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# Teachers' self-efficacy in supporting learners presenting with autism spectrum disorder in mainstream classrooms

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**Background:** Teachers' experiences with supporting learners who are living with autism spectrum disorder (ASD) in regular classrooms depend on their self-efficacy beliefs. Albert Bandura's theory provides constructs of verbal persuasion, emotional state, prior experience, and observation of models, useful for in-service teacher training.

**Aim:** To design, implement, and evaluate an interactive, in-service workshop to equip teachers with knowledge and skills for addressing the high-level needs of learners with ASD.

**Setting:** Mainstream classrooms.

**Methods:** Using qualitative participatory action research, we purposively sampled primary school teachers ($n$ = 20) as participants. We developed the workshop's content, based on literature and a pre-workshop survey of the teachers' previous experiences. We facilitated the workshop in collaboration with the participants and conducted a post-workshop survey to evaluate the workshop's effectiveness. Data were analysed thematically to reveal four themes.

**Results:** Firstly, the challenges teachers' experience cause doubts in their self-efficacy to support neurodiverse learners. Secondly, teachers relied on informal methods, ad hoc peer support, and minimal use of evidence-based strategies. Thirdly, after participating in the workshop, with hands-on activities, role-playing, and vicarious observations of models, the teachers' confidence improved as they mastered effective strategies. Lastly, participants valued the effectiveness of the workshop, increasing their self-efficacy.

**Conclusion:** Participatory, collaborative, interactive workshops strengthen teachers' self-efficacy capacity to address unique ASD learning needs.

**Contribution:** In-service workshops should be designed collaboratively with facilitators actively engaging teachers with accurate knowledge and practical strategies, which enhance self-efficacy to perform specialised didactic practices supporting the increasing prevalence of neurodiverse learners in mainstream classrooms.

**Keywords:** autism spectrum disorder; ASD training guidelines; inclusive education; participatory action research; self-efficacy; teacher training.

## Introduction

A wide range of abilities and support needs are characteristics of autism spectrum disorder (ASD), a complex neurodevelopmental condition (Brasic, Farhadi & Elshourbagy 2019) in which some people become independent, while others need constant support. Depending on each learner's distinct characteristics, teachers' experiences with learners with ASD vary (Kurtz-Nelson et al. 2020), necessitating a variety of learner-centred approaches (Stahmer et al. 2014). Teachers often find it challenging to effectively modify their teaching strategies for learners with ASD because they frequently struggle with participation and academic performance (Cerbo & Rabi 2019; Jansen et al. 2017). Classroom dynamics change when learners with ASD are included, and teachers face additional responsibilities for which they are often insufficiently prepared. The study aimed to assist mainstream teachers in modifying their instruction to better accommodate learners with ASD. The growing number of learners with ASD in regular South African schools, along with a lack of specialised resources and teacher training, makes it very hard to include everyone effectively. Many teachers feel unprepared and unsure when it comes to meeting the behavioural, emotional, and communication needs of learners with ASD.

This indicates a pressing need for professional development that is both practical and easily accessible, enabling teachers to feel more confident and capable. Even though there is more inclusion, not much research has been carried out in South Africa to see how in-service training that focuses on ASD can help teachers feel more confident in their abilities. A study conducted by De Goede (2022) indicated inadequate preparation and insufficient integration of theoretical concepts with practical classroom application. This study contributes by assessing an interactive, theoretically based workshop that combines ideas from Bandura's self-efficacy theory, inclusive education, and characteristics of ASD. It offers evidence regarding the impact of contextually relevant training on teachers' self-efficacy and their ability to assist learners with ASD.

## Motivation

Teaching learners with ASD poses many challenges, including complex behaviours, impaired social functioning, limited communications, and emotional detachment (Vorster 2019). Teachers often experience the repetitive behaviour patterns, such as hand-flapping, rocking and spinning, displayed by learners with ASD, as a particularly disruptive challenge (Maenner et al. 2021).

