rd edn, ASQ-3; Squires et al. 2009) is a questionnaire that asks parents to rate their child and is designed as a developmental screening tool. The primary use for the ASQ-3 is to screen at a population level and identify children who require further assessment (Glascoe 2005). The tool is suitable for children aged one month to five years of age and screens for children's overall development.

The ASQ-3 has been found to be a valid tool to identify children who require further assessment across more specified areas of development, including children who present with features of autism spectrum disorder (Hardy et al. 2015) and children who are born prematurely and are at risk of neurodevelopmental delays (Kerstjens et al. 2015).

The ASQ-3 is also recognised as a global screening scale with translations into multiple languages and standardisation of developmental data from many different countries (for a review, see Singh, Yeh & Blanchard 2017).

Instrument description

The ASQ-3 includes different questionnaires for different ages and may take 10–15 minutes for parents/guardians to complete. Each age-specific questionnaire includes 30 items and screens for difficulty across five developmental domains:

- problem-solving
- communication
- social
- gross motor
- fine motor.

The child's total score based on all the items in the ASQ-3 is calculated. At each age, there are pass or fail criteria. If a child demonstrates a total score below the identified threshold for their age, it is recommended that they complete further assessment across the domains of concern. There is no evidence for the ASQ-3 to be used as an outcome measure or a measure of performance over time.

The ASQ-3 is available in English, Spanish and French, and has been translated into a number of different languages for research purposes (that is, into Korean by Kwun et al. 2015; into Norwegian by Richter & Janson 2007; into Zulu and Nyanya by Hsiao et al. 2017 and into Turkish by Kapci, Kucuker & Uslu 2010). In addition, ASQ-3 has been adapted, and translated into local Aboriginal languages, for use in remote Aboriginal communities in Australia (D'Aprano et al. 2016).

Discussion

As with many tools designed to screen young children, the ASQ-3 is a parent-report measure to screen children's development. The ASQ-3 has been reported to be highly sensitive and specific in identifying children who require further developmental assessment (Squires et al. 2009). There is some evidence to suggest that the ASQ-3 can be a valuable tool to use within a two-stage screening process where the first stage includes broad screening at a population level (for example, all children in an

early childhood education centre) and the second stage includes further, more specified follow-up screening for particular developmental concerns to investigate concerns for autism spectrum disorders or developmental language delay (Hardy et al. 2015). However, there is also evidence to suggest that the sensitivity and specificity of the ASQ-3 across all domains may be lower in younger children (Veldhuizen et al. 2015), and lower in the motor development domain for children in early childhood (King-Dowling et al. 2016).

Assessment, Evaluation, and Programming System for Infants and Children (AEPS)

Overview

The Assessment, Evaluation, and Programming System for Infants and Children (AEPS; Bricker, Capt & Pretti-Frontczak 2002) is an evaluation package designed for parent-reporting and early childhood professional–reporting of children's development. This tool has two components. The first is suitable for children aged from birth to three years zero months; the second is suitable for children aged from three years zero months to six years zero months.

Instrument description

The AEPS is designed to allow parents/guardians and/or early childhood professionals to identify whether different developmental skills are present ('yes'), developing ('sometimes'), or not present ('not yet'). The AEPS may take up to 30 minutes to complete and includes questions that enquire about children's development across six domains:

- fine motor
- gross motor
- adaptive
- cognitive
- social-communication
- social.

A score for each of the domains can be calculated and compared to the child's previous scores across each domain.

Discussion

The AEPS has not been standardised on a normative sample and so there is limited capacity to use it as a stand-alone screening tool. This tool may be used to monitor progress over time and it has been suggested that it can be administered up to four times each year (Bricker, Capt & Pretti-Frontczak 2002). The tool may be used as a way for parents/guardians and early childhood professionals to discuss children's development using a structured, developmentally comprehensive evaluation tool.

