Skills and Employment Supports for Persons with Learning Disabilities

Full Report
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VRAIE IDEA
INCLUSIVE DESIGN FOR EMPLOYMENT ACCESS
VISION RADICALE POUR L'ACCÈS INCLUSIF À L'EMPLOI

EXECUTIVE SUMMARY

Addressing the employment gap between persons with learning disabilities and those without disabilities is crucial to realizing the individual, organizational and societal benefits of inclusion. In this study we explore best and promising practices for supporting persons with learning disabilities aged 15 and over in the labour market through a comprehensive review of literature. There are two core research modules, both of which include Canadian and international sources —a scoping review of peer-reviewed literature and an environmental scan of grey literature and websites. We draw on an intersectional approach, considering factors such as gender, race, age, and disability profile. The findings are presented in four main sections.

In the first section, we describe the various definitions of learning disabilities used by different jurisdictions and organizations, though our aim is not to identify or establish a standardized definition. Rather, in our synthesis of best and promising practices, we embrace a broad working definition, in order to encompass a larger number of studies. We acknowledge our choice deviates from the official definition developed by the Learning Disabilities Association of Canada. But our broader approach holds value from a policy standpoint, given the commonalities amongst conditions and the transferability of promising practices.

In the second section we provide information on the diagnoses of learning disabilities, a process that involves thorough assessment, the details of which are determined by various factors. These factors include the purpose of assessment, such as for employment, educational needs, or self-awareness. Age at diagnosis also plays a crucial role. Regional guidelines further shape this process, with variations across Canadian provinces and territories due to social services, health care and education falling under provincial/territorial jurisdiction. Learning disabilities typically fall into three primary categories: dyslexia, involving challenges in reading comprehension; dysgraphia, characterized by difficulties in writing; and dyscalculia, affecting

mathematical understanding and computations. These three types can vary in severity and often co-occur with each other and with other types of disabilities. Nonetheless, the Learning Disabilities Association of Canada stresses the importance of accurately distinguishing between these disabilities. Therefore, diagnosing learning disabilities requires a comprehensive approach that includes differentiating them from other conditions that affect learning such as intellectual disabilities.

In the second section we also provide a profile of persons with learning disabilities in Canada. To Amongst all persons with disabilities, one in five (21%) or about 1.7 million reported having learning disabilities. Amongst persons with disabilities aged 15 to 64 (5.5 million), over one-quarter (26%) or about 1.4 million reported to have learning disabilities).[1] Noteworthy is that the prevalence of learning disabilities amongst all persons with disabilities has increased by 3 percentage points (from 15-18%) over the five-year period from 2017 to 2022.

In the third section we summarize findings from literature, focusing on promising practices from Canadian and international sources that support individuals with learning disabilities in preparing for, securing, and maintaining employment. We consider skills training and equitable and inclusive employment from a life course perspective, highlighting the need for early diagnosis and ongoing support. Best and promising practices applicable to training, skills development, performance measurement, promotion and career advancement are discussed. In the learning, training, and skills development domain, compensatory strategies help individuals learn and apply adaptive techniques. Key approaches involve identifying individuals' learning styles, integrating basic skills instruction with practical applications, employing multi-sensory methods, and adjusting educational and training strategies based on individual education plans. In relation to skills assessment and performance measurement, we highlight the significance of clear job descriptions, well-defined performance expectations, and understanding essential job functions. Strategies for promotion and

[1] Statistics Canada. 2024. Type of disability for persons with disabilities aged 15 years and over, by age group and gender. Link: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310037601

career advancement include mentoring programs, buddy systems, leveraging social networks, fostering workplace flexibility, and promoting effective time management. Equipping supervisors with training on equitable career development opportunities, providing regular feedback, and addressing performance issues are essential components in achieving these goals.

In the fourth section we address intersectionality, specifically, individuals with learning disabilities who also belong to various racial, ethnic, gender, or socioeconomic backgrounds. Though research in this area is modest, we note that being a person with a learning disability and having other marginalized identities might amplify barriers and increase discrimination. These individuals are likely to encounter more barriers in education, employment and career development. This can be as a result of discrimination, bias, stereotyping, stigma, and insufficient accommodations. Fostering workplace environments that are inclusive of persons with learning disabilities that have other marginalized identities require a nuanced understanding of intersectionality and proactive strategies. Suggested practices include training hiring managers on unconscious bias and inclusive interviewing techniques, establishing diversity and inclusion goals, providing skills training and educational resources, offering necessary accommodations, and advocating for policies that promote equality and inclusion in the workplace.

To summarize, we make seven recommendations for more equitable and inclusive skills training and employment opportunities for persons with learning disabilities, taking a holistic approach. Our recommendations are as follows:

1. Ensure Early Diagnosis and Intervention: Enhance awareness of learning disabilities, provide access to resources, and develop individualized support plans.
2. Develop Inclusive Training Systems: Implement inclusive curriculum, provide educator training, and offer access to assistive technologies.

3. Facilitate School-to-Work Transition: Begin transition planning early, provide internships and work experiences, offer tailored career counseling, and create job placement services that support suitable job matches.
4. Provide Rewarding Volunteer and Work Experience: Provide rewarding volunteer opportunities, ensuring they are time limited.
5. Advance Practices for Inclusion in Workplace: Encourage inclusive hiring practices, ensure necessary workplace accommodations, provide clear job descriptions and performance expectations, offer training for supervisors, and implement mentoring systems.
6. Target Empowering Employment Strategies: Facilitate job matching, establish vocational training programs, and provide comprehensive on-the-job supports.
7. Create Inclusive Communities: Foster stakeholder collaborations, raise community awareness of issues and best practices, and advocate for policies and legislation that promote inclusion in education and employment.

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INTRODUCTION

Addressing the disparities in employment rates between persons with disabilities and those without is essential for Canadian society to realize the benefits, both economic and social, of inclusion. Inclusive labour-markets not only promote social cohesion and reduce dependency and discrimination, but also fosters creativity and innovation.[1,2,3] Ensuring equal access to essential services further enhances quality of life, societal well-being and enriches communities. Numerous studies underscore the economic and social gains from accessibility and full societal participation. Several studies have sought to quantify the gap between current accessibility levels in Canada and a fully inclusive and accessible society as envision in the Accessible Canada Act.[4,5,6]

This study examines how persons with learning disabilities 15 years of age and older, may be better supported in the Canadian labour market. The work involves an evidence synthesis of both peer-reviewed and grey literatures. The study takes an intersectional lens to the synthesis (i.e., applying Gender-based Analysis Plus (GBA Plus)) to ensure consideration is given to how social location affects lived experiences of persons with learning disabilities. Where possible, diverse socio-demographic characteristics are considered including gender, racialized group membership, immigrant status,

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[1] Walton, Oliver. 2012. "Economic Benefits of Disability-Inclusive Development (GSDRC Helpdesk Research Report)." University of Birmingham. Birmingham. Available at: https://assets.publishing.service.gov.uk/media/57a08a5ae5274a31e000056a/hdq831.pdf

[2] Barnes C, Mercer G. 2005. Disability, work, and welfare: Challenging the social exclusion of disabled people. Work, employment and society. 19(3):527-45.

[3] Gewurtz R, Tompa E, Lysaght R et al., (2017). A Clear Business Case for Hiring Aspiring Workers. Available at: https://www.mentalhealthcommission.ca/sites/default/files/2018-04/Business_case_for_aspiring_workforce_eng.pdf

[4]Tompa E, Mofidi A, Jetha A, Lahey P, Buettgen A. Development and implementation of a framework for estimating the economic benefits of an accessible and inclusive society. Equality, Diversity and Inclusion: An International Journal. 2022 Apr 20;41(3):318-39.

[5] Tompa E, Mofidi A, Jetha A, Lahey P, Buettgen A. (2019). Environmental Scan of the Impacts, Including Social Benefits, of Accessibility and Social Inclusion for Persons with Disabilities. 175p. Available at: https://www.crwdp.ca/sites/default/files/cost_of_exclusion_final_report_full_version_etompa_et_al._final_submission_v2.1_clean.pdf

[6] Tompa E, Samosh D. and Santuzzi AM. 2022. Guest editorial: The benefits of inclusion: disability and work in the 21st century. Equality, Diversity and Inclusion, 41 (3): 309-317.DOI: https://doi.org/10.1108/EDI-04-2022-376

indigeneity, religion, age, and disability profile (note that **Appendix 1** provides a glossary of key terms used in this report).