There are now more learners with ASD in mainstream schools worldwide (Jaffal 2022), with differences by race and ethnicity. The prevalence of ASD in the United States in 2022 was 32.2 per 1000 children (1 in 31) (Shaw et al. 2025). There are few national statistics for South Africa; however, a study conducted in the Western Cape found that the number of ASD cases increased by 76% between 2012 and 2016 (De Goede 2022). Although these numbers may not be representative of the entire nation, they indicate rising identification rates, underscoring the need for inclusive teaching strategies.

In South African mainstream schools, the needs of learners with ASD are often inadequately addressed with therapy or academic support (Engelbrecht et al. 2015). Since many schools lack the infrastructure and resources necessary to meet the needs of their learners, the lack of specialised schools and pervasive poverty further impede efforts at inclusion (Sumbane et al. 2023). Furthermore, teachers are insufficiently trained on how to manage issues related to ASD. Through interactive workshops, this study hoped to enhance mainstream teachers' self-efficacy in teaching learners with ASD.

## Problem statement

The increasing number of learners with ASD in mainstream primary schools (Jaffal 2022) has exposed a significant gap between inclusive education policy and classroom practice. Although policies advocate for inclusion, many teachers remain inadequately prepared to address the complex behavioural, emotional, and communication needs of learners with ASD, including emotional dissociation and challenging behaviour (Maenner et al. 2021; Vorster 2019). Research indicates that teachers often lack the necessary pedagogical knowledge and effective strategies, despite policy expectations, and receive limited ongoing, contextually relevant professional development (Jaffal 2022; Sumbane et al. 2023). This challenge is intensified in under-resourced contexts that are characterised by poverty, insufficient learner support services, and limited access to therapeutic interventions (Engelbrecht et al. 2015; Erasmus, Kritzinger & Van der Linde 2019; Sumbane et al. 2023). Consequently, there is a clear need for structured, contextually grounded in-service teacher training as a practical intervention to bridge the gap between policy and practice and to equip teachers with sustainable strategies to effectively support learners with ASD in mainstream classrooms.

## Research question

*What in-service teacher-training intervention workshop can be designed to support learners with ASD in mainstream primary schools, and what content could be used in such a workshop?*

### Aim

To design, implement, and evaluate an interactive, in-service workshop to equip mainstream teachers with knowledge and skills for addressing the high-level needs of learners with ASD.

### Objective

To determine what content topics and interactive learning activities could be used in an in-service teacher-training workshop, and to explore how such a workshop could contribute to teachers' didactic practices.

# Conceptual framework

The conceptual framework for this study was formed by merging Bandura's (1977) self-efficacy theory with the principles of inclusive education and the characteristics of ASD (Figure 1).

## Autism spectrum disorder

Autism spectrum disorder is characterised by repetitive behavioural patterns as well as limited social functioning, communication, and participation (Maenner et al. 2021). Autism spectrum disorder is a condition that is diagnosed by a duly qualified professional (WHO 2021). In this study, we focused on the social communication difficulties, emotional difficulties, repetitive habits, and sensory sensitivity as significant characteristics of ASD (Vorster 2019). These characteristics influence classroom dynamics and were suggested by the participating teachers based on their experiences of learners with ASD. Repetitive behavioural patterns and difficulties in social interaction and communication are characteristics of ASD (Grove et al. 2019). Teachers can assist learners with ASD who exhibit repetitive behaviours by offering structured choices, transition cues, and visual supports (Kurtz-Nelson et al. 2020). Learners with