Communication and Symbolic Behavior Scales (CSBS) Developmental Profile Infant-Toddler Checklist

Overview

The Communication and Symbolic Behavior Scales (CSBS) Developmental Profile: Infant-Toddler Checklist (Wetherby & Prizant 2002) is a parent-rated questionnaire designed to screen children at a population level and identify children who require further assessment. The tool should be used to evaluate the communication and behaviour of children aged six to 24 months. It is appropriate for early childhood professionals to complete this tool if they have frequent contact with the child. The authors of the CSBS suggest that the questionnaire can be completed by any person 'who nurtures the child daily' (Wetherby & Prizant 2002). This tool considers children's verbal and non-verbal communication.

Instrument description

The CSBS is a 24-item, one-page questionnaire that can be completed in 10 minutes and is designed to determine children's development in the areas of:

- emotion and eye gaze (four items)
- communication (four items)
- gestures (five items)
- sounds (three items)
- words (two items)
- understanding (two items)
- object use (four items).

A total score is calculated based on answers to all questions. In addition, three composite scores can be calculated across the domains of social development (including the areas of emotion and eye gaze, communication and gestures), speech development (including sounds and words) and symbolic development (including understanding and object use). Raw scores can be converted to standard scores and percentile ranks to identify children who may require further assessment across each of the domains.

Discussion

The CSBS has been normed on a sample of 2000 English-speaking children in the USA (Wetherby & Prizant 2002) and the use of this tool may have good predictive validity (Glennen 2007; McCathren, Yoder & Warren 2000), including with children who have autism spectrum disorder (Beranova et al. 2017; Pierce et al. 2011; Wetherby et al. 2008) or those at risk of developmental delays due to low birth weight (Beranova et al. 2017; Dudova et al. 2014). The structure of the CSBS was examined using data collected from 1725 12-month-old Australian infants (Eadie et al. 2010). The analysis presented in the Australian study identified the value of the three composite components of the tool.

Focus on the Outcomes of Communication Under Six (FOCUS©)

Overview

Focus on the Outcomes of Communication Under Six (FOCUS©; Thomas-Stonell et al. 2012) is a parent or professional questionnaire designed and produced by Holland Bloorview Kids Rehabilitation Hospital in Toronto, Canada. The tool is suitable for children aged 18 months to five years 11 months and can be used to evaluate children's communication skills across a number of settings. The tool specifically considers how children interact verbally and non-verbally with others for a range of purposes and has previously been used as an outcome measure following communication intervention (Thomas-Stonell et al. 2013).

Instrument description

This 50-item questionnaire can be used to describe children's body function and capacity (for example, speech, expressive language, pragmatics, receptive language, attention) and performance (for example, intelligibility, expressive language, social/play, independence, coping strategies/emotions) with respect to the International Classification of Functioning, Disability, and Health (ICF-CY; World Health Organization 2007). The completion of the questionnaire takes approximately 10 minutes. A total score is calculated based on answers to all questions; some reverse scoring is required due to question wording. To use FOCUS© as an outcome measure, a total change score is calculated based on the difference in total score between two administration dates, typically before and after intervention to support communication. The tool is available in English, French (FOCUS-F and FOCUS-34-F), Chinese, German, Hebrew, Spanish, Danish, Afrikaans (FOCUS-A and FOCUS-34-A), Greek, Norwegian, Dutch, Tagalog and Portuguese.

Discussion

FOCUS© relies on evaluation of children's communication by an adult familiar with the child (for example, a parent, caregiver or early childhood professional). It is a reliable and valid questionnaire with documented evidence, for use by parents/guardians and speech-language pathologists. Convergent and discriminant validity was established against the Ages and Stages Questionnaire: Social-Emotional based on a sample of 97 children. Both the parent and the speech-language pathologist tools have been demonstrated to have high inter-rater reliability, that is, the assessments of both professionals and parents/guardians are frequently the same (Oddson et al. 2013). To date, FOCUS© has been validated for use with children with communication difficulties, but has not been normed with children who have typical speech and language skills.