Several specific areas are explored that address how skills training providers and employers can play a more responsive and proactive role in identifying and accommodating persons with learning disabilities in training and employment. Accommodations can take many different forms including assistive technologies, compensatory strategies, extended time to complete tasks, varied learning and assessment methods, job task substitution, adaptation and support, training, and specific communication styles and formats.

The absence of a universally accepted definition of learning disability creates notable inconsistencies both nationally, within Canada, and globally. Formulating a precise definition is challenging due to the diverse practices reviewed and falls outside the scope of our literature review. Instead, we embrace a broad definition to include many of the studies identified in this review, acknowledging that this broad deviation falls outside of the official definition of learning disabilities (based on Learning Disabilities Association of Canada). We believe this broad approach adds value from a program policy standpoint, given the similarities in experiences and needs across different conditions and the transferability of promising practices. Additionally, the high co-occurrence of learning disabilities with other conditions makes it more practical to have policies that apply to a broader range of conditions.

Ultimately, a deeper understanding of how persons with learning disabilities may be better supported in training and employment can help inform recommendations for policy and practice going forward. Specifically, recommendations from this project can support the development of more inclusive and equitable skills training and employment opportunities across Canada. Creating stronger labour market attachments and opportunities for high-quality jobs for persons with learning disabilities, and more broadly all persons with disabilities, is fundamental to Canada’s inclusive growth strategy. Canada’s long-term economic resilience depends on leveraging skilled

workers and accelerating high-growth, high-skilled occupations and sectors.

METHODOLOGY

There are two core research modules in this project. The first is a scoping review of the peer-reviewed literature. The second is an environmental scan of grey literature and websites. Both modules included Canadian and international sources. The knowledge from these sources is used to address issues related to the study's five research questions. The methodology of each module is described in the next section.

Peer-Reviewed Literature

A scoping review approach was used to synthesize the extent, scope, and evidence on skills and employment supports for persons with learning disabilities published in the peer-reviewed literature.[1]

The scoping review follows the methodological steps outlined by Arksey and O'Malley[2], with the refinements proposed by Levac et al.[3] The review complies with reporting guidance for the conduct of scoping reviews (i.e., Preferred Reporting Items for Systematic Reviews and Meta-Analyses [PRISMA] extension for Scoping Reviews [http://www.prisma-statement.org/Extensions/ScopingReviews].

The scoping review methodology consisted of the following five steps.

Identifying the research questions

The five research questions guiding this study are:

1. What is the socio-demographic and employment profile of persons with learning

[1] Khalil, H., Peters, M.D.J., Godfrey, C.M., McInerney, P., Soares, C.B., & Parker, D. (2016). An evidence-based approach to scoping reviews. Worldviews on Evidence-based Nursing, 13(2), 118-123. DOI: https://doi.org/10.1111/wvn.12144

[2] Arksey H, O'Malley L. Scoping studies: towards a methodological framework. International journal of social research methodology. 2005 Feb 1;8(1):19-32.

[3] Levac D, Colquhoun H, O'Brien KK. Scoping studies: advancing the methodology. Implementation science. 2010 Dec;5(1):1-9.

disabilities?

2. How are persons with learning disabilities typically identified/diagnosed, and what are the Canadian and international best practices for identifying persons with learning disabilities in training and employment (including what does not work/has not worked)?
3. What are the Canadian and international best practices for supporting persons with learning disabilities in the labour market in areas such as:
    i. Learning, training and skills development,
    ii. Performance measurement and skills assessment, and
    iii. Promotion and career advancement?
4. What unique employment challenges are faced by persons with learning disabilities with intersectional identities (e.g., women, BIPOC, 2SLGBTQ2IA)?
5. What recommendations can be proposed to provide more equitable and inclusive employment and skills training opportunities for persons with learning disabilities?

The peer-reviewed literature search focused primarily on research questions 2, 3 and 4. Though research question 1 was also in scope for this search, it was felt that socio-demographic and employment data would more likely be found in reports and therefore would be captured in the grey literature search. Research question 5 was addressed through a synthesis of the research findings.

Developing the search strategy

The search strategy for each of the research questions followed a PCC framework. The PCC mnemonic stands for Population (or Participants), Concept, and Context and is also used to inform the creation of inclusion criteria. Population or participants are important characteristics that should be detailed (e.g., type of learning disability). Concept refers to the core concept examined (e.g. interventions, phenomena of interest, definitions, methodological approaches, outcome, theories, format and contents of included studies). Context can relate to location, timing, cultural factors, particular jurisdiction, or system.

A two-phase search strategy was used. In Phase 1, we identified six articles to support the development and testing of the structured peer-reviewed search strategy.[1,2,3,4,5,6] These six articles were used to assist in determining the search terms and databases. That is, if the search caught the six articles, we had confidence that it was capturing articles of relevance to our research questions. We searched those databases in which the articles were indexed.

Phase 2 we searched three electronic databases (ERIC, Scopus and Web of Science). The search was limited to those studies published after 2017, however, there were no limits placed on the types of study design and reference lists of included studies were also within scope.

Selecting studies

Level 1 screening (titles and abstracts) was applied to all the references from the second search strategy (i.e., the search generated from the six key articles). The references were reviewed by one reviewer. Subsequently, level 2 screening (full text) was applied to studies identified from level 1 screening that met the inclusion criteria. The same set of inclusion and exclusion criteria was applied for both level 1 and level 2 screening.

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[1] Chen X, Wu JR, Grenawalt TA, Mpofu N, Chan F, Tansey TN. Employer practices for customized training for onboarding of people with disabilities. Rehabilitation Research, Policy, and Education. 2023 Mar 9;37(1):10-22.

[2] Theobald RJ, Goldhaber DD, Gratz TM, Holden KL. Career and technical education, inclusion, and postsecondary outcomes for students with learning disabilities. Journal of Learning Disabilities. 2019 Mar;52(2):109-19. https://10.1177/0022219418775121

[3] Hunter J, Runswick-Cole K, Goodley D, Lawthom R. Plans that work: Improving employment outcomes for young people with learning disabilities. British Journal of Special Education. 2020 Jun;47(2):134-51. DOI: https://doi.org/10.1111/1467-8578.12298

[4] Hall E, McGarrol S. Bridging the gap between employment and social care for people with learning disabilities: Local Area Co-ordination and in-between spaces of social inclusion. Geoforum. 2012 Nov 1;43(6):1276-86. DOI: https://doi.org/10.1016/j.geoforum.2012.03.015

[5] Davies J, Matuska G. Workforce development: perspectives from people with learning disabilities. Tizard Learning Disability Review. 2018 Dec 12;23(4):165-72.

[6] Stevens, Martin. Commentary on “workforce development: perspectives from people with learning disabilities”, Tizard Learning Disability Review. 2018 Vol. 23 Issue: 4, pp.173-177. DOI: https://doi.org/10.1108/TLDR-08-2018-0024

Inclusion terminology:

- Learning disabilities;
- Attention deficit disorder (ADD);
- Attention hyperactivity disorder (ADHD);
- Development disorders;
- Dyslexia;
- Dyscalculia;
- Dysgraphia;
- Developmental aphasia; and
- Adults, older adults and youth.

Inclusion criteria:

- Literature published between 2018-2023 (last five years, with a search of references of included articles and systematic reviews);
- Both qualitative and quantitative studies;
- Expert opinion, scoping and systematic reviews;
- Conceptual frameworks, measures/indicators;
- National and international focus; and
- Peer-reviewed and grey literature.

Exclusion Criteria:

- Conference abstracts; and
- Accessibility but not a focus on persons with disabilities (e.g., racialized group membership, recent immigrant, women).

Charting the data

One reviewer utilized a piloted and standardized data extraction form to gather data on the following items:

- General information;
- First author;
- Title;
- Source;

- Abstract;
- Jurisdiction;
- Population;
- Disability;
- Notes; and
- Research question(s).

