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Career Transition Support for Learners with Down Syndrome: A Global Scoping Review (2013-2023)

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Abstract: The transition from school to post-school settings is a critical period for learners with Down syndrome (DS); however, research focused on career transition support remains limited. This scoping review examined literature from 2013 to 2023 addressing career transition support for learners with DS, employing a conceptual framework that combines neurodiversity theory with Bronfenbrenner's ecological systems theory. A systematic search across seven databases yielded no results that met the inclusion criteria. A supplementary Google Scholar search identified fifty-four studies, which were analysed to examine the general scope of DS literature. Four main themes emerged: pedagogical and educational support, in-school transitions, post-school functioning, and general career transition for learners with special educational needs. Notably, no studies focused specifically on career transition support for learners with DS as their primary objective. This review reveals a significant gap in educational research; life expectancy for individuals with DS has increased from nine to 60 years, yet educational research has not adapted to this reality. Educational research predominantly focuses on in-school support and fails to address the career development needs of learners with DS, thereby hindering their independence and self-sufficiency in post-school settings. These findings highlight the need for research targeting comprehensive career transition frameworks that address developmental trajectories and support requirements for learners with DS across diverse contexts. Future research should prioritise ability-based approaches that recognise the unique capabilities of learners with DS, moving beyond deficit-focused frameworks.

Keywords: Down syndrome, transition, career development, neurodiversity theory, ecological systems theory.

1. Introduction

Over five million people worldwide live with Down Syndrome (DS), making it the most prevalent genetic neurodevelopmental condition associated with intellectual challenges (Kamat, 2024). Despite significant medical and social advances that have extended life expectancy from nine years in 1900 to 60 years currently (Esbensen et al., 2024), individuals with DS face substantial barriers in achieving successful post-school outcomes. The transition from school to life after education is a complicated process that requires careful planning, decision-making, and goal-setting to achieve independent living (Wehman, 2013). Research reveals alarming disparities and challenges in post-school outcomes for individuals with special educational needs, with such individuals being disproportionately unemployed or underemployed (Mathew et al., 2026; Vargas-Salas et al., 2025; Vaswani, 2024; Bam et al., 2023). This situation is particularly pronounced in Global South contexts, where limited career options result in inadequate knowledge of career decision-making processes and insufficient employment-ready skills (Sefora & Ngubane, 2023). For individuals with DS, the post-school transition is complicated by the history of the condition, unique cognitive profiles, health considerations, and societal barriers that differentiate their needs from those of other neurodevelopmental conditions. Although general literature on career transition support exists, the unique characteristics and needs of learners with DS, which require specialised and tailored research

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and intervention approaches, remain largely unexplored. The "one size fits all" method in career transition research presents significant challenges and limitations, as each condition has distinct histories, characteristics, support requirements, and developmental trajectories that influence career pathways in different ways. This scoping review addresses this critical gap by examining the extent to which literature from 2013 to 2023 discusses career transition support for learners with DS, thus providing a foundation for future research and the development of evidence-based practices.

1.1 Conceptualising down syndrome

Down syndrome (DS) is a multisystem neurodevelopmental condition and the leading cause of intellectual disability, affecting individuals in physical, medical, and psychological aspects (Karkera, 2021; Korlimarla et al., 2021). This condition results from an entire or partial third copy of chromosome 21, which is the most common chromosomal abnormality in live-born infants (Karkera, 2021). Individuals with DS face a range of health issues, including challenges with learning and memory, congenital heart defects, and a heightened risk of Alzheimer's disease, leukaemia, and various other medical conditions. There are three distinct variants: Non-disjunction (the most prevalent, accounting for approximately 88% of cases and occurring more frequently in older mothers), Translocation (where a segment of chromosome 21 is attached to another chromosome), and Mosaic (the least common variant, characterised by a mixture of normal and affected cells, which may exhibit higher cognitive function) (Karkera, 2021; Kamat, 2024).

The historical context of DS understanding reveals evolving perspectives. The clinical characteristics of DS were initially recorded by Jean Etienne Dominique Esquirol in 1838, followed by Edouard Seguin in 1844 and 1846; however, they did not identify these features as a singular syndrome (Wajuihian, 2016; Kamat, 2024). John Langdon Down, an English physician, provided the first extensive description in his 1866 presentation titled "Observations on an ethnic classification of idiots," which led to his recognition as the father of this condition (Karkera, 2021; Wajuihian, 2016). In his presentation, Down used language that was common at the time, referring to those affected as "congenital idiots" and "typical Mongols," believing that this condition was present across all races (Kamat, 2024). The term “Mongolism” was widely used by the early 1900s, although the cause was still not understood (Kamat, 2024). In response to petitions from the People's Republic of Mongolia, which expressed their dissatisfaction with the pejorative terminology, the designation was officially changed in 1965 when the WHO formally adopted "Down syndrome" (Kamat, 2024). The first reliable documentation regarding Down syndrome (DS) prevalence in Africa emerged from a study conducted by Adeyokunnu in 1982. This study was conducted over nine years at an academic hospital in Ibadan, Nigeria (Christianson, 1996).

Down syndrome is present in about 1 in 691 live births, with 417,000 people in Europe diagnosed with the condition (Windsperger & Hoehl, 2021). This condition is not a disease; it is a genetic disorder caused by extra chromosome 21 material, which means there is no available cure (Faragher, 2023). Its diagnosis is determined by distinctive physical characteristics and behavioural traits initially recorded by John Langdon Down, who observed that individuals affected by the condition "resembled one another as if they were siblings". The defining features include broad flat faces, thick tongues, small noses, narrow eye openings, and eyes that are placed obliquely (Windsperger & Hoehl, 2021; Wajuihian, 2016). Down also described typical behavioural patterns, noting that individuals were "humorous" with a "lively sense of the ridiculous" and possessed imitation abilities that could be cultivated, along with speech that is"thick and indistinct" but improvable through targeted interventions (Down, 1866).