Infant-Toddler Social and Emotional Assessment (ITSEA)

Overview

The Infant-Toddler Social and Emotional Assessment (ITSEA; Briggs-Gowan & Carter 1998) is a questionnaire available to document the social and emotional development of infants and toddlers. The tool includes questionnaire forms for parents/guardians and early childhood professionals as well as additional assessments to be completed by a trained therapist (that is, speech pathologist or psychologist). The ITSEA is suitable for children aged 12–36 months. A brief version of the ITSEA, the Brief Infant-Toddler Social and Emotional Assessment (BITSEA; Briggs-Gowan & Carter 2002), is also available. The BITSEA can be used at a population screening level to identify children who may require additional support. The BITSEA may also be used as a second stage of screening to identify children who require further assessment.

Instrument description

The ITSEA includes a 166-item questionnaire that is available to be completed by parents/guardians and/or early childhood professionals. The BITSEA is a 42-item questionnaire (selected as a subset from the larger ITSEA). Each of the tools requires the respondent to answer questions on a three-point scale (not true/rarely; somewhat true/sometimes; very true/always). The ITSEA takes 25–30 minutes to complete whereas the shorter BITSEA scale reportedly takes 7–10 minutes to complete. Both scales can be completed by early childhood professionals (educator form) or caregivers (parent form).

The ITSEA includes 17 subscales: activity/impulsivity, peer aggression, aggression/defiance, depression/withdrawal, general anxiety, separation distress, inhibition to novelty, sleep, negative emotionality, eating, sensory sensitivity, compliance, attention, imitation/play, mastery motivation, empathy, and pre-social peer relations. These subscales span four domains (externalising, internalising, dysregulation, competence). The BITSEA covers each of these subscales and domains but with fewer items for each. Scoring of the ITSEA and the BITSEA occurs for each subscale and combined domain scales.

Discussion

The ITSEA and the BITSEA have been found to be psychometrically sound. The ITSEA has acceptable internal consistency for the domains of externalising (.92), internalising (.75), dysregulation (.78), and competencies (.84) and good test-retest reliability (.61–.91, mean D 0:79) (Briggs-Gowan & Carter 1998). The BITSEA has been found to be valid and reliable screener for social-emotional and behavioural difficulties in children (Briggs-Gowan et al. 2004).

Intelligibility in Context Scale (ICS)

Overview

The Intelligibility in Context Scale (ICS; McLeod, Harrison & McCormack 2012a) is a seven-item parent-report questionnaire available in over 60 languages. It is designed to be used as a description of how well different communication partners understand a child (for example, parents/guardians, family members, friends, teachers, unfamiliar adults). It is also designed as a screening tool to determine whether children may need to seek an in-depth assessment from a communication specialist (for example, speech pathologist). The ICS is particularly useful for early childhood professionals to use as a screening tool with children and families who do not speak the same languages as the early childhood professional.

Instrument description

The ICS is a one-page questionnaire which includes seven questions for parents/guardians to complete. Questions follow a similar format. For example, 'Do you understand your child?', 'Do strangers understand your child?'. The five possible responses are: always, usually, sometimes, rarely, or never. The ICS has undergone rigorous translation and back translation into more than 60 languages. Sensitivity, specificity, validity and reliability have been established in a range of languages, including English.

Discussion

The ICS has been normed on 803 Australian-English-speaking four-to-five-year-old children; an average score of less than four out of five suggests that the child may require further speech assessment (McLeod, Crowe & Shahaeian 2015). No significant difference has been found for the ICS based on socio-economic or multilingual status (McLeod, Crowe & Shahaeian 2015). It has been validated for use in many languages, including English (McLeod, Harrison & McCormack 2012b), Cantonese, Fijian, German, Jamaican and Vietnamese.

MacArthur-Bates Communicative Development Inventories (CDI)

Overview

The MacArthur-Bates Communicative Development Inventories (CDI; Fenson et al. 2007) are parent-report questionnaires. The Words and Gestures Infant questionnaire is suitable for use with children aged 8–18 months, whereas the Words and Sentences Toddler questionnaire is suitable for use with children aged 16–30 months. There are shorter versions available for assessing children's current language level, and to suit parents/guardians with lower literacy levels.

