

# Kindergarten research insights

Professional reading resource



## Fostering executive functions

The *Queensland kindergarten learning guideline* (QKLG) highlights the importance of fostering children's executive functions as a vital aspect of their wellbeing and active learning. By supporting the development of these cognitive processes, educators help children build the skills they need to succeed not only in kindergarten, but also in future learning and life beyond school.

### What are executive functions and why are they important for kindergarten children?

Executive functions are like the brain's control centre, helping us navigate complex situations by managing our thoughts and actions. These higher-order cognitive processes are used when we need to override habits, impulses, or desires to make thoughtful decisions (Doebel, 2020). Think of them as the tools we use to plan, stay focused, think critically, solve problems, and adapt to change — all essential for both children and adults. They allow us to remember instructions, resist temptations, see things from new perspectives, and make connections between ideas or facts.

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At their core, executive functions rely on three key skills:

- **working memory**, which helps us hold and manipulate information for a short period of time, e.g. when playing a memory card game, remembering the card locations is key to making correct matches on each turn
- **inhibitory control**, which lets us pause and choose a better response over an automatic reaction, e.g. keeping our thoughts in mind while patiently waiting for our turn to share during circle time
- **cognitive flexibility**, which allows us to shift attention and adapt to new information, e.g. shifting focus from building in the block area to tidying up and adapting to the new activity (Diamond, 2020).

Applying these skills requires significant effort, but the benefits are substantial. For children, executive functions are the foundation of academic success, influencing everything from early learning to university-level achievements. In fact, they play a bigger role in school readiness than IQ or initial reading and math abilities (Diamond, 2016). Children who have well-developed executive functioning are better equipped to thrive in their education and beyond.

# Effective pedagogies: teaching and learning that support the development of executive functions

## Support child autonomy

The QKLG highlights the importance of positive interactions and responsive relationships in enhancing children's learning. Central to this is the role of educators' autonomy-supportive behaviours, which are attuned to children's needs, interests, and values. Research demonstrates that behaviours including those that support autonomy can play a role in fostering the development of executive function skills (Day et al. 2022; Distefano et al. 2022; Madanipour et al. 2025).

Autonomy support includes intentional strategies such as:

- offering just the right amount of support, i.e. scaffolding
- following the child's pace, providing meaningful choices
- actively listening and valuing their perspective
- encouraging persistence
- empowering children to take an active role in their learning journey.

The QKLG provides a range of intentional strategies that align with these research findings and offer both reflective opportunities and practical guidance for educators.

Autonomy-supportive behaviours work within a child's zone of proximal development, where a more knowledgeable individual offers the appropriate level of assistance to help the child complete a task successfully (Vygotsky, 1978). Take, for example, a scenario where a child is engaged with a puzzle. The educator notices that the child has been trying to solve the puzzle for some time, but signs of frustration are emerging. To support the child's perseverance, the educator can:

1. engage the child's **working memory** with gentle prompts like, 'Remember where you saw that edge piece earlier? Let's try it here', while guiding the child's attention to specific puzzle sections
2. facilitate **inhibitory control** by encouraging patience, saying, 'Take a deep breath — let's try turning this piece very slowly'
3. support **cognitive flexibility** by modelling alternative approaches, such as rotating a mismatched piece and suggesting, 'What if we try flipping it? Maybe it fits this way'.

These strategies keep the child engaged and build essential executive function skills. By providing choices, using a calm tone, and encouraging persistence, the educator helps the child stay focused, adapt strategies, and build independence, promoting executive function skills through meaningful interaction.

To effectively provide autonomy support and scaffold children's executive functions, it is crucial for educators to explore and draw on their own well-developed executive function skills (Bardack & Obradović, 2019). For instance, during the above puzzle activity, an educator must exercise inhibitory control to resist the urge to complete the task or place puzzle pieces for the child. Additionally, the educator relies on cognitive flexibility to adapt their approach based on the child's needs and working memory to recall the steps and strategies needed to guide the activity effectively.

## Encourage sustained shared thinking

Research also highlights the importance of intentional strategies to support and extend children's language and critical thinking as a means of stimulating their executive functions development. The QKLG promotes purposeful decision-making about intentional teaching strategies that can support quality interactions with children to extend their thinking and communication. These strategies include using language to:

- deepen and sustain children's thinking, facilitating interactions that involve negotiation, problem-solving, flexible thinking, and encouraging reflection and reasoning (Distefano et al. 2020)
- promote higher-order thinking by asking open-ended questions, modelling language, expanding children's responses, and narrating or questioning activities (Moreno et al. 2017; Muir et al. 2024)
- engage in collaborative sustained shared thinking involving educators and children to work together — often playfully — to solve problems, clarify concepts, evaluate actions, or enrich narratives (Siraj-Blatchford, 2008).