Appendix 2 contains the Data Extraction Table.

Grey Literature Search

The grey literature search considers research questions 1 through 4.

Grey literature is defined as documents and/or resources not commonly found through scientific/bibliographic databases searches (this includes policy documents, dissertations, conference proceedings, reports, book chapters, magazine articles, newsletters, blogs, wikis).

Searching within grey literature databases or repositories required multiple search strategies as each database has unique searching capabilities, with some being quite rudimentary. This process was done by entering keywords, based on the PCC, into search engines on the grey literature databases. If relevant to research questions 1 through 4. We kept track of all searches and their yields.

Inclusion criteria for the grey literature:

- Literature published/posted between 2018-2023 (last five years, with a search of references of included articles);
- Both qualitative & quantitative studies;
- Expert opinion, scoping and systematic reviews;
- English language;
- Conceptual frameworks and measures/indicators;
- National and international focus; and
- Peer-reviewed and grey literature.

Exclusion Criteria for the grey literature:

- Accessibility but not a focus on persons with disabilities; and
- Languages other than English.

In our endeavor to amass evidence, we reviewed several websites. These online sources were selected for their specialized focus and expertise, which we scrutinized to ensure that the information gathered from them was reliable and pertinent. In our exploration of these sites, we sought to enhance our understanding of learning disabilities, workplace accommodations, and successful programs. Our aim was to offer a supplementary contribution to the evidence gathered from peer-reviewed literature for use in this study. Each website was initially searched using the search terms from the PPC framework and then searched organically. **Table 1** provides links to websites identified.

Collating and summarizing results

Results from the peer reviewed, grey literature, and website searches were collated and summarized with those found through organic searches by research question.

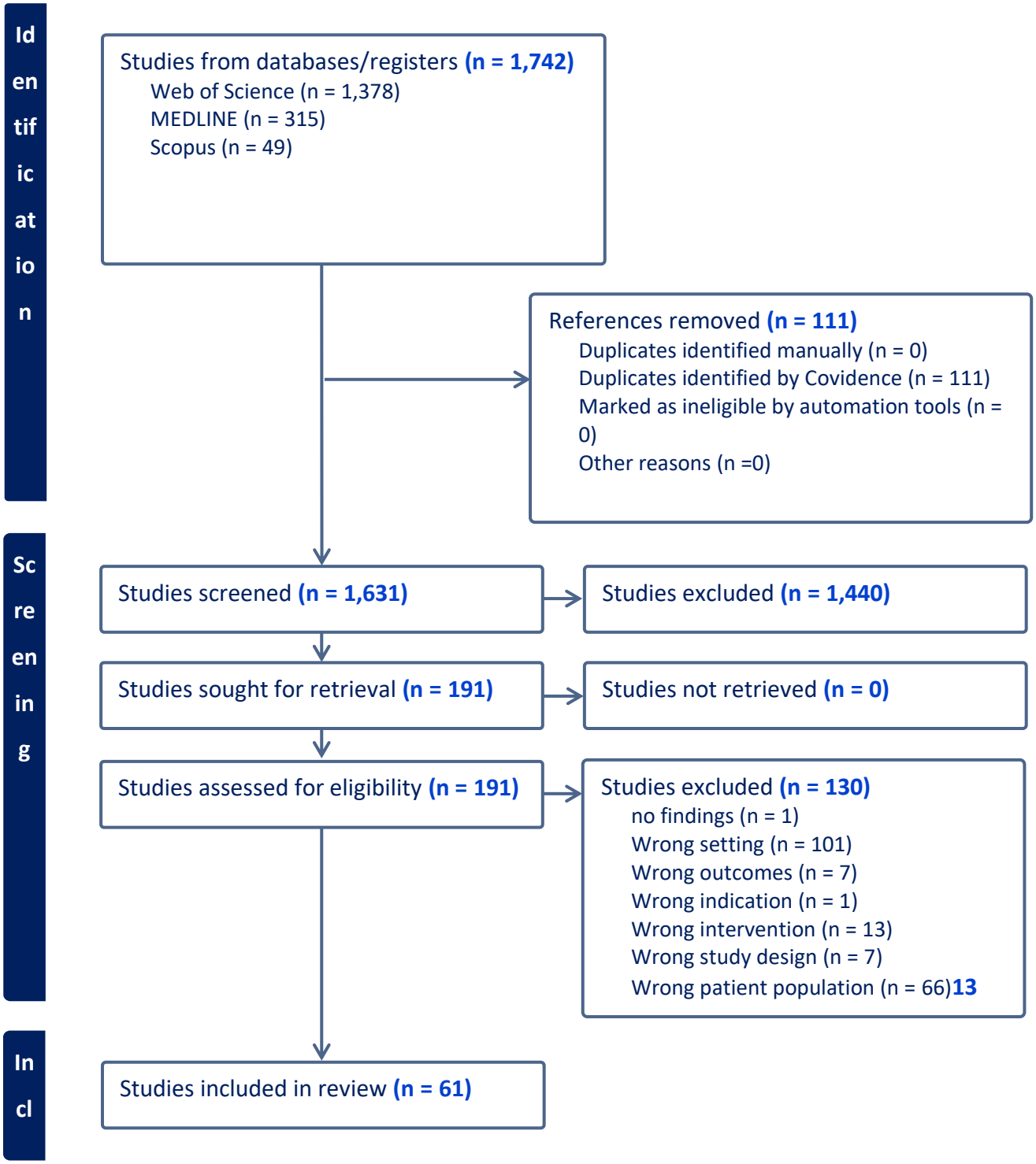
Table 1. Selected Websites with Information on learning Disabilities

No	Website	Link
1	Guide for Assessing Persons with Disabilities	https://www.canada.ca/
2	Learning Disabilities Association of Canada (IDAC)	https://www.ldac-acta.ca/
3	Learning Disabilities Association of Ontario (LDAO)	https://www.ldao.ca/
4	Learning Disabilities Association of Toronto	https://www.ldatd.on.ca/
5	Learning Disabilities Society	https://ldsociety.ca/
6	The Counselling Foundation of Canada	https://ceric.ca/
7	EmployAbilities	https://employabilities.ab.ca/
8	University of Toronto Career Centre: Learning Disabilities	https://www.utm.utoronto.ca/careers/
9	Learning Disabilities Association of America	https://ldaamerica.org/
10	Mencap	https://www.mencap.org.uk/
11	National Center for Learning Difficulties	https://ncld.org/resources/#expanders--section single--title link--583
12	Guidelines for Assessment and Intervention with Persons with Disabilities	https://www.apa.org/pi/disability/resources/assessment-disabilities
13	Canadian Transportation Agency - Best Practices for Interacting with Persons with Disabilities: A Guide	https://otc-cta.gc.ca/eng/publication/best-practices-interacting-persons-disabilities-a-guide
14	Guideline on Accommodating Physical and Mental Disabilities at Work	https://www2.gnb.ca/content/dam/gnb/Departments/hrc-cdp/PDF/Guideline-Accommodating-Disability-at-Work-New-Brunswick.pdf
15	HSE: Health and safety for disabled people at work	https://www.hse.gov.uk/disability/index.htm
16	Disability Confident - A practical guide for line managers	https://assets.publishing.service.gov.uk/media/5fbe437b8fa8f559e0e5cc61/disability-confident-line-managers-guide.pdf
17	Neil Squire	https://www.neilsquire.ca/wordq-an-overview/

LITERATURE SEARCH RESULTS

Peer-Reviewed Literature Search Results

Figure 1. PRISMA flowchart



In **Figure 1**, the PRISMA flow chart illustrates the results of the peer-reviewed literature search. Following are some details about the process:

- After 111 duplicates were removed, the titles and abstracts (level 1) of 1,631 peer-reviewed studies were screened using the inclusion/exclusion criteria;
- 1,440 titles and abstracts were excluded, and 191 full articles (level 2) were retrieved, and the inclusion/exclusion criteria were applied; and
- 109 studies were excluded (reasons displayed in the flowchart) and 82 studies were forwarded for data charting.