Instrument description

The short form of the Words and Gestures test includes an 89-word vocabulary from which parents/guardians can select to indicate whether their child understands, signs, or verbally uses each word. The Words and Sentences subtest includes a 100-word checklist (including items related to vocabulary use in isolation and in combination with other known vocabulary). The longer form may take up to 30 or 40 minutes for a parent to complete whereas the shorter forms may take closer to 20 or 30 minutes.

The tool has been adapted to be suitable for use in more than 100 languages, including Spanish (Jackson-Maldonado, Marchman & Fernald 2013), Kigiriama and Kiswahili (Alcock et al. 2015), and Danish (Vach, Bleses & Jorgensen 2010). The Australian English Communicative Development Inventory (OZI; Kalashnikova, Schwarz & Burnham 2016) is a version for Australian parents/guardians and has normative data for 1496 typically developing Australian children.

Discussion

The CDI is designed to capture a comprehensive view of children's communication through both verbal and non-verbal means. It has been found to be valid tool to screen the communication skills of young children with cochlear implants (Thal, Desjardin & Eisenberg 2007) and children with a diagnosis of autism spectrum disorder (Charman et al. 2003). The long-form version of the tool has been used to demonstrate the relationship between early communication and vocabulary development (that is, as measured by the CDI) and children's later performance on receptive language and cognitive skills tasks (Feldman et al. 2005). Further, some authors have suggested that early vocabulary size (as measured by the MCDI) may be able to predict language development and use up until 10 years of age (Lee 2011). Can et al. (2013) demonstrated that the short form can also be a valuable tool to identify children who may be at risk of poor language performance when older. In the study reported by Can et al. (2013), CDI data was collected from parents/guardians of about 76 children (aged 17–30 months) who were followed up in their first year of primary school (with a mean age of less than six years one month). Children's performance on the CDI at the younger age explained variance in syntax (11 per cent), semantics (7 per cent) and expressive vocabulary (17 per cent) by the time children reached school age. Thus, utilising the long-form or short-form version of the CDI may provide comprehensive, valuable information about children's early communication development and identify children who require further assessment or support for language development.

Parents' Evaluation of Developmental Status (PEDS)

Overview

The Parents' Evaluation of Developmental Status (PEDS; Centre for Community Child Health 2005; Glascoe 2000) is a 10-item parent-report questionnaire that can be used as a screening tool to consider children's development and identify children who may benefit from specialist assessment and early intervention (Armstrong & Goldfeld 2008). The questions cover the areas of: expressive speech and language, receptive language, social-emotional skills, school readiness, behaviour, self-help skills, fine motor skills and gross motor skills.

Instrument description

PEDS is a 10-item questionnaire that is completed by parents/guardians. Questions follow the same format. For example, one question is 'Do you have concerns about how your child talks and makes speech sounds?' The response options are yes, a little, and no. The responses of the parent/guardian can be discussed and analysed by early childhood professionals. The PEDS manual provides guidance about indicators of developmental risk at different ages. A systematic review of 37 studies that used PEDS with 210,242 children indicated that overall, 13.8 per cent of children were at high developmental risk and 19.8 per cent at moderate developmental risk (Woolfenden et al. 2014). For the two questions about communication, there is high agreement between parent concern and clinical testing (Harrison et al. 2017).

PEDS has also been used by early childhood professionals and carers in a number of Australian studies, and comparisons have been made between the responses of the parent/guardian and those of the early childhood professionals. Overall, both groups have indicated that the majority of their concerns about children's development were in the domains of expressive speech and language, behaviour and social-emotional skills (Coghlan, Kiing & Wake 2003; McLeod et al. 2017).