Medical advances have significantly improved the outcomes for individuals with Down syndrome (Channell & Loveall, 2018), with life expectancy increasing from nine years to sixty years. The evolution of prenatal screening has been substantial, shifting diagnosis from postnatal to prenatal detection, which provides expectant parents with options and preparedness regarding the

continuation of their pregnancy (Windsperger & Hoehl, 2021). In the USA, in 1900, the life expectancy of people with Down syndrome was nine years, which has recently increased to sixty years (Esbensen et al., 2024). Recent studies conducted in Europe, Australia, and Japan also confirm this increase in life expectancy (Motegi et al., 2021). Although documented information on life expectancy, transition to adulthood, and ageing experiences is limited in African contexts (McGlinchey et al., 2025), it has become increasingly important to consider how individuals with Down syndrome are prepared for all life transitions, especially the transition to post-school settings, which is the most critical time for making independent decisions (Channell & Loveall, 2018).

1.2 Why does Career Transition support matter?

Career transition, as defined by Louis (1980), encompasses periods during which an individual is either changing roles (taking on a different objective role) or changing their orientation to a role already held (altering a subjective state). In educational contexts, transition has traditionally been framed as learners' movement between institutions or settings, such as from nursery to primary or from secondary to post-school settings. The transition to post-school settings is a lifelong process that requires inter-professional collaboration to prepare learners for a successful and smooth transition to an independent and self-sufficient life (Mazzotti et al., 2021).

Career advancement and transition represent intricate processes shaped by various factors, including disability, gender, socioeconomic status, family dynamics, self-efficacy, educational attainment, and age (Wehmeyer et al., 2019). Career transition programmes, defined as services provided to learners with special educational needs from preschool to post-school life (Meng & Yasin, 2023), aim to provide real-world training and skill development essential for workplace readiness (Shaffeei, 2021). These programmes require the development of measurable post-secondary goals based on age-appropriate transition assessment, addressing training, education, employment, and independent living skills that reflect learners' abilities, interests, and preferences (Wehman, 2013).

For learners with special educational needs, such as those with Down syndrome, effective career transition support contributes to the development of vital skills, reduces stigma, and increases self-esteem. Consequently, this enhances employability, facilitates better income opportunities, and promotes independent living (Eseadi & Diale, 2023; Taylor & Chandler, 2023). Educational institutions play a pivotal role in preparing learners for post-school life experiences and adult roles through specialised programmes and curricula designed to nurture workplace or entrepreneurial skills. Furthermore, the curriculum is meant to promote skills that prepare learners for a smooth transition to adult roles and responsibilities. This support is particularly important for learners with Down syndrome, who, due to their unique ways of processing information and interacting with the world, require individualised approaches that recognise and nurture their potential and prepare them for post-school environments that may not naturally accommodate their distinctive ways of engaging with the world.

1.2.1 Challenges in career transition support for individuals with special educational needs

Current challenges faced by individuals with special educational needs are compounded by significant policy and implementation gaps, particularly in Global South contexts. In some areas, policies aimed at improving access to post-school education for individuals with special educational needs lack clear implementation action plans and consistent policy guidelines (Beamish et al., 2024). South Africa exemplifies these systemic challenges, as the curriculum frameworks and post-school transition policies for individuals with special educational needs are still under revision, creating ongoing uncertainty and difficulties for professionals in preparing such learners for self-sufficiency and independent living (Ellman et al., 2020; Dzhugudzha et al., 2025). Furthermore, in Botswana, teachers report that they lack both the expertise and resources necessary to support the transition process for individuals with special educational needs (Ookeditse et al., 2024). Even where policies

exist, implementation in Hong Kong is hampered by inadequate professional preparation, as highlighted by Fung and Lan (2017). These systemic failures leave individuals with special educational needs unprepared for successful post-school transitions.

The glaring reality of post-secondary school outcomes for individuals with special educational needs has captured scholarly focus because the challenges are significant and ongoing. However, these noticeable employment gaps, where such individuals suffer from excessive unemployment, underemployment, and barriers in the workplace (Mathew et al., 2026; Vargas-Salas et al., 2025; Vaswani, 2024; Bam et al., 2023; Shogren & Wittenburg, 2020; Ndlovu & Walton, 2016; Frentzel et al., 2021; Mazzotti et al., 2021), reflect deep systemic issues that begin during the school years rather than at completion. The employment landscape for these individuals is characterised by significant disparities in job acquisition, wage equity, career advancement opportunities, and access to workplace accommodations and support systems (Frentzel et al.,2021). In addition, Mazzotti et al. (2021) highlight challenges faced by individuals with special educational needs in accessing and completing tertiary education, as concurred by Dwyer et al. (2023). Struggles such as managing intense workloads, stigma, prejudice, and inadequate accommodations have been reported (Dwyer et al., 2023; Fabri et al., 2022).

1.2.2 The void in career transition support literature for learners with DS

While some research exists examining post-school outcomes for individuals with DS, there remains a significant gap in research specifically focusing on career transition support for learners with DS during their school years. Foley et al. (2013) investigated the relationship between functioning and post-school occupations but did not examine the educational support systems that might influence these outcomes. Similarly, Loveall et al. (2022) examined employment and community engagement outcomes for young adults with DS who had recently left school. However, this study focused on post-school results rather than analysing the nature of career transition support these individuals received while in school. In addition, High and Robinson (2021)'s autoethnographic account of a woman with DS's university experience emphasises academic inclusion in post-secondary school settings. This research pattern suggests that while post-school outcomes for individuals with DS receive some research attention, the critical period of career preparation and transition support during schooling remains underexplored.

The existing literature also indicates a concerning trend; there are comprehensive and current reviews regarding career transition for individuals with intellectual challenges. Recent reviews have mainly concentrated on intellectual challenges as a broad category (Dzhugudzha et al., 2025; Leite & Campos; Coñoman et al., 2024; Almalky, 2020; Rosner et al., 2020; Jones et al., 2020; McCaffrey et al., 2025). Although DS can be associated with intellectual challenges, this broad approach tends to obscure the unique genetic, cognitive, and developmental characteristics inherent to DS. Delabar et al. (2016) explain that DS is the most prevalent genetic cause of intellectual challenges, with varying degrees of severity. Additionally, individuals with DS display distinct physical characteristics, congenital heart defects, thyroid issues, and an increased risk of leukaemia (Aluzeib et al., 2024). Therefore, in examining Leite and Campos's (2025) review of international post-secondary transition programmes for individuals with intellectual challenges, there was no differentiation among the various causes of intellectual challenges, which may lead to missing condition-specific post-secondary transition support programmes. Likewise, Christianson-Barker et al. (2025) investigated tailored employment practices for individuals with intellectual challenges in general, without recognising that those with DS might need different accommodations compared to individuals with intellectual challenges stemming from other origins.