Grey Literature Search

Using the methodology outlined above the following databases were searched and relevant materials were downloaded:

- OPENGREY.EU;
- National Technical Information Service;
- Health Canada;
- CADTH;
- Health ON;
- CIHI;
- OAIster; and
- TSpace.

Websites Search

Using the methodology outlined above the websites were searched and relevant materials were downloaded.

FINDINGS

Definition of Learning Disabilities

History of Learning Disabilities in Canada

In Canada, definitions of learning disabilities traditionally have varied across provinces and territories.[1] The debate over the definition of specific learning disabilities and associated classification criteria has been ongoing since the inception of the concept. In the late 1950s, psychiatrist Edward Levinson drew attention to learnings disabilities in Canada when he identified children with mild behavioral issues, average intelligence, yet significant academic struggles. Levinson's observations led to the establishment of the Montréal Children's Hospital Learning Centre in 1960, dedicated to exploring learning disabilities and implementing effective interventions. Subsequently, in 1962, concerned parents formed the Association for Children with Learning Disabilities, which subsequently evolved into the Learning disabilities Association of Canada (LDAC). By 1977, chapters were established in all 10 Canadian provinces, marking a crucial moment in the growth of national learning disabilities associations. These chapters have played a vital role in raising awareness of and advancing services for persons with learning disabilities across the country. Provincial-level differences has resulted in a persistent policy variability which underscores the ongoing nature of the learning disabilities discourse in Canada.[2] More detailed insights into the diverse interprovincial definitions of learning disabilities in Canada can be found in Kozey et al. (2008)[3].

Official Definition of Learning Disabilities in Canada

The Official definition of learning disabilities adopted by LDAC on January 30, 2002, and

[1] Stegemann KC. Learning disabilities in Canada. Learning Disabilities: A Contemporary Journal. 2016 Mar 22;14(1):53-62.
[2] Stegemann KC. Learning disabilities in Canada. Learning Disabilities: A Contemporary Journal. 2016 Mar 22;14(1):53-62.
[3] Kozey M, Siegel LS. Definitions of learning disabilities in Canadian provinces and territories. Canadian Psychology/Psychologie canadienne. 2008 May;49(2):162.

re-endorsed on March 2, 2015, is as follows:[1,2]

> "Learning disabilities refer to a number of disorders which may affect the acquisition, organization, retention, understanding or use of verbal or nonverbal information. These disorders affect learning in individuals who otherwise demonstrate at least average abilities essential for thinking and/or reasoning. As such, learning disabilities are distinct from global intellectual deficiency."

Based on LDAC (2015):

> "Learning disabilities result from impairments in one or more processes related to perceiving, thinking, remembering, or learning. These include but are not limited to: Language processing; phonological processing; visual spatial processing; processing speed; memory and attention; and executive functions (e.g., planning and decision making)."

Learning disabilities range in severity and may interfere with the acquisition and use of one or more of the following:

- oral language (e.g., listening, speaking, understanding);
- reading (e.g., decoding, phonetic knowledge, word recognition, comprehension);
- written language (e.g., spelling and written expression); and
- mathematics (e.g., computation, problem solving).

Learning disabilities may also involve difficulties with organizational skills, social perception, social interaction, and perspective taking.

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[1] Stegemann KC. Learning disabilities in Canada. Learning Disabilities: A Contemporary Journal. 2016 Mar 22;14(1):53-62.
[2] LDAC (n.d.). Official definition of learning disabilities. Link: https://www.ldac-acta.ca/causes/for-professionals/#1513281532557-06d7ac16-f126

Learning disabilities are lifelong. The way in which they are expressed may vary over an individual's lifetime, depending on the interaction between the demands of the environment and the individual's strengths and needs. Learning disabilities manifest as academic under-achievement or achievement which is maintained only by unusually high levels of effort and support.

Learning disabilities are due to genetic and/or neurobiological factors or injury that alters brain functioning in a manner that affects one or more processes related to learning. These disorders are not due primarily to hearing and/or vision problems, socio-economic factors, cultural or linguistic differences, lack of motivation or ineffective teaching, although these factors may further complicate the challenges faced by persons with learning disabilities.

Co-Occurrence with Learning Disabilities

Based on LDAC (2015), learning disabilities may co-occur with various conditions including attentional deficit, behavioural and emotional disorders, sensory impairments or other medical conditions. Given these are common co-occurrences, we considered these conditions as in scope for the purpose of this report.

Understanding Varied Definitions Around the World

The concept of learning disabilities takes on varied meanings across different countries, as it does across Canada. Definitions generally vary in scope, with some encompassing a broader range of conditions relative to others. For example, some definitions include attention problems within the domain of learning disabilities, while others do not. In some definitions, conditions such as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia are considered in scope, while learning problems resulting primarily from visual, hearing, or motor disabilities,

intellectual disabilities, emotional disturbance, or environmental, cultural, or economic disadvantage are excluded.[1]

Table 2 provides a summary of various definitions of learning disabilities in Canada and internationally. Variation in inclusion and exclusion criteria across definitions appears contextual and difficult to explain. However, in this study, we do not aim to establish a standardized definition of learning disabilities, but rather embrace a broad definition to assure inclusion of as many relevant studies as possible, acknowledging that this broad scope deviates from the official definition of learning disabilities based on LDAC. While our inclusive working definition may diverge from official definitions, it holds significant value from a program policy standpoint, given the commonalities amongst conditions and the transferability of best practices. Furthermore, the high prevalence of learning disabilities alongside other conditions underscores the practicality of policies that encompass a broader range of conditions. We acknowledge and highlight these discrepancies where relevant. In sections concerning demographics or employment rates, we explicitly specify the definition used when presenting statistics.

Table 2. Summary of various definitions of learning disabilities within Canada and internationally (selected countries).

Source(s)	Definition of learning disabilities	Ref.
Learning disabilities Association of Canada (LDAC)	Learning disabilities refer to a number of disorders which may affect the acquisition, organization, retention, understanding or use of verbal or nonverbal information. These disorders affect learning in individuals who otherwise demonstrate at least average abilities essential for thinking and/or reasoning. As such, learning disabilities are distinct from global intellectual deficiency. Learning disabilities result from impairments in one or more processes related to perceiving, thinking, remembering or learning. These include but are not limited to: Language processing; phonological processing; visual spatial processing; processing speed; memory and attention;	2,3

[1] U.S. Department of Education's Individuals with Disabilities Education Act (IDEA). Section 1401 (30). Specific learning disability. Link: https://sites.ed.gov/idea/statute-chapter-33/subchapter-i/1401/30
[2] Stegemann KC. Learning disabilities in Canada. Learning Disabilities: A Contemporary Journal. 2016 Mar 22;14(1):53-62.
[3] LDAC (n.d.). Official definition of learning disabilities. Link: https://www.ldac-acta.ca/causes/for-professionals/#1513281532557-06d7ac16-f126

Source(s)	Definition of learning disabilities	Ref.
	and executive functions (e.g. planning and decision making).	
Statistics Canada	In Canada, the definition of learning disability used for statistical purposes is used in the Canadian Survey on Disability (CSD). The 2012 CSD identified adults with a learning disability as those whose daily activities were limited because of difficulties caused by a learning condition. The survey used the Disability Screening Questions (DSQ) to identify disability. The initial step in identifying a learning disability was to establish the existence of a learning condition. This was done using two questions: DSQ_25 Do you think you have a condition that makes it difficult in general for you to learn? This may include learning disabilities such as dyslexia, hyperactivity, attention problems, as well as other conditions. DSQ_26 Has a teacher, doctor or other health care professional ever said that you have a learning disability? Those who answered yes to one or both of these questions received a follow up question to determine how often the condition limited their daily activities: DSQ_27 How often are your daily activities limited by this condition? Never, Rarely, Sometimes, Often, Always. Those who indicated being limited at least rarely were asked another follow up question to determine the amount of difficulty experienced. DSQ_28 How much difficulty do you have with your daily activities because of this condition? No difficulty, Some difficulty, A lot of difficulty, You cannot do most activities Respondents who reported being limited at least sometimes were automatically considered to have a learning disability. If they reported being limited 'rarely,' they were only considered to have a learning disability if they also reported having 'a lot of difficulty' or if they reported being unable to do most activities. All others were defined as not having a learning disability.	1,2