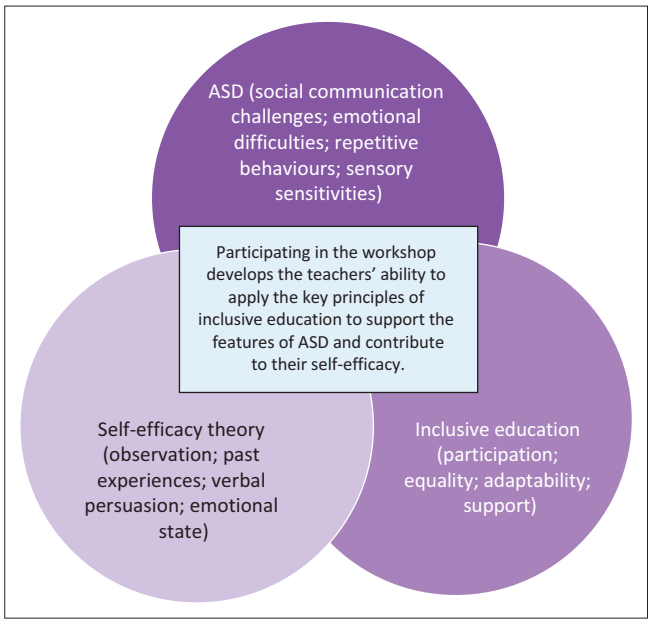


**FIGURE 1:** The combined theoretical framework.

ASD thrive in well-structured, controlled environments as routine disruptions and sensory sensitivity can impede learning (APA 2022; Hetherington 2017; Vorster 2019). To improve communication and language development, milieu teaching, a naturalistic developmental behavioural intervention, builds on learners' interests during everyday interactions (Franz et al. 2019; Hampton et al. 2019). Milieu teaching offers a successful, interest-based strategy for assisting ASD learners by combining natural contexts with learner-initiated communication.

## Inclusive education

Every child should receive the support they require in order to learn, engage, and contribute to all aspects of school life. Learners should feel accepted by their local schools and be enrolled in regular, age-appropriate classes (Jardinez & Natividad 2024) as the foundational principles of inclusive education dictate. The goal of inclusive education is to develop and organise programmes, events, schools, and classrooms that promote participation and learning for all learners (DBE 2014). Four key principles of inclusive education: support, equity, flexibility, and involvement were incorporated in the workshop for this study.

## Self-efficacy

One of the main concepts of Albert Bandura's social cognitive theory is self-efficacy (Bhati & Sethy 2022). Self-efficacy is a person's belief in their ability to perform and finish a task (Bandura 1994). Self-efficacy is essential to academic learning, performance, critical thinking, and task motivation (Razzaq et al. 2018). According to Albert Bandura's theory, verbal persuasion, emotional state, prior experience, and observation of models are the four information sources of self-efficacy.

## Conceptual integration

This study advances inclusive education by designing an in-service teacher–training intervention, grounded in the constructs of Autism, Inclusive Education and Self-Efficacy (Figure 1), to strengthen teachers' self-efficacy in supporting learners with ASD. By connecting educational psychology, inclusive education, and needs unique to ASD with Bandura's theory of self-efficacy, the study demonstrates how systemic support, resources, and training help teachers to become more confident when implementing techniques such as sensory integration and visual supports. By addressing key characteristics of ASD and reducing teacher anxiety through modelling, past successes, encouragement, and emotional regulation, the training was guided by four fundamental principles of inclusion: participation, equality, adaptability, and support structures (Beghin 2021). The study expands the idea of inclusive education beyond physical placement to include meaningful engagement and advancement, and infuses teacher development with theoretical understandings of teacher self-efficacy.

Observing the behaviour of other participating teachers can help in-service teacher participants develop the skills to address social challenges faced by learners with ASD. The in-service teacher training workshop aimed to equip teachers with the tools to support learners with ASD in the classroom. This approach could enhance the teachers' sense of self-efficacy in improving the social communication skills of learners with ASD. Teacher training interventions can benefit teachers' emotional well-being by improving their didactic practices.

Encouraging equality can assist in addressing the negative experiences that lower teacher self-efficacy as well as the emotional difficulties faced by learners with ASD (Murungi 2015). Teachers can support learners' emotional understanding by transforming past challenges into positive experiences when they treat learners with ASD optimally. Teachers who receive in-service training gain the skills necessary to promote quality education and boost their self-assurance when working with learners who have ASD.

Teachers find it challenging to motivate these learners to shift their focus when they are engaged in what interests them in a classroom. Autism spectrum disorder learners may become anxious, which may lead to head-banging, tantrums, aggression, social withdrawal and communication challenges (Centre for Disease Control and Prevention 2022). Teachers can assist learners with ASD to change their fixated focus through careful verbal persuasion, which can manage repetitive behaviours (Hussain & Khan 2022). An in-service teacher training workshop designed around these principles could thus empower teachers who are teaching ASD learners in mainstream schools to do so more successfully with a sense of self-efficacy.