We also observe that the geographic focus of career transition research is clearly evident in Global North contexts, even with the wider recent literature on intellectual challenges. A review by Leite and Campos (2025) confirms that most post-secondary programmes are evident in the United States,

with minimal representation from Latin America and Africa. This pattern aligns with our observations related to DS-specific research. This suggests that the research gap on career transition support for learners with DS is further complicated by systemic inequities in disability research on a global scale.

The lack of research into career transition support for learners with DS during their educational journey indicates a significant gap in educational literature. This gap suggests that current educational frameworks may lack the theoretical foundation required to develop effective career transition support for learners with DS while they are still in school. This study adopts a dual theoretical approach that can guide both researchers and educational practice in developing career transition support systems for learners with DS.

1.1.3 Conceptual framework

This study employs a conceptual framework that combines neurodiversity theory with Bronfenbrenner's ecological systems theory to conceptualise career transition support for learners with DS. Neurodiversity theory views neurological differences, such as DS, as natural variations of human diversity rather than disorders that need to be fixed (Saruwatari & Imamura, 2025; Kapp, 2020). This perspective challenges deficit-based medical models by highlighting the value and unique contributions of individuals with DS to society. In the context of career transition, neurodiversity theory supports strengths-based approaches that identify and build upon individual capabilities rather than focusing primarily on limitations. Rather than viewing DS as a disability and a barrier to employment preparation, neurodiversity theory encourages educational research and practice to recognise and develop the specific strengths of learners with DS.

Bronfenbrenner's ecological systems theory provides a structural framework for understanding the multiple environmental influences affecting career transition planning and outcomes (Bronfenbrenner, 1977). This theory conceptualises human development within nested systems of increasing complexity. The microsystem includes direct relationships with family, teachers, and peers who influence transition expectations (Crawford, 2020). The mesosystem involves connections between these groups, such as how families and schools collaborate in transition planning. The exosystem covers wider community factors, such as employment policies and local resources, which indirectly affect career transition outcomes. The macrosystem includes cultural beliefs, social attitudes, and policy environments that influence career transition methods. The chronosystem examines changes over time, including updated policies, changing views on disability inclusion, technological advances, and historical shifts in educational and employment practices (Crawford, 2020).

Integrating the two theories provides a comprehensive lens for analysing research gaps in career transition support. Neurodiversity theory offers a philosophical foundation that emphasises strengths-based approaches, while ecological theory provides a structural framework that identifies various system levels influencing career transition planning and post-school outcomes. This combined perspective demonstrates that effective career transition support requires the development of individual strengths and the implementation of systematic accommodations to the environment across all ecological levels. Success depends on creating supportive microsystems to prepare learners for a smooth transition, coordinated mesosystem connections, resource-rich exosystems, inclusive macrosystem policies, and chronosystem awareness of evolving best practices.

1.3 Research questions

This scoping review examined the scope of research addressing career transition support for learners with Down syndrome (DS) from 2013 to 2023. The review aimed to identify trends in research focus and geographic distribution, while highlighting gaps in existing knowledge. By analysing literature

from both Global North (GN) and Global South (GS) contexts, this review generated conclusions relevant to the global context. This review was guided by the following research question:

- To what extent does the literature reflect on career transition support for learners with DS?

2. Methodology

This section outlines the methodological framework adopted to systematically explore the existing literature on career transition support for learners with Down syndrome. It details the study design, inclusion and exclusion criteria, search strategy, screening procedures, and supplementary searches that guided the evidence synthesis.

2.1 Study design

This study employed a scoping review methodology, defined as evidence synthesis aimed at identifying and mapping relevant evidence that meets predetermined inclusion criteria regarding the topic, field context, concept, or issues (Peters et al., 2022). Scoping reviews are suitable for examining the breadth and nature of literature in emerging or under-researched areas, making this methodology ideal for exploring career transition support for learners with DS. A scoping review approach facilitated comprehensive mapping of available evidence and identified research gaps.

2.2 Inclusion and exclusion criteria

This review encompassed peer-reviewed research studies published in English between 2013 and 2023, conducted in both Global North and Global South contexts, and focusing on learners with Down syndrome as the primary participants. Eligible studies were required to address issues pertaining to career support, transition planning, vocational preparation, or employment readiness within the educational domain. Studies were excluded if they were non-peer-reviewed sources, such as policy documents or organisational materials, not published in English, conducted outside the specified timeframe, or did not explicitly identify learners with Down syndrome as participants. Furthermore, studies that were primarily medical, clinical, or health-focused, lacking explicit educational or vocational components, were also excluded from the review.

2.3 Search strategy and screening

A comprehensive systematic search was conducted across seven electronic databases between April and August 2025. The focus was on examining literature related to career transition support for learners with Down syndrome within a 10-year research period, from 2013 to 2023. The databases searched were: Sabinet (n=1), Emerald Insight (n=0), JSTOR (n=0), Wiley (n=2), Taylor and Francis (n=3), Scopus (n=4), and EBSCO (n=3), using the following search terms: (TITLE-ABS-KEY("Down syndrome" OR "Down's syndrome") AND TITLE-ABS-KEY("career transition" OR "post-school transition" OR "vocational preparation" OR "employment readiness" OR "transition planning" OR "career support")).

The systematic database search yielded a total of 13 studies across the seven databases. Two duplicates identified by the Covidence systematic review software were removed. Two reviewers (authors) screened all 11 remaining studies against the inclusion criteria, with disagreements resolved through discussion. All eleven studies were excluded during the screening process as they did not meet the inclusion criteria related to career transition support for learners with DS (refer to Figure 1). Therefore, the systematic review process resulted in zero studies (n=0) being included in the final review.