[1] Statistics Canada. Learning disabilities among Canadians aged 15 years and older, 2012. Link: https://www150.statcan.gc.ca/n1/pub/89-654-x/89-654-x2014003-eng.htm
[2] Canadian Survey on Disability (CSD). Link: https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvVariableList&Id=1329901

Source(s)	Definition of learning disabilities	Ref.
Ontario Ministry of Education	One of a number of neurodevelopmental disorders that persistently and significantly has an impact on the ability to learn and use academic and other skills and that: • Affects the ability to perceive or process verbal or non-verbal information in an effective and accurate manner in students who have assessed intellectual abilities that are at least in the average range; • Results in (a) academic underachievement that is inconsistent with the intellectual abilities of the student (which are at least in the average range) and/or (b) academic achievement that can be maintained by the student only with extremely high levels of effort and/or with additional support; • Results in difficulties in the development and use of skills in one or more of the following areas: Reading, writing, mathematics, and work habits and learning skills; • May typically be associated with difficulties in one or more cognitive processes, such as phonological processing; memory and attention; processing speed; perceptual-motor processing; visual-spatial processing; executive functions (e.g., self-regulation of behaviour and emotions, planning, organizing of thoughts and activities, prioritizing, decision making); • May be associated with difficulties in social interaction (e.g., difficulty in understanding social norms or the point of view of others); with various other conditions or disorders, diagnosed or undiagnosed; or with other exceptionalities; and • Is not the result of a lack of acuity in hearing and/or vision that has not been corrected; intellectual disabilities; socio-economic factors; cultural differences; lack of proficiency in the language of instruction; lack of motivation or effort; gaps in school attendance or inadequate opportunity to benefit from instruction.	1
U.K., Valuing People, the 2001 White Paper	'Learning disability includes the presence of: A significantly reduced ability to understand new or complex information, to learn new skills (impaired intelligence), with; a reduced ability to cope independently (impaired social functioning); which started before adulthood, with a lasting effect on development.	2

[1] Ontario Government. Definition of the term learning disability. Link: https://www.ontario.ca/document/education-ontario-policy-and-program-direction/policyprogram-memorandum-8#section-1

[2] Emerson E, Heslop P. A working definition of learning disabilities. Durham: Improving Health & Lives: Learning Disabilities Observatory. 2010. Link: https://www.researchgate.net/profile/Eric-Emerson/publication/265306674_A_working_definition_of_Learning_Disabilities/links/5428856f0cf26120b7b5692b/A-working-definition-of-Learning-Disabilities.pdf

Source(s)	Definition of learning disabilities	Ref.
U.S., National Center for Learning Disabilities	Learning disabilities are neurological disorders that affect an individual's ability to process, store, and communicate information. These disabilities can make it challenging to learn new skills or perform certain tasks, but with the right support, persons with learning disabilities can thrive.	1
U.S., Department of Education	InIndividuals with Disabilities Education Act (IDEA), the term "specific learning disability" means a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which disorder may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations.	2
U.S., National Institute of Neurological Disorders	Learning disabilities are disorders that affect the ability to: • Understand or use spoken or written language; • Do mathematical calculations; • Coordinate movements; and/or • Direct attention.	3
Australian Bureau of Statistics (ABS)	The definition of disability adopted by the Australian Bureau of Statistics (ABS) in the Survey of Disability Ageing and Carers (SDAC) aligns with the WHO definition and is defined as: "A state of arrested or incomplete development of mind."	4
World Health Organisation (WHO)	According to the WHO (2004), persons with learning disabilities are defined as meeting all three of the following criteria: An intelligence quotient (IQ) less than 70; impairment of daily living skills or diminished ability; and identification of such lifelong problems before the age of 18. Based on this definition, people who meet the criteria are further classified into one of four severity levels: Mild (IQ 50–69), moderate (IQ 35–49), severe (IQ 20–34) and profound (IQ less than 20).	5

[1] Ruben Kesherim (2023). 31 Learning Disabilities Statistics, Prevalence & Facts. Link: https://www.supportivecareaba.com/statistics/learning-disabilities#:~:text=According%20to%20a%20study%20by,72%25%20of%20adults%20without%20disabilities

[2] U.S. Department of Education's Individuals with Disabilities Education Act (IDEA). Section 1401 (30). Specific learning disability. Link: https://sites.ed.gov/idea/statute-chapter-33/subchapter-i/1401/30

[3] National Institutes of Health. Learning Disabilities. Link: https://www.ninds.nih.gov/health-information/disorders/learning-disabilities#:~:text=Learning%20disabilities%20are%20disorders%20that,Coordinate%20movements

[4] Australian Government (2021). Disability Employment Landscape Research Report. Link: https://www.dss.gov.au/disability-employment-landscape-research-report

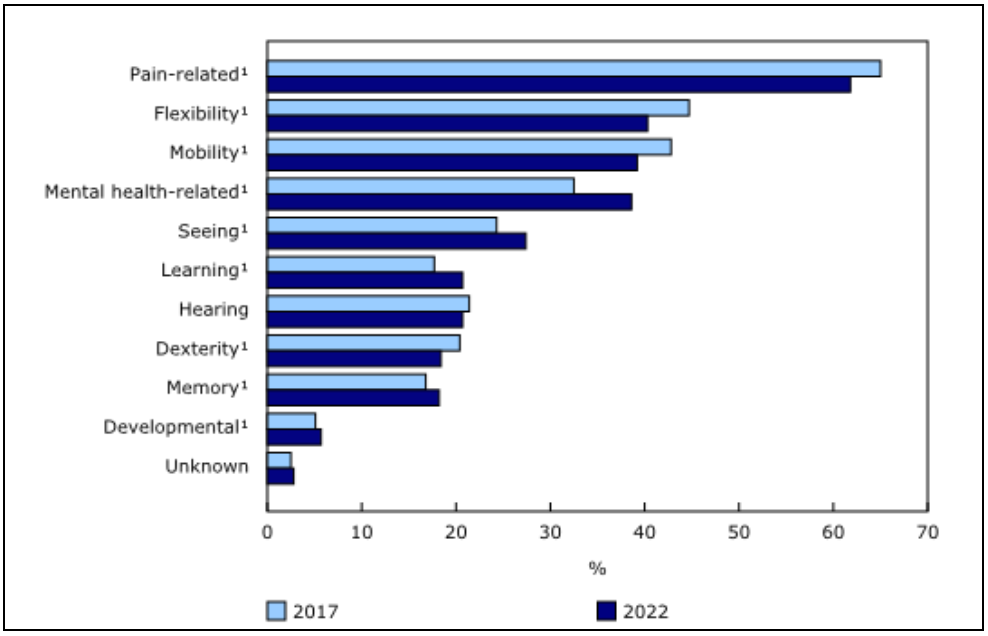
[5] The Scottish Government (2023). Definitions of Learning Disability, Autism and Neurodiversity: FOI release. Link: https://www.gov.scot/publications/definitions-of-learning-disability-autism-and-neurodiversity-foi-release/

Socio-Demographic and Employment Landscape

Prevalence of Learning Disabilities Amongst Canadian Aged 15 and Over

Data from the 2022 Canadian Survey on Disability (CSD) indicates that 27% of Canadians aged 15 years and older, or 8 million people, had one or more disabilities that limited them in their daily activities (**Figure 2**) (Statistics Canada, 2023)[1]. Amongst all persons with disabilities, one in five (21%) or about 1.7 million reported having learning disabilities. Amongst persons with disabilities aged 15 to 64 (5.5 million), over one-quarter (26%) or about 1.4 million reported to have learning disabilities).[2] Noteworthy is that the prevalence of learning disabilities amongst all persons with disabilities has increased by 3 percentage points (from 15-18%) over the five-year period from 2017 to 2022.

Figure 2. Prevalence of disability types amongst persons with disabilities aged 15 years and over, 2017 and 2022.



