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EXECUTIVE FUNCTIONING: WHAT IT IS AND WHY IT MATTERS

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Rebecca Gilbertson and Tania Allan Ross

There has been an increase in reported additional learning needs across Aotearoa New Zealand in the last 30 years, largely due to increased knowledge in this space (Bourke et al., 2021). It is well known that students with disabilities are among the groups of people most commonly excluded from education (Slee, 2018) and this has the potential to create a huge impact on life outcomes. Therefore, educators must be equipped with an understanding of the range of learning needs in classrooms today. Sadly, many Initial Teacher Education (ITE) programmes in Aotearoa New Zealand lack the depth of training required for educators to feel confident in meeting additional learning needs (Attwood, 2017), which does a disservice to students who have such needs.

In the tertiary space, students need to be self-advocates with strong metacognition and executive functioning skills, given the teaching style at this level. The increase in reported additional learning needs in Aotearoa New Zealand has drawn attention to students who struggle with executive functioning skills and how this can impact their learning outcomes. Kenworthy et al. (2012) note that there is evidence to suggest some, but not all, executive functioning skills are challenging for neurodiverse individuals such as those with autism and attention deficit hyperactivity disorder (ADHD); however these challenges can vary between individuals. To explore this further, a workshop was developed as part of the Neuroability Symposium in 2023, hosted by Otago Polytechnic and Ako Aotearoa, titled "Executive Functioning: What it is and Why it Matters." A range of attendees participated, including those with lived experience, social workers, students, and educators from early childhood, primary, and tertiary sectors. This article reflects on the workshop content and the discussions with the attendees.

WHAT EXECUTIVE FUNCTIONING IS

Executive function is an umbrella term that encompasses the cognitive skills that are part of human behaviour (Andrés et al., 2019). These skills allow us to complete everyday tasks such as focusing, remembering instructions, completing multiple tasks at once, and planning (Moyes, 2014) which are essential for school and educational success as they empower students to engage in learning actively (Andrés et al., 2019). Executive functioning enables students to be attentive, resist distractions, follow instructions, plan and organise activities, and solve problems.

NEUROTYPICAL DEVELOPMENT OF EXECUTIVE FUNCTIONING SKILLS

Executive functioning skills for neurotypical people begin to develop in the early years of a child's life (Best & Miller, 2010; McClelland et al., 2019; Taylor et al., 2012). Some research indicates executive functioning skills develop at different rates and reach optimal levels at different ages. Best and Miller (2010) explore a range of executive functioning development models and note that inhibition develops rapidly in early childhood followed by slower improvements in adolescence, while working memory typically improves linearly from early childhood through to adolescence. Taylor et al. (2012) examine studies of neurotypical development from ages

five to 22 and propose that environmental and social changes in late adolescence and early adulthood may have an influence on non-linear development of executive functioning skills during this time. It appears that, while executive functioning skills are linked and can be built upon, they are required at all stages of development. The support of educators, family, and trusted adults is required to embed these skills throughout a person's life.

HOW EXECUTIVE FUNCTIONING IMPACTS LEARNERS

When students have strong executive functioning skills, they will be more readily able to meet the academic demands of tertiary education as they have developed the skills necessary to meet this high-demand environment (Coşkun, 2018). They are more likely to be able to work independently, plan effectively, self-monitor progress, and prioritise, which are all foundation skills for academic success (Coşkun, 2018). In addition, they will have likely developed skills in working memory which relates specifically to their ability to engage with information, manipulate it, and use it for other purposes, allowing them to digest information from multiple sources effectively (Coşkun, 2018; Waterman & Miller, n.d.).

Students who experience executive functioning difficulties may find their learning journey challenging. They may feel a strong desire to feel accepted and mask their difficulties to fit in (Neurodiversity in Education Coalition, 2023). This could prove successful in the short term but possibly lead to barriers to success as academic demand increases when they enter tertiary education. Levine (1994) proposes that difficulties with executive functioning skills have a huge impact on learning. A lack of such skills may prevent students from dealing effectively with the equipment needed to learn efficiently, cause confusion about time and the sequencing of tasks, and make it difficult for students to 'shift gears' smoothly or remember to do something that had been planned (Levine, 1994). Neurodiverse students may find all this particularly challenging to manage.

HOW TO SUPPORT EXECUTIVE FUNCTIONING SKILLS

Having a strengths-based approach to teaching and learning allows people to utilise their strengths and resources as part of the process. McCashen describes a strengths-based approach as power-sharing, stating:

The Strengths Approach emphasises people's ability to be their own agents of change and is applied by creating conditions for people to identify, value and mobilise their strengths, capacities and resources. A core principle of this approach is working from values, beliefs and actions that share "power-with" rather than exerting "power-over" others. (2005, p. 19)

Once a strengths-based approach has been established, through the building of a teacher and student relationship where they begin to know and understand each other, and once specific learning needs are known, there are a wide range of executive functioning skills that educators can support students with, for example through modelling and explicit teaching. Given the time constraints, the workshop focused on three key skills: working memory, planning, and organisation. The challenges around these skills and strategies for supporting them were discussed.