Let's imagine an educator deeply engaged in an inquiry-based learning experience with a group of children. To promote critical thinking, the educator asks open-ended questions such as 'Why do you think that happened?' or 'How do you know this works?'. These questions are more than just conversation — they encourage reasoning and reflection, key drivers of executive function skills (Almy & Zelazo, 2015). Reflection, in this context, supports children in pausing to consider options, monitoring their actions, and thinking twice before reacting.

Consider another example: during a socio-dramatic play scenario in a pretend café, an educator supports the development of executive functions through sustained shared thinking. As children role-play as chefs and customers, the educator encourages **working memory** by saying, 'Remember the order the customer gave earlier — what did they ask for first?' This helps the child recall and sequence information. When two children reach for the same play utensil, the educator supports **inhibitory control** by calmly suggesting, 'Let's take turns using the whisk. Can you wait until your friend finishes mixing? While you wait, you can help set the table or choose the next ingredient to add'. To foster **cognitive flexibility**, the educator models adaptability by saying, 'Oh no, we ran out of milk! What else can we use instead?' or 'How do you divide the cake, so everyone gets a piece?' These interactions deepen the children's thinking, encourage problem-solving, and promote collaboration in their imaginative play.

## Points for reflection

- How do I engage and support children in developing executive functions such as working memory, inhibitory control and cognitive flexibility during everyday activities and interactions?
- What opportunities could I provide for children to practise executive functions in a variety of contexts and environments, such as during play, routines, or group activities?
- How do I assess and document children's use of executive functions in meaningful situations, such as their ability to plan, organise, and adapt to challenges?
- How do my own executive function skills, such as my ability to plan, organise, inhibit impulses, and adapt to unexpected situations, influence the way I support children's development of these skills?

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## References

- Almy, BK, & Zelazo, PD 2015, 'Reflection and executive function: Foundations for learning and healthy development', *Revista Argentina de Ciencias del Comportamiento*, vol. 7, no. 1, pp. 53–59.
- Bardack, S, & Obradović, J 2019, 'Observing teachers' displays and scaffolding of executive functioning in the classroom context', *Journal of Applied Developmental Psychology*, vol. 62, pp. 205–219, <https://doi.org/10.1016/j.appdev.2018.12.004>
- Day, N, Paas, F, Kervin, L, & Howard, SJ 2022, 'A Systematic Scoping Review of Pre-School Self-Regulation Interventions from a Self-Determination Theory Perspective', *International Journal of Environmental Research and Public Health*, vol.19, no.4, <https://doi.org/10.3390/ijerph19042454>

- Doebel, S 2020, 'Rethinking Executive Function and Its Development', *Perspectives on Psychological Science: A Journal of the Association for Psychological Science*, vol. 15, issue 4, pp. 942–956, <https://doi.org/10.1177/1745691620904771>
- Diamond, A 2016, 'Why improving and assessing executive functions early in life is critical', In JA Griffin, P McCardle & LS Freund (eds), *Executive function in preschool-age children: Integrating measurement, neurodevelopment, and translational research*, pp. 11–43, American Psychological Association.
- Diamond, A 2020, 'Executive functions', *Handbook of Clinical Neurology*, vol. 173, pp. 225–240, <https://doi.org/10.1016/B978-0-444-64150-2.00020-4>
- Distefano, R, Schubert, EC, Finsaas, MC, Desjardins, CD, Helseth, CK, Lister, M, Carlson, SM, Zelazo, PD, & Masten, AS 2020, 'Ready? Set. Go! A school readiness programme designed to boost executive function skills in preschoolers experiencing homelessness and high mobility', *European Journal of Developmental Psychology*, vol. 17, issue 6, pp. 877–894.
- Distefano, R, Nelson, KM, Palmer, AR, Masten, AS, & Carlson, SM 2024, 'The role of parenting in autonomy and executive function development among young children experiencing homelessness', *Children And Youth Services Review*, vol. 166, <https://doi.org/10.1016/j.childyouth.2024.107997>
- Madanipour, P, Garvis, S, Cohrsen, C, & Pendergast, D 2025, 'Early childhood teachers' understanding of executive functions and strategies employed to facilitate them', *Frontiers in Education*, vol. 9, <https://doi.org/10.3389/feduc.2024.1488410>
- Moreno, AJ, Shwayder, I, & Friedman, ID 2017, 'The function of executive function: Everyday manifestations of regulated thinking in preschool settings', *Early Childhood Education Journal*, vol. 45, issue 2, pp. 143–153.
- Muir, RA, Howard, SJ, & Kervin, L 2024, 'Supporting early childhood educators to foster children's self-regulation and executive functioning through professional learning', *Early Childhood Research Quarterly*, vol. 67, pp. 170–181, <https://doi.org/10.1016/j.ecresq.2023.12.001>
- Siraj-Blatchford, I 2008, 'Understanding the relationship between curriculum, pedagogy and progression in learning in early childhood', *Hong Kong Journal of Early Childhood*, vol. 7, issue 2, pp. 6–13.
- Vygotsky, LS 1978, *Mind in society: The development of higher mental processes*, Cambridge, MA: Harvard University Press.



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