[1] Statistics Canada. 2023. "Canadian Survey on Disability, 2017 to 2022". The Daily, Friday, December 1, 2023, catalogue no. 11-001-X.
[2] Statistics Canada. 2024. Type of disability for persons with disabilities aged 15 years and over, by age group and gender. Link: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310037601

Source: 2022 Canadian Survey on Disability, 2017 and 2022.
Link: https://www150.statcan.gc.ca/n1/daily-quotidien/231201/dq231201b-eng.htm

Prevalence of Learning Disabilities Amongst Youth and Young Adults Aged 15 to 24

Amongst youth with disabilities, the most common disabilities were mental health-related disabilities (68%), learning disabilities (46%), and pain-related conditions (34%) based on data from 2022 (Statistics Canada, 2023).[1] Put differently, almost half of the youth with disabilities have learning disabilities, making it the second most prevalent type of disability in this demographic.

Prevalence of Learning Disabilities Amongst Children Under 15

The importance of equitable and inclusive employment and skills training from a life course perspective cannot be overstated. For that reason, it is important to consider the situation of children under 15 years of age. While the Canadian Survey on Disabilities does not provide statistics on the prevalence of disabilities amongst Canadian children aged 15 and younger (LDAC, n.d.),[2] data from other surveys, such as the 2006 Participation and Activity Limitation Survey (PALS), offer valuable insights. According to PALS, more children under 15 years of age in Canada have learning disabilities than all other types of disabilities combined.

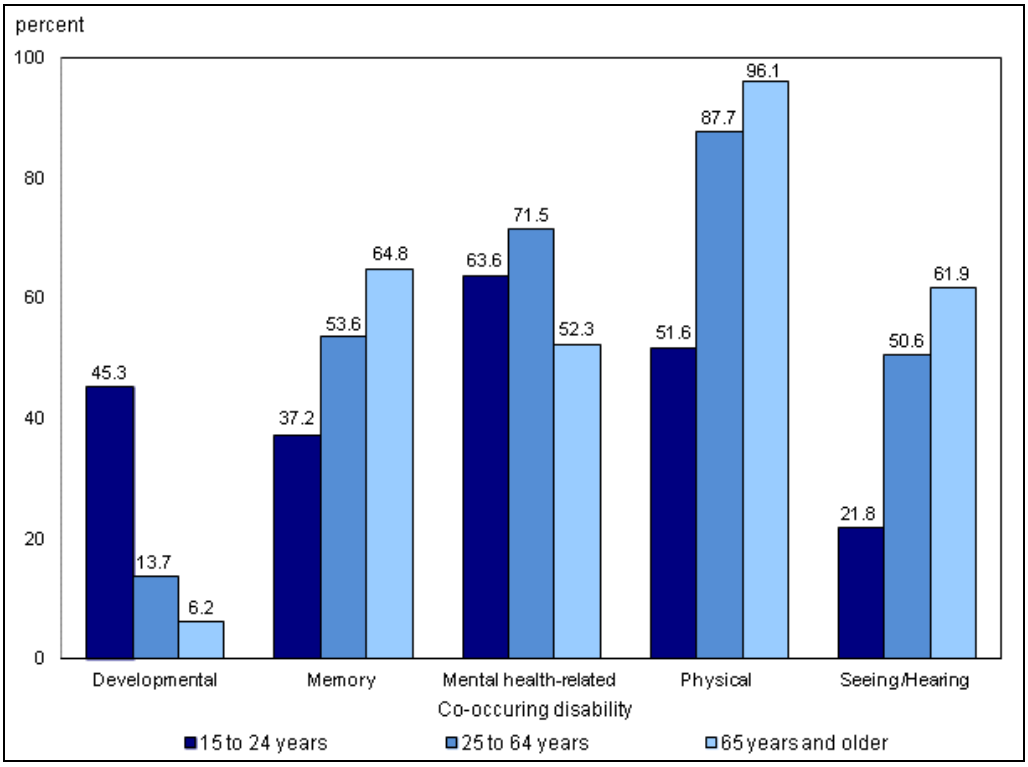
Prevalence of Co-Occurring Disabilities

Learning disabilities frequently co-occur with other types of disabilities. In fact, 96.3% of persons reporting a learning disability also experiencing at least one other disability (Bizier et al., 2015).[3] The pattern of co-occurrence varied by age (
Figure 3). Mental health-related disabilities were the most common co-occurrence for youth aged 15 to 24 with a learning disability, while physical disabilities were most common for adults aged 25 and older with learning disabilities.

[1] Statistics Canada. 2023. “Canadian Survey on Disability, 2017 to 2022”. The Daily, Friday, December 1, 2023. catalogue no. 11-001-X.
[2] IDAC (Learning Disabilities Association of Canada), n. Link: https://www.ldac-acta.ca/prevalence-of-learning-disabilities/
[3] Bizier C, Till M, Nicholls G. Learning disabilities among Canadians aged 15 years and older, 2012. Des Libris; 2015. Catalogue no. 89-654-X2014003.

Co-occurring disabilities with learning disabilities can potentially create additional barriers in the labour market, as these individuals may face compounded challenges such as communication difficulties, physical limitations, and mental health issues. The effects of co-occurring conditions on the employment of persons with disabilities have not yet been fully investigated. Although the literature on some types of disability, such as, mental health-related disabilities suggests that comorbidities affect employment outcomes,[1] there is insufficient evidence regarding the impact on persons with learning disabilities.

Figure 3. Prevalence of co-occurring disability types amongst adults with a learning disability, by age group, aged 15 years and older, Canada, 2012



Note. Physical disability includes mobility, flexibility, dexterity, and pain-related disability types.
Source: Statistics Canada, Canadian Survey on Disability, 2012. Link: https://www150.statcan.gc.ca/n1/pub/89-654-x/2014003/c-g/desc/c-g02-desc-eng.htm

[1] Cook JA, Razzano LA, Burke-Miller JK, Blyler CR, Leff HS, Mueser KT, Gold PB, Goldberg RW, Shafer MS, Onken SJ, McFarlane WR. Effects of co-occurring disorders on employment outcomes in a multisite randomized study of supported employment for people with severe mental illness. Journal of Rehabilitation Research and Development. 2007 Nov 1;44(6):837.

Employment Rate Amongst Persons with Learning Disabilities Aged 15 to 64

Regarding the employment rate of persons learning disabilities in Canada, we were only able to locate somewhat outdated data from Canada's 2012 Canadian Survey on Disability (**Table 3**) (Statistics Canada, 2012).[1]. The data reveals a challenging situation for these individuals, particularly those aged 15 to 24 with learning disabilities (Statistics Canada, 2012). The employment rate for this group was just 25.9%, nearly half the rate for those without disabilities (51.9%). In addition to this significant difference in employment rates, these individuals commonly face extra hurdles at work, including shorter work hours, lower earnings, and various other barriers.

Table 3. Labour-force status of adults with learning disabilities by age group, 2012

	Total, 15 to 64 years	15 to 24 years	25 to 34 years	35 to 44 years	45 to 54 years	55 to 64 years
Total labour force **(number)**	490,230	90,350	62,130	76,910	159,890	100,950
Employed **(number)**	125,480	22,110	23,060	24,280	41,570	14,470
Unemployed **(number)**	33,510[E]	7,740[E]	5,730[E]	F	6,240[E]	2,290[E]
Not in labour force **(number)**	276,350	55,560[E]	30,030	29,480	95,490	65,800
Participation rate **(%)**	36.5	35	48.9	54.8	33.4	20.3
Age standardized participation rate **(%)**	38.6	34.9	48.9	54.8	33.4	20.3
Employment Rate **(%)**	28.8	25.9[E]	39.2	37.2	29	17.5
Age standardized employment rate **(%)**	29.9	25.9[E]	39.2	37.2	29	17.5
Unemployment rate **(%)**	21.1[E]	25.9	19.9[E]	F	13.1[E]	13.7[E]
Age standardized unemployment rate **(%)**	20.8	25.9	19.9[E]	F	13.0[E]	13.6[E]

[E] use with caution
[F] too unreliable to be published
Source: Canadian Survey on Disability, 2012. Statistics Canada. Table 13-10-0348-01. DOI: https://doi.org/10.25318/1310034801-eng

[1] Statistics Canada. 2012. Canadian Survey on Disability, 2012. Statistics Canada. Table 13-10-0348-01. DOI: https://doi.org/10.25318/1310034801-eng

Employment Rate Amongst Persons with Learning Disabilities in Selected Countries

Looking at the issue of employment of persons with disabilities in an international context can provide some insights, though comparing employment rates amongst persons with learning disabilities presents a notable challenge due to varying definitions (see **Table 2**, of learning disabilities adopted by each nation).[1] In fact, like Canada, some other countries too have multiple definitions. For instance, there are several definitions of learning disabilities used only in UK[2] and US[3]. In what follows, we provide data on the employment rate amongst all persons with disabilities for several country.