Discussion

PEDS has been used widely in Australia by early childhood professionals and has informed policy and practice. While one study did not find that the PEDS results prior to school predicted children's academic and language skills two years later (Wake, Gerner & Gallagher 2005), other studies using data from *Growing Up in Australia: The Longitudinal Study of Australian Children* have found that parental concern regarding speech and language on PEDS is a predictor of subsequent academic and social outcomes (Harrison et al. 2009; McCormack et al. 2011; McLeod et al. 2016).

Record of Oral Language

Overview

The Record of Oral Language (Clay et al. 2007) provides a technique for recording and assessing change in children's oral language development. It provides information on the ability to hear, recall and repeat sentences containing a range of language complexities.

Instrument description

The Record of Oral Language task allows an early childhood professional to monitor changes occurring in a child's control of English. Performance of tasks can be used to select children for more intensive attention to oral language learning or to check what changes have occurred in children's language as a result of particular instruction. Change over time can be an important indicator of whether a particular child will know how to learn more about language for themselves in future.

Discussion

The task is administered by an early childhood professional and is suitable for children aged four to seven years and for whom English is their first language. It is also suitable for five-year-olds after beginning English as an additional language. Clear guidelines for administration and analysis are provided in the text by Clay et al. (2007). The observer reads each of the sentences aloud, speaking as normal to the child who is asked to repeat each of the sentences. The observer records exactly what the child says for subsequent analysis.

Summary

This review of the literature has clearly identified and defined the key components of communication development in children from birth to eight years. A comprehensive list of 10 assessment tools spanning all aspects of children's communication has been reviewed in this document. Furthermore, seven principles for assessing children's communication have been identified and described. These should be used by early childhood professionals to inform their decisions about assessment.

Early childhood professionals are one of the key identifiers of communication difficulties in early childhood. If children are experiencing communication difficulties, collaboration with and early referral to communication specialists is essential for maximising communicative capability. This review provides early childhood professionals with the knowledge and resources to support assessment practices related to children's communication development. Early childhood professionals should work collaboratively in multidisciplinary networks to support children's communication. Early childhood professionals are well-placed to provide high-quality support for children's lifelong learning and successful participation in society.

Glossary

Alternative and augmentative communication: AAC is an umbrella term for communication that does not use speech. Types of AAC include gesture, sign language, picture communication and speech output devices. If a child is using augmentative communication they are supplementing speech with another mode of communication. If they are using alternative communication their communication is completely dependent on non-speech forms of communication.

Childhood apraxia of speech (CAS): A motor speech disorder where children have problems producing sounds, syllables and words. It is not caused by muscle paralysis or weakness, but by the brain's inability to move the body parts needed for speech.

Code switching: Alternating between languages during a conversation.

Code mixing: Occurs when speakers change between languages within a word or sentence.

Criterion-referenced assessments: Used to measure a child's performance against a set of criteria or standards.

Dialect: A form of a language that is a variation used by a particular group of people, for example, Australian English, American English and New Zealand English.

Discourse: A discussion or conversation.

Dynamic assessment: This type of assessment is an alternative to standardised testing. It assesses a child's existing ability with their potential ability.

Early childhood professionals: The term early childhood professionals includes, but is not limited to, maternal and child health nurses, all early childhood practitioners who work directly with children in early childhood education and care settings (educators), school teachers, family support workers, preschool field officers, inclusion support facilitators, student support service officers, primary school nurses, primary welfare officers, early childhood intervention workers, play therapists, health professionals and teachers working in hospitals, and education officers in cultural organisations.

Executive functioning: The overarching capacity of an individual to manage what they attend to and think about, and how they combine this new information with what they already know. Across birth to eight years it is evidenced in children's growing capacity to think things through and make well-considered decisions. From birth, the development of executive functioning is supported by positive and responsive interactions with significant people.

Expressive language: Expressive language is the use of verbal and non-verbal communication to convey a message.

Grammar: A set of rules that define the order and structure of words in a language.

Information and communication technology (ICT): Digital and technological environments for development, communication and knowledge creation. Digital environments refer to computers (including laptops, tablets, smart boards) and computer games, the internet, television and radio, among others.