### Teachers supporting learners with autism spectrum disorder in mainstream schools

Teachers face challenges integrating ASD learners into regular classrooms because of insufficient inclusive pre-service preparation (Jaffal 2022). Inadequate in-service teacher training specific to ASD may be present (Mamba 2023; Roberts & Webster 2020). Consequently, teachers in mainstream schools often confront the challenge of accommodating ASD learners without the necessary training in this area (Marais 2023).

The Department of Higher Education and Training (DHET) has established guidelines for teacher education programmes at the pre-service level (Nseibo et al. 2023). According to DHET policy, student teachers must recognise and embrace inclusive education (DHET 2015). The DHET outlines the training for prospective teachers to implement inclusive education effectively (Nseibo et al. 2023). However, because of limited time and credit availability in undergraduate programmes, ASD-specific pre-service training is often not feasible. Thus, in-service teacher training interventions are needed to adequately support ASD learners in mainstream primary schools.

To ensure that ASD learners can achieve their full potential, the Education White Paper 6 (EWP6) emphasises that learners' needs should be supported (DoE 2001). Because of the limited schools that specifically cater for ASD learners, teachers are often required to teach learners with ASD alongside their peers in a typical classroom setting (Majoko & Phasha 2018). This enhances inclusivity; however, teachers often do so without receiving adequate training and support from the educational system. By creating an in-service teacher training workshop, this study sought to address these training inconsistencies.

## Research methods and design

Based on a pragmatic paradigm, we employed participatory action research (PAR) with a qualitative approach to address the research aim. The PAR examines social situations while creating social change and encouraging collaborative participation (Salazar 2022). The researchers acted as the primary data collection instrument, making the study's design subjective (Ebersöhn, Eloff & Ferreira 2025).

In the planning stage, relevant literature was reviewed; we picked the site school and sampling method; gathered pre-workshop data to inform the content of the workshop; designed the workshop; determined how to analyse the data; and how to evaluate the workshop effectiveness.

The study was conducted at a mainstream primary school in Gauteng, South Africa, which provided a targeted sample of primary school teachers working with learners with ASD. The training event occurred in the school's assembly hall and was conducted through an in-person workshop. Participants were selected using purposeful sampling. The participants were 20 teachers with teaching experience ranging from less than 1 to 15 years. Five participants had taught for less than a year, four participants between 2 and 4 years, five between 5 and 10 years, and six between 11 and 15 years. Their qualifications ranged from a diploma in Foundation Phase teaching ($n$ = 2), a Bachelor of Education (BEd) in Foundation Phase ($n$ = 9), a BEd in the Intermediate or Senior and Further Education and Training phases ($n$ = 3), a postgraduate certificate ($n$ = 3), a postgraduate degree in Human Movement Science ($n$ = 1), and an Honours in Psychology with a postgraduate qualification ($n$ = 1). Another participant was still busy with the BEd programme ($n$ = 1). Nine had received ASD training, while 11 had not. The researchers acted as facilitator participants and worked outside of the school, thus reducing researcher bias.

The workshop design was based on the results of a pre-workshop survey (PWS), which also provided a baseline assessment of the participants' knowledge and attitudes towards educating learners with ASD. The PWS was divided into two parts. The first part gathered demographic information from the participants, including their educational background, pre-service training and teaching experience. The second part consisted of open-ended questions to assess the participants' knowledge, understanding and skills of teaching learners with ASD. The reflection on the pre-workshop data and literature review identified relevant resources to support learners with ASD, contributing to the workshop content and the further cycle of taking action, collecting and analysing data and evaluating the workshop.