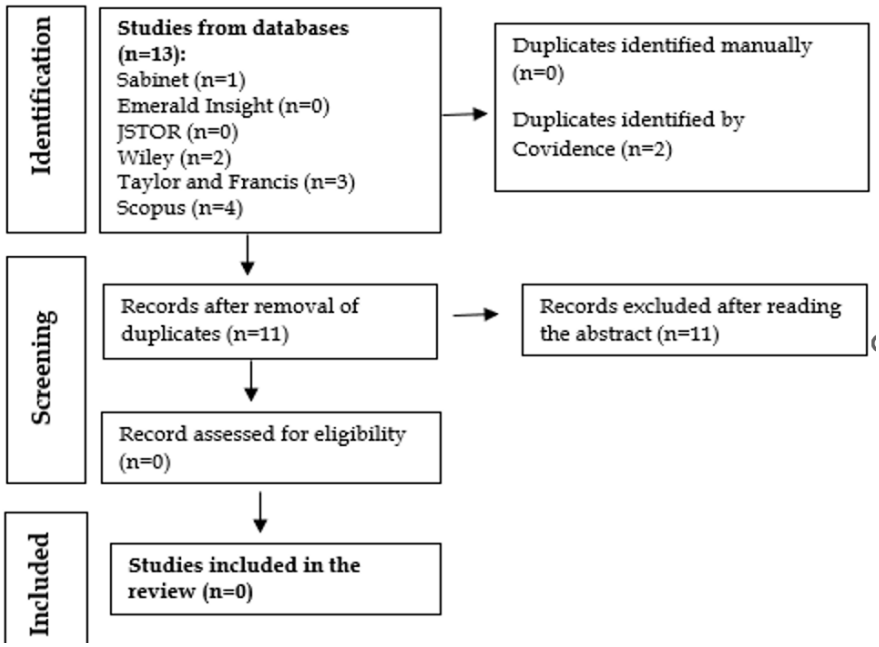

Figure 1: PRISMA Flow chart

2.4 Supplementary search

Given the absence of studies that met the inclusion criteria, a supplementary manual search on Google Scholar was conducted using broader terms to identify related literature on Down Syndrome (DS). After some deliberation, we analysed fifty-four studies that addressed broader aspects of DS education, transitions, and support to understand the DS research landscape. The list of identified studies is presented in Table 1.

Data extraction was conducted using a standardised form that captured study characteristics such as the year, author, location, participant demographics, and primary aim. Studies were categorised by geographic region (Global North (GN) /Global South (GS)) and research focus themes.

Two reviewers independently coded the studies using thematic analysis to identify patterns, with themes emerging inductively from the data. To ensure consistent grouping of studies, we initially worked independently on 20% of the studies and subsequently compared our findings. When disagreements on the categorisation of a study arose, we deliberated until a mutual understanding was reached. Following the refinement of our methodology, we completed the analysis with a 96% agreement on the categorisation of the studies.

Table 1: Charted research studies

Year	Location	Authors	Study focus
2013	GN	Foley, et al	To explore the connection between functioning and post-school day activities for young adults with DS
2013	GS	Forlin, C	Explores the transition of a student with special educational needs from a subsidised primary school in Hong Kong to a secondary school.

2013	GN	Lightfoot, L. & Bond, C	This study examines the various factors that impact decisions related to transitions and determines what is beneficial for children with DS as they progress from primary to secondary school.
2013	GS (Malaysia)	Loh, S.C & Yahya, S.Z. S	The case study investigates the transitional necessities and then creates a comprehensive transition strategy from secondary education to employment for Malaysian individuals with special needs.
2013	GS (South Africa)	Tod, C. J	This study examined the employment experiences of people with DS, their employers, and their families.
2014	GS (South Africa)	Brynard, S	The article sought to demonstrate the significant role that parents can have in the educational development of students with Down Syndrome.
2014	GS (South Africa	Brynard, S	The article seeks to improve educational prospects for individuals with DS by integrating self-advocacy principles at the school level.
2014	GN (New Zealand)	Gladstone, C. A	This qualitative study examines the transition process from school to post-school life for students with learning disabilities.
2015	GN	Neil, N. et al	This study was designed to confront the phenotypic limitation in task persistence by adjusting the intensity of the intervention delivered.
2017	GS (Malaysia)	Nassir & Hashim	The study sought to examine and clarify the Career Transition Program for students with special educational needs and learning disabilities that is in place within secondary education.
2017	GN (UK)	Kendall, L	This investigation relies on data from five parents of children with DS who were taught in mainstream educational institutions.
2017	GN (USA)	Sehic, S	This article sought to offer insights into teaching strategies that may empower teachers to support learners with DS in acquiring reading skills and refining their existing competencies.
2017	GN	Bush, K, & Tasse, M	The objective of the study was to analyse the existing employment situation for three groups of adults with intellectual disabilities, namely those with Autism, those with DS, and those with idiopathy.
2018	GS (Philippines)	Labrague, C	The report details the different categories of students with special educational needs and highlights schools that accommodate children with SEN.
2018	GN	Channell, MM & Loveall, S. J	This paper analyses the literature on transition outcomes after high school for those with DS,

			integrating a phenotypic approach to underscore the personal and environmental traits related to these outcomes.
2018	GN (Ireland)	Prendeville, P	The study explored parental experiences and factors impacting the successful transition of young people with Down Syndrome from primary to mainstream secondary school.
2018	GN (Ireland)	Mullan, P. et al	This investigation focused on parents' experiences and the factors that affect the successful transition of young people with DS from primary to mainstream secondary education.
2018	GN (Canada)	LeVatte, L	The research investigated the professional development experiences of elementary general teachers who have instructed a student with DS in an inclusive environment. Numerous students with Down syndrome are being educated in inclusive settings across Canada.
2019	GN (Ireland)	Mullan, P. et al	The research examined the experiences of parents and the elements influencing the effective transition of young individuals with DS from primary education to mainstream secondary school environments.
2020	GS (Pakistan)	Amjad, H & Muhammad, Y	The study aimed to develop an understanding of the learning difficulties faced by students with DS through the perspectives of special schoolteachers and psychologists.
2020	GS (Malaysia)	Shaffeei et al	Analyse the needs of the Special Needs transition program in the school
2020	Systematic Review	Rowe et al	This Systematic review identifies evidence-based and research-based practices in secondary special education and transition for students with disabilities.
2020	GN/GS	Atkinson, Takriti & Elhoweris	The study investigated teachers' perceptions of successful school transition for children with or no DS across two locations, the UAE and the UK.
2020	GN	Cerasi, C.C et al	This study aims to develop a mobile game for children with DS to help them learn everyday knowledge using a mobile device such as a smartphone or a tablet.
2020	GS (South Africa)	Reyneke, L.K. & Hoosain, M	The study's objective was to explore whether the behaviour in the classroom and the performance on tasks of learners with DS showed improvement when a stability ball was employed as a chair in the classroom.
2020	Systematic review	Bills, K.L. & Mills, B	This literature review analyses 11 studies conducted worldwide to provide an overview of