- **England:** Persons with severe or specific learning difficulties aged 16 to 64 years had an employment rate of 26.5%, which was significantly lower than the average employment rate for persons with disability as whole at 53.6% (Office for National Statistics: Annual Population Survey).[4]
- **United States:** 47% of adults aged 21 to 64 years old with learning disabilities were employed, compared to 41% of adults with disabilities as an average (U.S. Census Bureau, Survey of Income and Program Participation, 2010).[5,6]
- **Australia:** People with difficulty learning or understanding things aged 15 to 64 years had an employment rate of 32.5%, compared to the average rate for

[1] Sally-Ann Cooper, Angela Henderson, Myrthe Jacobs, Elita Smiley (2016). What Are Learning Disabilities? How Common Are Learning Disabilities? Scottish Learning Disabilities Observatory. Link: https://www.sldo.ac.uk/media/1610/what-are-learning-disabilities-how-common-are-learning-disabilities.pdf

[2] Hardie E, Tilly L. An introduction to supporting people with a learning disability. Sage; 2012 Feb 13. Chapter 1. Definitions of learning disability and learning difficulties. Link: https://nadp-uk.org/wp-content/uploads/2015/02/QCF-intro-to-LD-sample.pdf

[3] Hardie E, Tilly L. An introduction to supporting people with a learning disability. Sage; 2012 Feb 13. Chapter 1. Definitions of learning disability and learning difficulties. Link: https://nadp-uk.org/wp-content/uploads/2015/02/QCF-intro-to-LD-sample.pdf

[4]Office for National statistics (2021). Outcomes for Disabled People in the U.K.: 2020. Link: https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/disability/articles/outcomesfordisabledpeopleintheuk/2020

[5]US Census Bureau (2010). Americans with Disabilities 2010. Link: https://www.census.gov/data/tables/2010/demo/disability/p70-131.html

[6] Ruben Kesherim (2023). 31 Learning Disabilities Statistics, Prevalence & Facts. Link: https://www.supportivecareaba.com/statistics/learning-disabilities#:~:text=According%20to%20a%20study%20by,72%25%20of%20adults%20without%20disabilities

persons with disability of 47.9% (Australian Bureau of Statistics, Survey of Disability, Ageing and Carers, 2018).[1,2]

- **Scotland:** 25% of people aged 16 to 64 years who self-reported as having a severe or specific learning difficulty as their main impairment type were in employment. This is almost half of the average employment rate for persons with disabilities at 50.7% (Office for National Statistics Annual Population Survey publication, official source for labour market indicators, 2022).[3,4,5,6]

[1] Australian Government (2021). Disability Employment Landscape Research Report. Link: https://www.dss.gov.au/disability-employment-landscape-research-report
[2] ABS (2018). Survey of Disability, Ageing and Carers. Link: https://www.dss.gov.au/sites/default/files/documents/12_2021/disability-employment-landscape-research-report.pdf
[3] https://www.gov.scot/publications/labour-market-statistics-for-scotland-by-disability-january-to-december-2022/documents/
[4] https://www.parliament.scot/chamber-and-committees/questions-and-answers/question?ref=S6W-19002
[5] Annual Population Survey, January to December 2022, ONS. Link: https://www.gov.scot/binaries/content/documents/govscot/publications/statistics/2023/05/labour-market-statistics-for-scotland-by-disability-january-to-december-2022/documents/labour-market-statistics-for-scotland-by-disability-january-to-december-2022/labour-market-statistics-for-scotland-by-disability-january-to-december-2022/govscot%3Adocument/Labour%2BMarket%2BStatistics%2Bfor%2BScotland%2Bby%2BDisability%2B-%2BJD22.pdf
[6] https://www.gov.scot/binaries/content/documents/govscot/publications/statistics/2023/05/labour-market-statistics-for-scotland-by-disability-january-to-december-2022/documents/labour-market-statistics-for-scotland-by-disability-january-to-december-2022/labour-market-statistics-for-scotland-by-disability-january-to-december-2022/govscot%3Adocument/Labour%2BMarket%2BStatistics%2Bfor%2BScotland%2Bby%2BDisability%2B-%2BJD22.pdf

Identifying and Diagnosing Learning Disabilities

The diagnosis of learning disabilities typically involves a thorough process that may differ based on factors such as the reasons that lead the person to seek an assessment, the person's age, and the specific guidelines or regulations in a region.[1] In Canada, there may be slight variations in diagnosis guidelines across provinces and territories, given that education, health and employment falls under the jurisdiction of the provinces/territories. There are also some differences in assessment for educational, employment or self awareness purposes (LDAC, n.d.).[2]

There is no one test for diagnosis of learning disabilities but a series of psychological tests. It is important that the diagnosis is made by a specialist licensed to diagnose learning disabilities. Some of the specialists in this field include neuropsychologists, psychologists, clinical psychologists, school psychologists, educational psychologists and psychometrists who are:

- Trained to administer the various tests;
- Trained and experienced in interpreting the results; and
- Able to provide concrete recommendations for better learning and coping (LDAC, n.d.).[3]

Age at Diagnosis of persons with Learning Disability

The identification of learning disabilities can occur at various ages, since signs often manifest at different stages in an individual's academic and career developmental journey. Some individuals may be diagnosed in early childhood, while others may not receive a formal diagnosis until later in their academic or professional life. Generally, identification efforts begin early in childhood and extend throughout the school years,

[1] Maki KE, Adams SR. A current landscape of specific learning disability identification: Training, practices, and implications. Psychology in the Schools. 2019 Jan;56(1):18-31.
[2] LDAC (n.d.). For adult. Adult and assessment procedure. Link: https://www.ldac-acta.ca/causes/for-adults/#1513271506777-b40f212d-648a
[3] LDAC (n.d.). For adult. Adult and assessment procedure. Link: https://www.ldac-acta.ca/causes/for-adults/#1513271506777-b40f212d-648a

often pinpointing challenges in reading, writing, and/or mathematics during the early school years (NICHD, 2018).[1]

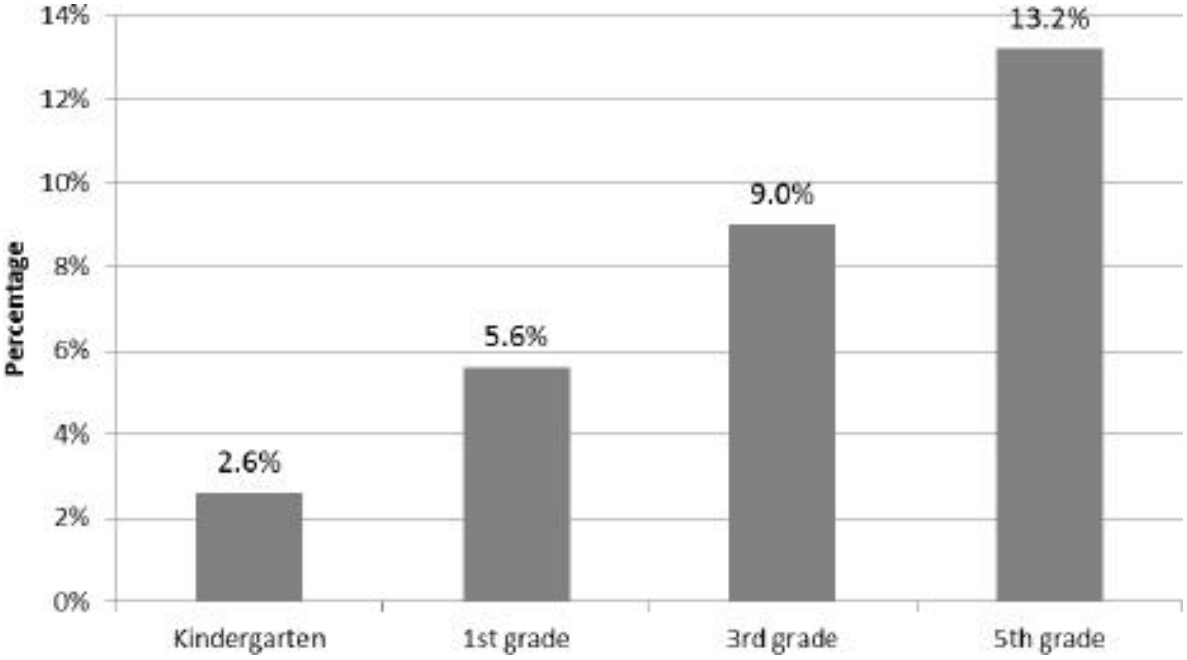
The late diagnosis of children with learning disabilities can significantly hinder their future employment prospects. Without early identification and intervention, these children often face academic challenges, lower skill development, and diminished self-esteem, all of which limit their qualifications and readiness for the workforce. They may also miss out on necessary workplace accommodations and struggle with social and communication skills, making it harder to secure and retain jobs.