The workshop took place for 4 hours each day for 2 days, during holidays scheduled as in-service teacher training time, so as not to detract from official school hours. At the beginning of the programme, participants received foundational knowledge on ASD characteristics and best practices for teaching learners with ASD. During the workshop, hands-on activities, such as creating concrete teaching aids, sensory fidgets, and visual organising schedules, were performed (Martin & Wilkins 2022). Teachers engaged in role-playing scenarios with each other, for example, ASD learners having a temper meltdown, and demonstrated how to calm the learner. Teachers watched pertinent videos of teachers modelling responses to typical ASD stereotypic repetitive behaviours. Teachers practised using the Picture Exchange Communication System (PECS) as a useful communication tool for non-verbal learners (Mirnawati & Amka 2018). Teachers were engaged in an activity to create a safe, sensory-friendly space in their classroom (Lory et al. 2024). Milieu teaching techniques were explored as a way to further support language communication (Hampton et al. 2019). These interactive activities were interspersed with informative knowledge-based presentations by the facilitators and browsing of pertinent websites. The researchers observed the teachers' engagement and interactions in these activities during the workshop.

After the workshop, a post-workshop survey (POS) was conducted to evaluate the workshop's effectiveness. The POS was emailed to participants, who were given 1 week to complete it. The POS consisted of two sections. The first section featured open-ended questions designed to gather information about participants' understanding of learners with ASD and how they can support these learners in their classrooms. The second section was a brief evaluation of the facilitation of the workshop, with open-ended questions to assess the hands-on learning activities, the role-playing scenarios, the videos, and the information sessions.

An inductive approach to data analysis was employed to identify and establish coherent themes across the datasets (Bordens & Abbott 2018). ATLAS.ti software was used for thematic content analysis (ATLAS.ti 2024). The analysis entailed becoming familiar with the raw data (Braun & Clarke 2006) collected from the PWS, during the workshop, and POS. Codes were generated and clustered into categories by consolidating related concepts into categories and themes (Tracy 2020).

### Trustworthiness

Credibility, confirmability, dependability, transferability and authenticity are the criteria that Guba and Lincoln (1986) proposed to assess the quality of qualitative research. The trustworthiness of the findings was ensured through triangulation and detailed methodological reporting. Credibility was established by using multiple data sources and encouraging open and honest participant responses. We maintained neutrality and bias was minimised as we used an unfamiliar site, and the data were independently checked by an impartial reviewer. Confirmability was ensured by open communication, a research diary and an audit trail. Data were cross-checked and methods reported in detail to ensure reliability. Transferability was enhanced by the provision of rich contextual detail, allowing the reader to relate whether the findings can be useful in their own setting.

### Ethical considerations

An ethical clearance certificate was obtained from the Research Ethics Committee (REC) at the University of Johannesburg, Faculty of Education, authorising the study, with ethical clearance number (SEM2-2024-119), with the REC Registration Number of 110613-036. Ethical issues, such as informed consent, confidentiality and protection from harm, were adhered to. The school principal and teachers involved in the study were fully informed of the study's purpose before they gave written consent. Participation was voluntary, without any penalties for non-participation. Some teachers attended the workshop for their own professional development, but declined to participate in the research. The data were kept confidential and anonymous, accessible only to the researcher and supervisor. Personal information was kept safe and deleted 2 years after the end of the study. The researchers were alert to any potential harm, and support was provided to participants where necessary.

## Results

Four themes emerged from the data.

### Theme 1: Challenges and self-doubts

Participants reported substantial challenges and self-doubts when teaching learners with ASD (PWS). They described persistent difficulties related to attention, learning pace, and behaviour, noting that ASD learners often take longer to understand concepts and require frequent redirection to remain engaged:

> 'The behaviour of the learners is challenging, they take a long time to understand concepts, especially when they have limited language.' (Participant 6, female, teacher)

> 'It is challenging to keep learners focused and ensure they grasp new concepts, as they can get fixated on certain small details.' (Participant 15, female, teacher)

> 'Understanding how to assist them in regulating emotions, when temper tantrums occur, and creating a comfortable sensory-friendly environment for learners who are so sensitive to stimulus is very challenging.' (Participant 5, male, teacher)

Emotional and sensory-related behaviours were identified as concerns. Teachers expressed uncertainty about managing meltdowns, emotional outbursts, and general emotional well-being:

> 'Melting down – how do I manage it? So stressful.' (Participant 10, female, teacher)

> 'Emotional outbursts, meltdowns, regulating their emotions is so hard.' (Participant 14, female, teacher)

> 'Emotional capabilities and well-being. How to teach them to cope with their emotions.' (Participant 17, female, teacher)

Nearly all participants indicated that teaching learners with ASD required high levels of patience, flexibility, and specialised techniques. They found that attention difficulties often necessitated constant rerouting, while resistance to change and repetitive behaviours disrupted classroom routines. These challenges reinforced for teachers that a uniform instructional approach is inadequate, given the diverse emotional and behavioural needs presented by learners with ASD.