			teachers' overall perceptions of inclusion programs for children with DS.
2021	GS (Malaysia)	Shaffeei, K	Analyse the needs of the special needs career transition program in the school.
2021	GS (Malaysia)	Addullah & Ibrahim	This study examines the participation of parents and the difficulties they experience in executing career transitions for students with learning disabilities.
2021	GS Malaysia	Ibrahim et al	The research seeks to pinpoint the activities and challenges encountered by career transition programs for students with learning disabilities across different contexts.
2021	GN (USA)	Frentzel et al	Investigate and outline successful evidence-based interventions related to pre-employment transition services for students with disabilities that vocational rehabilitation counsellors may utilise.
2021	GS (Malaysia)	Ibrahim et al	The primary aim of the research was to explore the significance of career transition programs for students with learning disabilities.
2021	GN (UK)	Hargreaves, S et al	The research examined parents' opinions on the educational experiences of children with Down syndrome attending schools.
2021	Systematic review	Shahid, N.M.I, et al	This study thoroughly examines existing literature on technology-based support for children diagnosed with DS.
2021	GN	Rachey, K, & Johnson, H	The study provides information, support, and resources to parental caregivers of adolescents with DS transitioning out of high school.
2021	GN	High, R. & Robison, S	The paper reflects on the experience of a woman with DS who completed an undergraduate degree at an Australian university.
2022	GS (Japan)	Fujino, H. & Sato, N	The study focuses on teachers charged with special needs classes in middle school to identify their difficulties in supporting students' career decisions with social, emotional, and behavioural difficulties.
2022	GN (USA)	Loveall, S et al	The study aimed to define the outcomes related to employment, community-based living, community engagement, and their associated factors among young adults with DS.
2022	GN	Peters et al	The study aimed to explore the experiences, concerns, and needs of parents of children with DS and professionals regarding the transition from paediatric medical care to adult care.
2022	GN (USA)	King et al	The study purported to examine the utility of one commonly used assessment, curriculum-based measurement, for learners with DS.

2022	GS (Philippines)	Cahapay, M. B	The research focused on understanding how teachers adapt remote special education for students with DS in the context of the COVID-19 crisis.
2022	GN Canada	Dubois, P. et al	Based on self-determination theory, they tested the role of autonomy support and motivation in predicting transition status and well-being among learners with learning difficulties.
2022	GN	Gonzaga, C.G & Winokur, E. J	Care of adults with DS: The nurse practitioner perspective
2022	GN (USA)	Vasileios, et al	The paper examined the impact of the transition from primary to secondary on anxiety for children with Neurodevelopmental disorders, especially for autistic children, children with DS, and those with Williams Syndrome.
2022	GN	Petmezas, G. G	This ethnographic study aimed to understand the lived experiences of a special education teacher, a school administrator, and the father of a special needs child with DS.
2022	GN	Laura-Marie, M	This study investigated the experiences of parents and teachers as children with DS moved from preschool to primary school.
2023	GS (South Africa)	Eseadi, C, & Diale, B.M	The paper discusses the career transitioning of students with Specific learning disabilities, concerning existing research on knowledge, attitudes, and perceptions about these students.
2023	GS (South Africa)	Eseadi, C	This article examined some interventions for assisting students with visual impairment to experience a smooth career transition.
2023	GS (Philippines)	Campado, R.J, Toquero, C.M & Ulanday D.	The research investigated incorporating assistive technology in educating students with special educational needs in specific schools across the Philippines.
2023	GN	Lau-Zhu, A. & Mann, J	The report describes work with Colin, a 36-year-old man with DS and a learning disability, drawing on a range of narrative therapy practices.
2023	GN (UK)	Boundy, L. et al	The study used an online survey to explore the perception of teachers and TAs working with pupils with DS in mainstream primary schools in the UK.
2023	GS (Sabah)	Meng, T.Y & Yasin, M.M	The study aims to identify the level of implementation of the Career Transition Program for learners with Learning disabilities.
2023	GS (Pakistan)	Khurshid, H & Jabeen, A	The case study highlights the life skills training of a 7-year-old child with DS who is studying in a special school.

2023	GN	Hojberg, L.M. et al	To gain knowledge on how young adults with DS learn and retain new motor skills
2023	GN (USA)	Pando, L.M	The study asks what supports students in higher education with DS need to reach their person-centred planning goals upon entering higher education for their academic, social, and independent living goals.

3. Overview of Findings

While 54 related studies were identified through supplementary searches, none addressed career transition support as a primary focus for DS learners. This finding represents the central contribution of this review: the identification of a significant research gap in DS-specific career transition support literature.

The 54 identified studies showed uneven geographic distribution: 30 (55.6%) were from the Global North, 21 studies (38.9%) were from the Global South, and 3 (5.5%) were systematic reviews. This distribution indicates that while developed countries in the Global North hold the largest share of DS research, significant research activity is emerging from Global South regions. The predominance of Global North studies reflects broader research inequities in disability scholarship.