Language: A system for the communication, involving spoken, written, visual and physical modes.

Literacy: Involves students listening to, reading, viewing, speaking, writing and creating oral, print, visual and digital texts, and using and modifying language for different purposes in a range of contexts (Australian Curriculum, Assessment and Reporting Authority 2014).

Morphology: The study of grammatical patterns.

Multidisciplinary approaches: Ways of working where early childhood professionals from different disciplines are involved in the provision of integrated and coordinated services for children and families to support the best outcomes. In the early years across birth to eight years, multidisciplinary approaches may include, but are not limited to, maternal and child health, educators, community workers, allied health professionals and medical personnel.

Multilingual: Speaking at least three languages.

Norm-referenced tools: An assessment that measures a child against an average.

Oro-motor skills: The physical skills needed to control movement of the mouth, tongue and lips for speech.

Outcome measurement: An assessment that is made at the end of a program or treatment to assess its outcomes.

Phoneme: Distinct sounds that differentiate one word from another, for example, the consonants in 'bat, cat, sat'.

Phonetics: The system of sounds used in languages to make speech.

Phonics: A system of teaching reading through phonemic awareness.

Phonological awareness: Being able to identity and use the different sounds in a language.

Phonology: The study of how sounds are arranged and used in a language.

Pragmatics: The appropriate use of language, often known as 'social skills'. Pragmatic skills involve knowledge, processing and application of culturally appropriate behaviour that facilitates the establishment and maintenance of interpersonal relationships.

Receptive language: The understanding and interpretation of a communicative message. The message being received may be auditory, visual or multimodal.

Screening: Performing an assessment that will predict future outcomes.

Semantics: The meanings of words.

Sign languages: Sign languages are visual-spatial languages using distinct movements called signs in place of spoken or written words. These movements include hand shapes, eye gaze, expressions and arm, head and body postures. Different sign languages have their own vocabulary, grammar and syntax depending on their country of origin.

Social-emotional development: Learning that occurs from birth through interactions, relationships and everyday experiences with others. As children's socio-emotional development advances they become increasingly able to form and sustain positive relationships; experience, manage and express emotions; and explore and engage with their environment.

Specific language impairment (SLI): This term is used when a child's language doesn't develop according to key ages and stages, and there are no other causes that can be found.

Speech intelligibility: The ability of a speaker's message to be understood by a listener. Speech intelligibility is affected by three key factors: the speaker's proficiency of sound production, speech rate, fluency, stress patterns, volume, non-verbal cues, grammar and conversation breakdown and repair strategies; the listener's familiarity with the individual speaker, their attitude towards accented speech, their hearing ability and conversation breakdown and repair strategies; and environmental context and background noise.

Speech sound disorders (SSD): Condition describing a child who continues to make incorrect speech sounds after the age or stage at which they should be able to do it correctly.

Standardised assessment: An assessment that is standardised across all children being assessed.

Stuttering: A speech disorder that causes interruptions in the rhythm or flow of speech (from Speech Therapy Australia).

Sustained shared thinking: When two or more individuals work together in an intellectual way to solve a problem, clarify a concept [or] evaluate an activity. Both parties must contribute to the thinking and it must develop and extend the understanding … For early childhood professionals, sustained shared thinking involves children and educators working together in conversations, which provide opportunities to discuss and think about problems or challenges in a serious, extended way (VEYDLF).

Syntax: The way that words are ordered and structured in a sentence. For example, in English adjectives come before nouns, so a phrase would be structured, 'the purple rabbit', whereas in French, nouns come before adjectives, so the phrase would be structured, 'the rabbit purple'.

Texts: Include, but are not limited to, traditional picture books, e-books, songs, rhymes, poems, movies, videos, podcasts, audiobooks, drawings, paintings, letters, cards, online educational games, and shopping lists.

Vocabulary: The body of words known and used by a person to communicate.

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Appendix

Overview of tools used by specialists to assess children's communication.