### Theme 2: Knowledge and methods used before the workshop

The second theme identified was participants' prior knowledge and methods. The following quotes illustrate the knowledge participants previously had to support learners with ASD:

> 'Emotional outbursts or well-being, I don't really know how to handle.' (Participant 15, female, teacher)

> 'There are … emotional and mental stressors and time management, which I battle with.' (Participant 8, female, teacher)

Participants recognised the importance of including learners with ASD in the classroom. The PWS results provided insight into the participants' prior knowledge, experiences and

expectations regarding the instruction of ASD learners. The PWS indicated that teachers had a basic understanding of behavioural patterns commonly associated with ASD, as well as an awareness of the emotional challenges faced by these learners and the potential implications for academic and social development.

Despite this foundational awareness, the participants' overall comprehension of ASD was limited, as they did not understand the range or spectrum of abilities characterised from high through medium to low functioning. This highlighted the need for professional development and specialised training to enhance their capacity to support a range of learners:

Participants described several methods they used before attending the workshop to support learners with ASD:

> 'I use multi-sensory teaching and explaining the same concept in different ways, lots of repetition.' (Participant 4, female, teacher)
>
> 'I give them movement breaks, a good reward system, regulated activities and visual support.' (Participant 9, female, teacher)
>
> 'To treat each learner the same and I use multi-sensory learning.' (Participant 19, male, teacher)

These methods included multisensory teaching, classroom management techniques, remediation and repetition, and practices that provided emotional support. Participants made efforts to create structured and inclusive learning environments by breaking tasks down into smaller steps, showing patience, offering positive reinforcement, and adapting the curriculum to meet individual needs. They also used visual aids, minimised distractions, and established clear boundaries.

However, participants noted a lack of specific guidelines to support learners with ASD. The PWS highlighted their uncertainty, limited exposure and gaps in ASD-specific knowledge, emphasising the need for a structured teacher–training intervention to strengthen self-efficacy and instructional competence.

## Theme 3: Insights increase self-efficacy

The third theme identified was the participants' insights gained from the workshop, which contributed to an increase in their self-efficacy. Participants reported new learning and reflections, as illustrated in the following quotes:

> 'I learned how to create my own resources, like picture symbols and sensory calming fidgets.' (Participant 10, female, teacher)
>
> 'It grew my understanding that we can use strategies and make them fit the child's personal situation, as we role played the different scenarios.' (Participant 20, female, teacher)

The insights gained included a deeper understanding of the individual differences among learners with ASD. Participants created various resources for supporting learners with ASD. Participants gained practical knowledge on implementing sensory support to create a more accommodating learning environment, such as creating a safe corner in the classroom. The participants made resources that could enhance learning and improve engagement, such as visual timers:

> 'Include learners in making visual aids or sensory resources, posters and collages.' (Participant 7, female, teacher)
>
> 'Using multi-sensory toys and resources when handling a concept or theme in class. Using resources to spark their interest, concrete objects that can be felt and touched and played with.' (Participant 17, female, teacher)

Participants developed a greater appreciation for collaboration with parents through role-play scenarios where teachers held mock consultations with parents. This allowed participants to realise that effective support for learners with ASD requires a holistic partnership between teachers and families.

Participants recognised individual differences required using personalised teaching approaches. Participants valued the importance of maintaining structured environments and predictable routines. Participants explored milieu teaching, which promotes language communication through natural, everyday interactions. Post-workshop reflections indicated a clearer understanding of using PECS and multisensory resources to support learners more effectively.