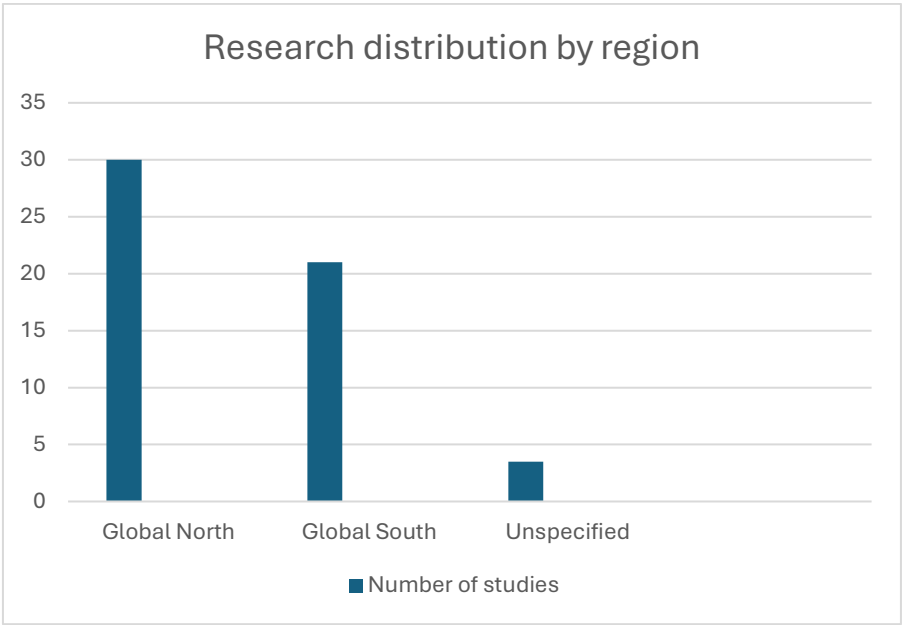

Figure 2: 54 research studies by geographical distribution

Figure 3 presents the distribution of research studies on DS from 2013 to 2023 by study focus. The analysis of research focus revealed that in-school transition led with 12 studies (22%), followed by employment outcomes with 11 studies (20%). Pedagogical approaches had 9 studies (17%), and parental experiences accounted for 8 studies (15%). Post-school outcomes showed 6 studies (11%). Technology and assistive tools, healthcare transition, and higher education each had 3 studies (6%), 3 studies (6%), and 2 studies (4%), respectively.

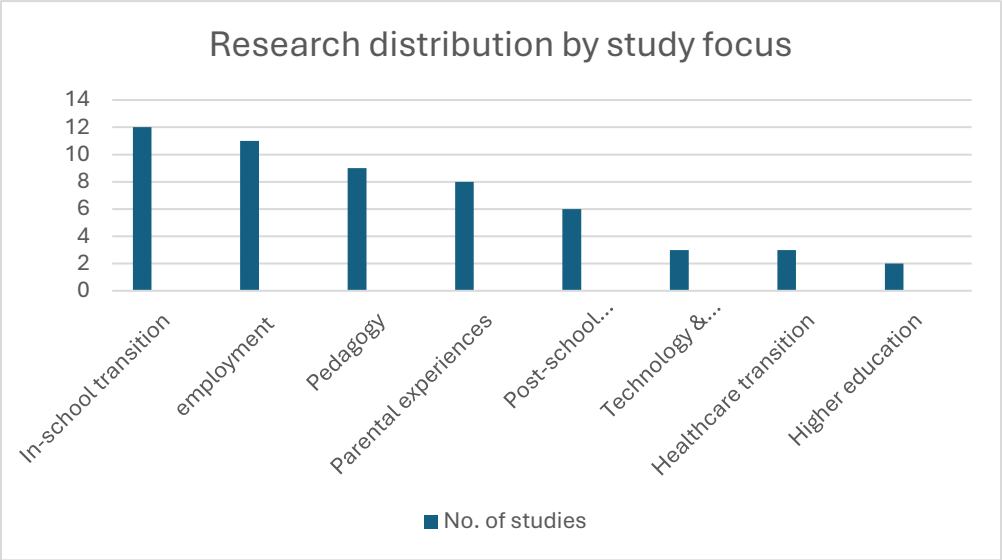

Figure 3: Distribution of the research studies on DS by study focus (2013-2023)

The focus of these charted studies was classified into four major themes: pedagogical strategies and educational support for learners with Down syndrome (DS), the in-school transition of learners with DS, post-school functioning of learners with DS, and generalised career transition for learners with special educational needs. This analysis highlights various aspects of the DS research landscape and reveals the absence of DS-specific career transition support literature.

3.1 Theme 1: Pedagogical strategies and educational support for learners with DS

The first theme focused on pedagogical strategies and educational support for learners with DS, with 21 studies (38.9%) identified. Educating learners with DS is not an easy task (Amjad & Muhammad, 2019); it requires considerable expertise and patience. This is why it is the most researched area: eight studies examined teacher perceptions and readiness to support learners with DS, six studies investigated technology interventions and assistive tools, four studies looked into classroom accommodations and behavioural support, and three studies explored collaboration between families and schools for educational support. The focus of this research indicates that the educational field prioritises immediate instructional issues over long-term career transition planning.

3.2 Theme 2: The in-school transition of learners with DS

The transition between schools is a continuous process encompassing early childhood education and progressing from secondary education to higher education, training, and job opportunities (Evans et al., 2018). Sefotho and Onyishi (2021) argued that successful school transitions are a foundation for career development and overall adult educational and socioeconomic outcomes. However, learners with special educational needs, such as those with Down syndrome (DS), face challenges during these transitions (Panopoulos & Drossinou-Korea, 2021). Twelve studies (22.2%) addressed various in-school transitions for learners with DS, primarily focusing on movements between educational levels rather than career preparation. The majority of these studies examined primary to secondary school transitions, with multiple studies from Ireland exploring parental experiences and factors affecting successful transitions (Prendeville, 2018; Mullan et al., 2018, 2019).

Other transition studies included preschool-to-primary transitions (Laura-Marie, 2022), transitions out of high school (Rachey & Johnson, 2021), and healthcare transitions from paediatric to adult services (Peters et al., 2022). Some studies examined the psychological impact of transitions, such as

anxiety during primary to secondary transitions for learners with neurodevelopmental disorders, especially for autistic children, children with DS, and those with Williams Syndrome (Vasileios et al., 2022). While these studies provide valuable insights into educational transitions, they focus primarily on academic and social adjustment rather than career readiness. The connection between in-school transitions and provisions for post-school career success remains largely unexplored.