Working memory

Working memory can be likened to a temporary sticky note in the brain. It is the ability to hold important information in your mind and manipulate it over short periods (Gathercole & Alloway, 2007). Working memory is a predictor of academic success (Sankalaite et al., 2023; Waterman & Miller, n.d.), alongside teacher-student relationships (Sankalaite et al., 2023), yet it appears educators often overestimate the capacity of working memory in students. Waterman and Miller's (n.d.) research found that over 75 percent of educators surveyed overestimated the time working memory remained effective. Educators need to be mindful of the limits of

working memory in the classroom setting, and how they can support the development of working memory skills. Workshop participants talked over the variations within students' abilities to recall taught tasks. Strategies used to support working memory were noted, including the repetition of taught content, the implementation of varied teaching methods such as the introduction of visual prompts, flow chart listing, and additional time to help students better process and retain new knowledge.

Planning

Planning skills are like a road map to a destination; they allow us to look to the future. Planning skills are crucial for the efficiency of learning (Kostromina, 2013); however, different environments and situations can impact a person's ability to plan, particularly when it comes to learning. Petersen et al. (2006) acknowledge the many demands of tertiary study and how balancing these demands can impact a person's ability to plan and set goals. Explicitly teaching planning skills was viewed by workshop participants to be one of the key factors for successful learning outcomes. Teaching these skills from a young age was viewed as important so students have strengths in this area by the time they reach the high-demand environment of tertiary study.

Organisation

Organisation skills can be linked to planning, and are required to deliver on short and long-term responsibilities. Tertiary students have a range of deadlines and responsibilities, both within their learning journey and their wider lives. Teachers who teach organisation skills to their students are imparting important lessons for education as well as for life (Gambill et al., 2008). Participants at the workshop discussed how these skills could develop over a person's life and how they were valuable in a range of capacities. It was noted how important it was for students to have a range of supports and structures in place to develop organisational skills. Educators felt they could not be solely responsible for supporting development in this area and students needed a range of supports such as family and friends. Both high-tech and low-tech tools such as diaries, calendars, apps, and reminders were viewed by participants as supporting the development of organisation skills across a range of contexts.

It is important to acknowledge that executive functioning skills develop at different rates for different people, and different levels of support are needed to ensure students can access learning. Students with additional learning needs such as autism, ADHD and specific learning difficulties such as dyslexia, often have difficulty with executive functioning skills and may find it challenging to develop skills such as organisation, planning, and working memory strategies (Mirfin-Veitch et al., 2020; Watson et al., 2016). These students may require additional support and time to develop and strengthen such skills and educators can use modelling, repetition, and explicit teaching of executive functioning skills in their practice as part of this process. Regardless of the time and level of support required, it will surely benefit the academic progress of students if they have stronger executive functioning skills (Alloway & Alloway, 2010; Watson et al., 2016).

REFLECTIONS FROM WORKSHOP PARTICIPANTS

Participants brought a wealth of personal and professional experiences with them, and a rich discussion resulted. Educators knowing their learners and being able to identify potential successful strategies and use these in their practice was noted to be an important first step in supporting students to develop executive functioning skills. Participants who were educators noted the particular importance of supporting their neurodiverse students as they were a group particularly at risk from exclusion from education. A common theme of the discussion was the challenges that students faced with executive functioning, particularly if these skills were not developed early on in the learning journey, as such challenges could pose an ongoing barrier to their learning. It was acknowledged that neurodiverse learners often struggled with developing executive functioning skills.

Experience from early childhood sector participants highlighted the importance of teaching executive functioning skills from a young age. These participants described the successes they had seen as young children moved through life with these strong foundations. It has been observed that a student may recognise indicators of neurodiversity in themselves while studying in learning environments which are aware and understanding. Those with lived experience spoke passionately about needing support from a range of sources such as family, friends, and their tertiary institution's learning support department, as well as executive functioning tools both low- and high-tech, to develop their executive functioning skills. They also highlighted strategies they had found successful such as minimising sensory input, and using visuals and diaries to help with organisation.

The availability of resources and sources of support were discussed at length. While early intervention was unanimously agreed to be essential, those with experience in the early childhood sector described a lack of resourcing in the early years. These participants felt resourcing in this area needed to be reviewed, especially as they viewed early intervention to be essential for developing the executive functioning skills required to progress to tertiary education. Those working in the primary and secondary sectors noted long wait times to access support; however, when support for educators did arrive, the resources and personnel made a huge difference in educators' ability to support students. The expertise in learning support found through organisations such as the Ministry of Education, and tertiary learning support departments, was viewed as valuable by educators in this workshop, as many felt they had received inadequate training in this area during their ITE programme.