Tool	Age range (years)			Administration					Australian created or normalised	Description
	0–3	4–6	6+	Speech pathologist	Occupational therapist	Parent	Child	Educator		
Boehm Test of Basic Concepts Third Edition: Preschool (BOEHM 3-Preschool) (Ann E Boehm; published by Pearson in 2001)	●	●		●		●				Basic concepts for school success
Clinical Evaluation of Language Fundamentals: Preschool (2nd edn) (CELF-P2) (Elisabeth H Wiig, Wayne A Second & Eleanor Semel; published by Pearson in 2006)	●	●	●	●					●	Expressive and receptive language, pragmatics, phonological awareness
Clinical Evaluation of Language Fundamentals Australian and New Zealand 5th edn (CELF-5 A&NZ) (Elisabeth H Wiig, Wayne A Second & Eleanor Semel; published by Pearson in 2017)		●	●	●					●	Expressive and receptive language, pragmatics, reading, writing
Children's Communication Checklist: Second Edition (CCC-2) (Dorothy Bishop; published by Pearson in 2003)		●	●	●					●	Language and social communication
Communication Matrix (Charity Rowland & Melanie Fried-Oken; published by the Child Development and Rehabilitation Center, Portland, Oregon, in 2010)	●	●	●	●		●		●		Expressive communication outside of speaking and writing (for example, sign, Braille). For children who have severe or multiple disabilities
Diagnostic Evaluation of Articulation and Phonology (DEAP) (Barbara Dodd, Zhu Hua, Sharon Crosbie, Alison Holm & Anne Ozanne; published by Pearson in 2002)	●	●	●	●						Speech sounds (articulation, phonology, oro-motor, consistency)
Communication Attitude Test for Preschool and Kindergarten Children who Stutter (KiddyCAT) (Martine Vanryckeghem & Gene J Brutten; published by Taylor & Francis Online in 2006)		●	●	●			●	●		Speech, stuttering, attitude
Oral and Written Language Scales (2nd edn) (OWLS-II) (Elizabeth Carrow-Woolfolk; published by Pearson in 2011)	●	●	●	●						Speaking, listening, reading, writing
Peabody Developmental Motor Scales (2nd edn) (PDMS-2) (M Rhonda Folio & Rebecca R Fewell; published by Pearson in 2000)	●	●			●					Motor development

Tool	Age range (years)			Administration					Australian created or normalised	Description
	0–3	4–6	6+	Speech pathologist	Occupational therapist	Parent	Child	Educator		
Peabody Picture Vocabulary Test (4th edn) (PPVT-4) **(Lloyd M Dunn & Douglas M Dunn; published by Pearson in 2007)**	●	●	●	●						Vocabulary
Preschool and Primary Inventory of Phonological Awareness (PIPA) **(Barbara Dodd, Sharon Crosbie, Beth McIntosh, Tania Teitzel and Anne Ozanne; published by Pearson in 2000)**	●	●	●	●				●	●	Phonological awareness
Preschool Language Scales, Fifth Edition: Australian and New Zealand Language Adapted Edition (PLS-5) **(Irla Lee Zimmerman, Violette Steiner & Roberta Evatt Pond; published by Pearson in 2012)**	●	●	●	●					●	Expressive and receptive language
Renfrew Action Picture Test (RAPT) **(Catherine Renfrew; published by ACER in 1997)**		●	●	●					●	Vocabulary and grammar
Shore Handwriting Screener (SHS) **(Leann Shore; published by Pearson in 2004)**		●	●		●					Handwriting
Test For Reception of Grammar: Second Edition (TROG-2) **(Dorothy Bishop; published by Pearson in 2003)**		●	●	●				●	●	Receptive language
Test of Early Language Development: Third Edition (TELD-3) **(Wayne Hresko, Donald Hammill & D Kim Reid; published by Super Duper Publications in 1999)**	●	●	●	●						Expressive and receptive language
Toddler Phonology Test (TPT) **(Beth McIntosh & Barbara Dodd; published by Pearson in 2011)**	●			●					●	Speech sounds