3.3 Theme 3: Post-secondary school functioning of individuals with DS

Transitioning out of high school is a significant life event, marking a pivotal time for making critical decisions about adult life (Channel & Loveall, 2018). Individuals with DS face unique challenges and support needs for successful post-school functioning. Channel and Loveall (2018) noted that research on the post-high school functionality of individuals with DS is in its infancy. Eleven studies (20.4%) have examined the post-school functioning of individuals with DS, providing insights into outcomes but offering a limited understanding of the educational processes that influence these results. Employment-related studies have dominated this theme, including analyses of employment experiences (Tod, 2013), employment situations across different intellectual challenges (Bush & Tasse, 2017), and employment outcomes for adults with DS (Loveall et al., 2022).

Some studies have utilised literature reviews to examine broader perspectives, investigating overall post-school outcomes for individuals with DS (Channel & Loveall, 2018) and evidence-based transition practices (Rowe et al., 2020). Others have explored the university experiences of individuals with DS (High & Robison et al., 2022) and the role of autonomy support in transition success (Dubois et al., 2022). While these studies provide valuable data on post-school outcomes, they primarily adopt a retrospective approach, examining results rather than the educational processes that might have influenced such outcomes.

3.4 Theme 4: Generalised career transition for learners with Special educational needs

Fifteen studies addressed career transitions for individuals with special educational needs in general, but none specifically focused on learners with DS. Eight studies evaluated programmes for multiple disability categories, four examined career preparations for specific learning needs, and two focused on visual impairments. This pattern demonstrates that while research on career transition support exists for special educational needs in general, the unique characteristics and needs of learners with DS remain unaddressed.

3.5 Critical gaps identified

The analysis uncovered significant research gaps that collectively illustrate the lack of extensive, Down syndrome-specific career transition support research. This demonstrates a major gap in educational research for learners with Down syndrome. Theoretical limitations also restrict the field of study in education, as the majority of studies utilised deficit-based approaches instead of strength-based approaches, which directly contradict neurodiversity principles that highlight the value and potential of neurological differences. Finally, systemic analysis gaps were identified, with few studies examining the policy frameworks on career transition support and few studies exploring the partnerships that are vital for effective transition support. Moreover, the research landscape reveals considerable geographical inequity, with global South regions, especially sub-Saharan Africa, being significantly underrepresented despite having socioeconomic and systemic issues affecting career transition programmes for learners with special educational needs in general (Bearnish et al., 2024; Ellman, 2020; Dzhugudzha et al., 2025; Ookeditse et al., 2024).

4. Discussion of Findings

This scoping review examined the extent to which the literature discusses career support and transition for learners with DS. To our knowledge, no studies have investigated the career transition support for these learners between 2013 and 2023; this is evidenced by two distinct systematic

reviews conducted from seven databases and a supplementary manual search of the Google Scholar database. Windsperger and Hoehl (2021) noted that DS is the least understood genetic disorder. Our review identified 54 articles focusing on pedagogical support, in-school transitions, post-school outcomes, and general career support for individuals with disabilities. The absence of DS-specific career transition support research reflects fundamental theoretical and methodological limitations in how the field of education views learners with DS. This research gap becomes more alarming when contextualised within the broader challenges facing individuals with special educational needs in post-school environments, such as employment and tertiary education (Mazzoti et al., 2020). Ndlovu and Walton (2016) demonstrated that such individuals are "disproportionately unemployed or underemployed after school," a pattern that has been consistently reinforced by recent studies (Mathew et al., 2025; Vargas-Salas et al., 2025; Vaswani, 2024; Bam et al., 2023; Mazzoti et al., 2020). The absence of DS-specific literature suggests that this population is in dire straits, as they receive generic rather than tailored support that fails to address their unique strengths and characteristics.

Although there are studies on strategies that improve teaching and learning for learners with DS, primarily in primary schools (Amjad & Muhammad, 2019; Sehic, 2017; Hargreaves et al., 2021), limited literature addresses how to support them at the secondary school level or beyond. This approach has a narrow focus on career support and the transition from secondary school to post-school settings, as noted by Channell and Loveall (2018) and Loveall et al. (2022). From a neurodiversity perspective, the focus on early childhood education perpetuates a deficit-based view that learners with DS require early remediation rather than lifelong strength development. Without a positive and strength-based theoretical foundation, it is difficult to encourage a smooth career transition for learners with DS in both policy and practice. Employing ecological systems theory to examine the current research landscape reveals important gaps at all system levels (Bronfenbrenner, 1979; Crawford, 2020). In the microsystem, only 23% of studies examined direct learner-environment interactions. None included the learner's voice or self-advocacy, reflecting concerns raised by Boundy et al. (2023).

Furthermore, substantial research on pedagogical strategies and educational support, with minimal focus on career transition support, contradicts the established understanding that career transition programmes in schools should provide real-world training and skill development for workplace readiness (Shaffeei, 2021). Educational institutions play a pivotal role in preparing learners for post-school life experiences and adult roles and responsibilities. This research gap also contradicts the established knowledge that individuals with Down syndrome (DS) have experienced dramatically improved life outcomes. While life expectancy has increased from nine years in 1900 to 60 years (Esbensen et al., 2024), educational research has failed to evolve correspondingly. The focus remains predominantly on early childhood interventions rather than preparing individuals for the extended adult lives they now experience. This misalignment between medical advances and educational research priorities represents a critical system failure.

The limited research on DS in global south (GS) contexts reflects a broader pattern of research inequity that has profound implications for DS populations worldwide. Much of the literature on DS has been conducted in the global north (GN), leaving significant knowledge gaps in regions with substantial DS populations (McGlinchey et al., 2025). This geographic disparity is particularly evident in Africa, where data on DS prevalence and survival rates in South Africa are primarily outdated and predominantly derived from studies conducted in the early 2000s (McGlinchey et al., 2025). Furthermore, research on life expectancy and transition outcomes for individuals with DS remains scarce in the GS, particularly in Africa, as most studies focus on childhood rather than adult life experiences and career development (McGlinchey et al., 2025). The absence of robust research infrastructure compounds these challenges, as scholars such as Christianson et al. (2006) have long warned about the lack of congenital disability surveillance systems in sub-Saharan Africa. This contributes to data shortages and slow policy progress in the region. This research deficit reflects

deeper systemic issues, including what Wajuihian (2016) identified as the ongoing neglect of intellectual challenges in African health and education systems. The practical consequences of this neglect are evident in career development contexts, where Ndlovu and Walton (2016) documented that learners with special educational needs, including DS, frequently miss out on career-focused programmes due to prevalent beliefs that they are unfit for productive adult roles. The lack of research from countries such as Zimbabwe, Nigeria, Kenya, and Ghana highlights the urgent need for studies that consider the social and economic realities of individuals with special educational needs while applying strength-based, ecologically informed approaches to career development.