Twelve key strategies to support working memory, planning, and organisation in learning environments were provided in the workshop as discussion points based on research (Leaver, 2019; Ministry of Education, n.d.; Obaid, 2013) and the experiences of the educators who ran the workshop. Participants broadly agreed these strategies were effective in supporting learners with executive functioning and learning and were the main ones discussed in the limited time of the workshop. Stories of personal experience were shared relating to these twelve strategies.

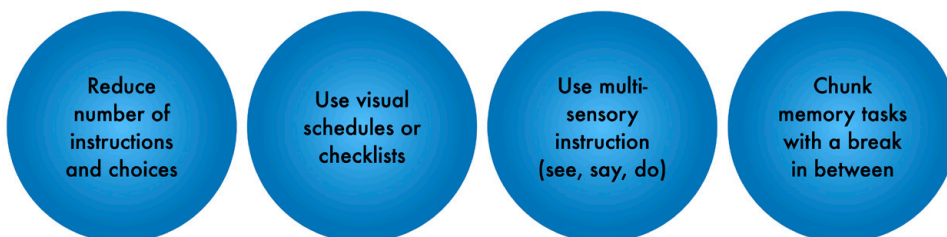


Figure 1. Working memory strategies.

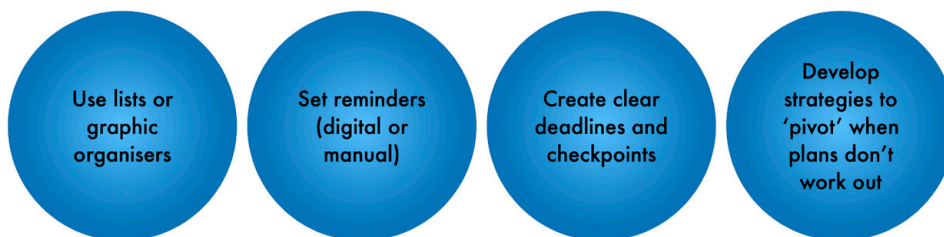


Figure 2. Planning strategies.

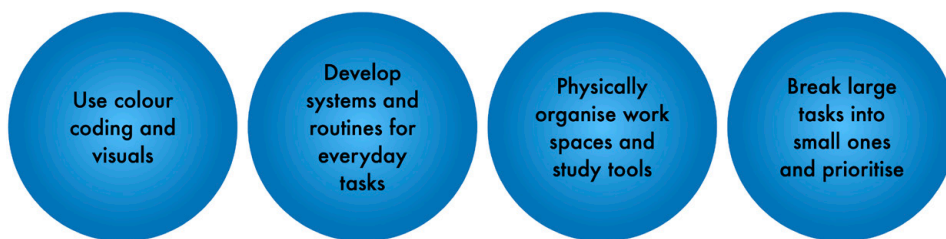


Figure 3. Organisation strategies.

Above all, participants agreed that the ability to self-advocate and the development of metacognition skills were key indicators for success in students, particularly at the tertiary level. They generally felt when students could articulate the areas in which they needed support, when they actively sought help when required, and when they knew their strengths and how to utilise these in their learning, those were key indicators for success. This observation is supported by several researchers (Coşkun, 2018; Gambill et al., 2008; Kane et al., 2014; Mirfin-Veitch et al., 2020), emphasising the importance of self-advocacy and the deliberate teaching of executive functioning and metacognition skills for students today.

CONCLUDING REMARKS

Executive functioning skills are important for both academic success and everyday life. With the rise in reported additional learning needs across Aotearoa New Zealand, educators need to be prepared to meet the needs of students present in today's classrooms. Executive functioning skills develop at different rates for different people and can be delayed for those with additional learning needs. Through explicit teaching, modelling, and encouraging self-advocacy focused on executive functioning skills, educators can support students in their learning journey to experience success. Developing strategies to support working memory, planning and organisation in particular will provide a strong platform for this.

The purpose of the workshop was to ignite discussion around the important topic of executive functioning in education. Participants brought a range of experiences to the discussion. It became apparent that executive functioning is an area where further support for educators is required. This support would enable them to feel confident in their practice and understand effective strategies to meet the diverse needs of students and achieve the ultimate goal of inclusive education: a position where "all children and young people are engaged and achieve through being present, participating, learning, and belonging" (Ministry of Education, 2023). Future research into how to support tertiary learners to develop the executive functioning skills needed for successful academic experiences would be beneficial, with a particular focus on strategies that are successful for neurodiverse learners.

Rebecca Gilbertson is tumuaki ki te Kura o Whakaohorahi – principal of Broad Bay school. She holds a Master of Inclusive Education and her experience as a Learning Support Coordinator for Ōtepoti ki te Raki Kāhui Ako, and her teaching background, has fostered a particular passion for empowering teachers to become inclusive practitioners. Rebecca's work is centred around identifying and removing barriers to education for rangatahi and she has recently been part of a city-wide dyslexia initiative to develop teacher capability and community awareness of support for tamariki with specific learning difficulties.

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