## Theme 4: The evaluation of the workshop

The fourth theme focused on the effectiveness of the workshop and teachers' motivation to continue their professional development. Teachers reported that they did not find any aspect of the workshop challenging. Their feedback from the POS included statements such as:

> 'I would attend more training especially on emotional regulation … the workshop was very useful, with practical ideas that we could practice on each other.' (Participant 9, male, teacher)
>
> 'Continue reading about ASD and how to help learners and do more fun workshops like this, where we make our own resources.' (Participant 11, female, teacher)

Participants indicated that no meaningful changes were required to the workshop structure. The content offered valuable support and practical resources that the teachers could apply immediately in their classrooms. Participants expressed satisfaction with the training. They reported that the workshop enhanced their ability to create more inclusive and supportive environments and equipped them with practical strategies for working with learners with ASD. Many felt that the skills gained improved their confidence and overall self-efficacy. Although participants found the workshop valuable, they also expressed a desire for more training to broaden their knowledge and deepen their skills in supporting learners with ASD. This highlighted an ongoing need for additional professional development opportunities in the next action cycle.

## Discussion

The results on challenges and self-doubt show that teachers who support learners with ASD often feel very uncertain and less capable of providing special needs support. The participants' descriptions align with existing literature that indicates learners with ASD frequently exhibit attention difficulties, emotional dysregulation, and behavioural rigidity, all of which can complicate classroom instruction and elevate teacher stress. This is in line with the Department of Education's standards for inclusive education (DBE 2014), which notes that teachers adapt teaching methods to help learners who are having challenges in learning, such as those with ASD.

The emotional and sensory challenges articulated by participants align with research indicating that individuals with ASD may find it difficult to comprehend, articulate, and manage emotions, elements that lead to social withdrawal and frustration (Berggren et al. 2017). Teachers' lack of confidence in handling meltdowns and emotional outbursts shows that they need specialised training and structured support strategies.

These findings underscore the need to enhance teacher self-efficacy within the study's conceptual framework. Bandura's theory (1994) emphasises that teachers need to have experiences of mastery, observe others performing tasks, learn how to manage their emotions, and receive verbal support to feel confident in handling the numerous demands of the classroom. The challenges identified by participants underscore the necessity for targeted training interventions that provide educators with practical, evidence-based strategies to address the behavioural, emotional, and sensory needs of learners with ASD.

The results show that even though the participants had some basic knowledge of ASD, especially about emotional problems and behavioural traits, there were still gaps that made it difficult to provide adequate support in the classroom. Marais (2023) similarly found that teachers in traditional primary schools often don't have the training they need to understand learners with ASD. Moreover, although participants acknowledged the significance of inclusion, their comprehension of practical, evidence-based methodologies was still constrained.

Teachers recognised the importance of emotional and behavioural support, aligning with the perspective that educators need particular skills and knowledge to implement inclusive education effectively (Vorster 2019). Their current strategies, including multisensory teaching, movement breaks, structured routines, and visual supports, align with prevalent methodologies in the literature; however, the lack of formal guidelines has led to ambiguity and inconsistent implementation. Case-Smith, Weaver and Fristad (2015) endorse the idea that deconstructing tasks into manageable steps can facilitate individuals with ASD in processing and executing activities, thereby validating certain pre-existing strategies employed by participants.

The conceptual framework's focus on teacher self-efficacy is pertinent. Encouraging teachers to change how they teach can make learning more enjoyable for learners with ASD and also help teachers feel more confident. These changes are, however, still limited in scope and effectiveness without specialised training. Overall, the results show that professional development needs to be organised and focused. An intervention centred on ASD-specific knowledge and pedagogical strategies could equip educators with the necessary resources to enhance learner support and bolster their self-efficacy in inclusive environments.

The workshop was valuable for helping teachers learn and feel more capable about helping learners with ASD. This aligns with South African policy, EWP6, which stipulates that all learners should receive sufficient support within a comprehensive system (DoE 2001). This highlights the importance of teachers having a variety of strategies to meet each learner's needs. The insights obtained, especially regarding sensory support, structured environments, and individualised instruction, align with established principles of inclusive education.