This underrepresentation reflects a complex interplay of structural, socioeconomic, and systemic factors that operate at multiple levels. Research priorities in many global South (GS) contexts focus on urgent public health issues, such as infectious diseases and maternal-child health initiatives. This focus diverts limited resources away from genetic and neurodevelopmental conditions like Down syndrome (DS) (Hay et al., 2017). These decisions occur within broader socio-economic environments where low-income levels, poor nutrition, and limited healthcare access lead to higher rates of congenital anomalies and infant mortality (Malini et al., 2016). Social stigma adds to these structural barriers. Widespread attitudes towards neurodevelopmental conditions limit family and community support for individuals with DS, which reduces advocacy efforts and opportunities for research participation (Devi et al., 2025). The misbelief that DS is a rare condition with little research limits funding and institutional support, despite the significant DS populations that require culturally relevant research and intervention approaches (Faragher, 2019).

Conversely, the global landscape also contributes to these disparities. DS research is mainly concentrated in the global North (GN) countries, particularly the United States. This situation creates inequities in collaboration and leaves researchers in the GS with fewer opportunities for advancements and knowledge exchange (Shafi et al., 2024). These interconnected factors create systemic barriers that not only hinder current research capacity but also prevent GS perspectives from being included in scholarship on genetic and neurodevelopmental conditions. This ultimately affects the livelihoods of individuals living with neurodevelopmental conditions such as DS.

5. Conclusions

The systematic search across seven databases, followed by a supplementary analysis of 54 studies related to Down Syndrome (DS), demonstrates that while substantial research exists on educational support, medical care, and general post-school outcomes for individuals with DS, no studies specifically examine how education systems can effectively prepare learners with DS for successful career transitions. Most reviewed studies on career transition support focus on general disability groups, though some are based outside the education field.

The thematic analysis revealed that research attention has concentrated on immediate pedagogical needs (38.9%) and in-school transitions (22.2%), while studies on post-school functioning (20.4%) predominantly adopt retrospective approaches that examine post-school outcomes for individuals with DS without investigating the foundational, critical period of career preparation and transition support during schooling. General career transition research demonstrates that the field possesses theoretical and methodological tools for effective transition research; however, these capabilities have not been applied to DS populations. Therefore, we deduce that the absence of DS-specific literature in career transition support is not merely an oversight but a severe theoretical limitation that reflects a persistent deficit-based and medicalised view of Down Syndrome, which perpetuates exclusion and underestimates potential. The predominance of deficit-based, medical-oriented research approaches contradicts neurodiversity principles that recognise neurological differences as natural human variations rather than disorders. The failure to examine career transition support across ecological system levels suggests that current research approaches remain too narrow,

focusing on individual characteristics rather than environmental factors that could be modified to support successful career transitions.

5.1 The limitations of the study

Several limitations affect the interpretation and generalisability of these findings. Restricting the search to English-language publications may have excluded relevant literature published in other languages. Despite searching multiple databases, valuable information from grey literature, such as dissertations, conference proceedings, and organisation or community reports, may have been overlooked. The decision to exclude grey literature may have disregarded valuable insights, particularly given the limited peer-reviewed literature in this area. The 2013-2023 timeframe may have excluded foundational research published earlier that continues to influence current research trends and practice. However, this timeframe was selected to focus on contemporary approaches to career transition support. Despite comprehensive database searches, the search terms may not have captured all relevant studies, particularly those using alternative terminology for career transition concepts.

5.2 Recommendations

The absence of DS-specific career transition support research creates an opportunity for developing innovative and revolutionary approaches that could enhance career transition support and ultimately transform post-school struggles into positive outcomes. Research institutions must prioritise DS-specific career transition research that examines longitudinal connections between educational interventions and career outcomes.

Research institutions in developed countries must strengthen and expand collaborative partnerships with Global South (GS) institutions focused on neurological and genetic conditions. Funding agencies must recognise the urgency of addressing this gap through research programmes that support both GN innovation and GS capacity building. These partnerships should prioritise mutual capacity building, shared funding responsibilities, and co-leadership structures that acknowledge the unique contextual expertise of GS researchers. Such partnerships must be encouraged in funding applications and researcher exchange programmes.

Education systems must also develop career transition curricula that build upon the identified strengths and interests of all learners. Policymakers must establish specific career transition policies with clear guidelines on how learners with special educational needs, such as those with DS, can smoothly transition to post-school settings. They must create inter-agency coordination frameworks that connect education, employment/entrepreneurship, and social services.

Educational institutions must invest in the emerging field of educational neuroscience to develop an evidence-based understanding of how neurodivergent learners, such as those with DS, process information, develop skills, and respond to different instructional approaches. This research should specifically examine the neurological basis of learning in neurodivergent individuals to inform more effective career transition strategies that build upon neurological strengths rather than attempting to remediate deficits. Neuroscience research could reveal specific cognitive strengths in learners with DS that could be leveraged for career development, challenge assumptions about intellectual limitations, and provide neurological evidence for strengths-based approaches advocated by neurodiversity theory. Teacher preparation programmes must incorporate specialised training in the neuroscience of neurodevelopmental conditions to equip teachers with the skills to understand both neurotypical and neurodivergent individuals.

8. Declarations

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(N.N.C. & M.M.S.); investigation (N.N.C. & M.M.S.); data curation (N.N.C.) drafting and preparation (N.N.C.); review and editing (M.M.S.); supervision (M.M.S.); project administration (N/A); funding acquisition (N/A). All authors have read and approved the published version of the article.

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