The participants learnt how PECS can help non-verbal learners improve their communication skills. The PECS offers a structured communication framework that encourages autonomy and enhances social engagement (Santos et al. 2021). Its basis in positive reinforcement enhances communication outcomes (Taryadi et al. 2019), thereby affirming its significance to the participants' learning. Using visual scheduling aids helps learners with ASD become more organised, behave better, and make transitions more smoothly (Lory et al. 2020). Visual schedules are especially helpful because many learners with ASD need to see things to understand routines and expectations (Martin & Wilkins 2022).

The growing appreciation for controlled classroom settings and predictable schedules corresponds with the general consensus that alleviating anxiety and enhancing structure facilitates daily functioning for individuals with ASD (Listiakova & Preece 2020; Nicklason 2023). This, in turn, helps teachers to feel more confident in their ability to handle problems well.

The workshop's use of milieu teaching is an example of evidence-based practice. Milieu teaching encourages communication through natural, meaningful interactions and can enhance engagement for learners who require support with language (Hampton et al. 2019). The participants' improved understanding of these techniques demonstrates that professional training is beneficial for enhancing teachers' self-efficacy.

The workshop's emphasis on working with parents highlights the value of having support systems that involve everyone. Teachers' acknowledgement of parents' pivotal

role corresponds with inclusive education frameworks that promote collective responsibility in facilitating learners' development (Erasmus et al. 2019).

In general, the workshop improved the participants' knowledge, strategies, and confidence. The conceptual framework posits that the motivation to adapt and enhance teaching methodologies not only elevates learner outcomes but also fortifies educators' self-efficacy, a crucial element in maintaining inclusive practices.

The results indicate that the workshop was fairly successful in meeting the needs of teachers and supporting their professional growth. The participants reported minimal challenges, and their eagerness for additional training indicates that the workshop effectively met their learning expectations. This supports Lenette's (2022) claim that teachers need to continually learn about new teaching and didactic methods to be effective in classrooms with diverse learner populations. The workshop appeared to meet this need by providing participants with new ideas, tools, and strategies for supporting learners with ASD. Learning from other teachers' experiences is an effective way to find solutions to classroom problems (Majoko & Phasha 2018; Murungi 2015). The workshop's hands-on, interactive format likely helped participants to feel more prepared and confident in their abilities.

The workshop provided teachers with a good foundation, but since ASD is so complex and diverse, they need to continue learning to stay current on the best ways to support learners and explore new interventions. Ongoing training would help teachers refine their methods, enhance their skills, and better support learners with ASD in increasingly inclusive settings.

# Conclusion

The study highlighted the value of collaborative in-service teacher training as an intervention to support learners with ASD. Mainstream teachers generally struggle to support learners with ASD because of insufficient resources and poor implementation of inclusive education policies. With most teachers having less than 5 years' work experience and nine having received ASD-specific training, many teachers lacked the knowledge and experience to support learners with ASD. The training intervention workshop that involved teachers in creating valuable strategies enhanced teachers' efficacy in supporting learners with ASD. The workshop aligned with the theoretical components of teacher self-efficacy within actual classroom practice. The study contributed to didactic practice by guiding in-service policy training in mainstream schools, emphasising the value of teacher self-efficacy by enabling teachers to develop appropriate strategies and foundational knowledge to support learners with ASD.

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During the preparation of this work, the authors used Grammarly and Atlas.ti as AI-assisted technology to code the raw data. The article benefited from the use of Grammarly for grammar refinement. The content was, however, reviewed and edited by the authors, who take full responsibility for its accuracy.

## Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

## CRediT authorship contribution

Danette Loubser: Conceptualisation, Data curation, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Validation, Visualisation, Writing – original draft. Jean V. Fourie: Conceptualisation, Funding acquisition, Supervision, Writing – review & editing. All authors reviewed the article, contributed to the discussion of results, approved the final version for submission and publication, and take responsibility for the integrity of its findings.

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## Data availability

The data that support the findings of this study are available from the corresponding author, Jean V. Fourie, upon reasonable request.

## Disclaimer

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