We were unable to locate specific Canadian statistics regarding the age of diagnosis for persons with learning disabilities in Canada. Consequently, we looked to statistics from the U.S. to provide contextual information on this matter. In the U.S., the Early Childhood Longitudinal Study (ECLS) provides some information on the prevalence of ever being diagnosed with a learning disability. ECLS is considered as one of the strongest sources of information on prevalence of and trends for rates of learning disabilities. This survey consists of three cohorts—the birth cohort (ECLS-B), the kindergarten class 1998–1999 (ECLS-K), and the kindergarten class 2010–2011 (ECLS-K:2011)—that are used to examine child development, school readiness, and early school experiences. The results from the ECLS-K indicate that the prevalence of ever being diagnosed with a learning disability increased with age from 2.6 percent in kindergarten to 13.2 percent in 5th grade (National Academies of Sciences, 2015) (**Figure 4**).[2]

[1] NICHD (2018). How are learning disabilities diagnosed? Link: https://www.nichd.nih.gov/health/topics/learning/conditioninfo/diagnosed#:~:text=Learning%20disabilities%20are%20often%20identified,required%20to%20make%20a%20diagnosis

[2] National Academies of Sciences, Engineering, and Medicine. Mental disorders and disabilities among low-income children. National Academies Press; 2015 Oct 28. Link: https://www.ncbi.nlm.nih.gov/books/NBK332880/

Figure 4. Prevalence of ever being diagnosed with a learning disability in the U.S.



Source: Early Childhood Longitudinal Study (ECLS-K), 1998–2004 (kindergarten class).
Link: https://www.ncbi.nlm.nih.gov/books/NBK332880/

Signs of Learning Disabilities Amongst Children

Many children have trouble reading, writing, or performing other learning-related tasks at some point. These signs alone are not enough to determine that a person has a learning disability.[1] A child with a learning disability often has several related signs that do not go away or decrease over time. The signs of learning disabilities vary from person to person (NICHD, 2018).[2] Common signs that a person may have learning disabilities include the following:

- Problems reading and/or writing;
- Problems with math;
- Poor memory;
- Problems paying attention;

[1] Please note that the generally common signs included here are for informational purposes only; the information is not intended to screen for learning disabilities in general or for a specific type of learning disability. Only a professional can diagnose a learning disability.
[2] NICHD (2018). What are some signs of learning disabilities? Link: https://www.nichd.nih.gov/health/topics/learning/conditioninfo/signs

- Trouble following directions;
- Clumsiness;
- Trouble telling time; and
- Problems staying organized (NICHD, 2018).[1]

A child with a learning disability also may have one or more of the following:

- Acting without really thinking about possible outcomes (impulsiveness);
- "Acting out" in school or social situations;
- Difficulty staying focused; being easily distracted;
- Difficulty saying a word correctly out loud or expressing thoughts;
- Problems with school performance from day to day or week to week;
- Speaking like a younger child; using short, simple phrases; or leaving out words in sentences;
- Having a hard time listening;
- Problems dealing with changes in schedule or situations; and
- Problems understanding words or concepts (NICHD, 2018).[2]

It important to emphasize that each learning disability has its own signs, and a person with a particular learning disability may not have all of the signs of that disability.

Signs of Learning Disabilities Amongst Adults

As an adult, knowing or even considering that one has a learning disability can be difficult because they have been living with it for years. If the condition is mild, symptoms can be subtle. Following are some symptoms of a mild learning disability in adults (Berg, 2024; LDA, n.d.)[3,4]

- Difficulties in understanding information;
- Problems with maths, reading or writing;
- Learning new skills at a slower pace;

[1] NICHD (2018). What are some signs of learning disabilities? Link: https://www.nichd.nih.gov/health/topics/learning/conditioninfo/signs
[2] NICHD (2018). What are some signs of learning disabilities? Link: https://www.nichd.nih.gov/health/topics/learning/conditioninfo/signs
[3] Berg V. (2024). Signs and diagnosis of a learning disability in adults. Link: https://www.homecare.co.uk/advice/signs-and-diagnosis-of-a-learning-disability-in-adults
[4] LDA (n.d.). Adults with Learning Disabilities – An Overview. Link: https://ldaamerica.org/info/adults-with-learning-disabilities-an-overview/

- Problems with memory;
- Problems with communication, such as speaking slowly or having a small vocabulary;
- Difficulties in understanding and following conversations;
- Problems with coordination; and
- Finding it difficult to understand concepts such as time and direction.

Diagnosis of Learning Disabilities

A learning disability can be diagnosed through a process called a psycho-educational assessment. A psycho-educational assessment is a comprehensive look at a person's cognitive, academic, and social-emotional-behavioural functioning (Reader, 2020).[1] Workplaces can facilitate this process by covering such assessments in their benefit plans and communicating the coverage.

Psychologists can use different definitions and criteria to identify a learning disability. In Canada, psychologists often use the definition provided by LDAC. However, psychologists also often use the Diagnostic and Statistical Manual of Mental Disorders – Fifth Edition (DSM-5). The DSM-5 uses the term "Specific Learning Disorders" instead of "Learning Disabilities" (Reader, 2020).[2]

If a diagnosis is made using the DSM-5 criteria, subsets of Specific Learning Disorders are identified with terms such as dyslexia (difficulties with reading), dysgraphia (difficulties with writing), and dyscalculia (difficulties with math). A persistent difficulty learning key academic skills and poor academic performance are consistent criteria for diagnosis of a learning disability whether the LDAC definition or DSM-5 criteria is used (Reader, 2020).[3]

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[1] Reader M (2020). Learning Disabilities What Educators Need to Know. Link: https://www.foothillsacademy.org/community/articles/ld-educators-need-to-know
[2] Reader M (2020). Learning Disabilities What Educators Need to Know. Link: https://www.foothillsacademy.org/community/articles/ld-educators-need-to-know
[3] Reader M (2020). Learning Disabilities What Educators Need to Know. Link: https://www.foothillsacademy.org/community/articles/ld-educators-need-to-know

Common Types of Learning Disabilities

Most learning disabilities fall into three basic categories–dyslexia, dysgraphia, and dyscalculia. Following is a brief definition for each:

- **Dyslexia**: A specific learning deficit that hinders a person's ability to read;
- **Dysgraphia**: Difficulty with writing; and
- **Dyscalculia**: Difficulty with calculations and mathematics (NILD Canada, n.d.).[1]

More information is provided in **Appendix 1** on each of these disabilities and the signs and the condition that they may include.

Conditions Not Considered Learning Disabilities

In the media, ADHD and ASD are frequently grouped together under the term "Learning Disabilities," which is not accurate based on Learning Disabilities Association of Ontario (LDAO). Despite its association with learning challenges, ADHD itself is not classified as a learning disability by the LDAO. The LDAO emphasizes the importance of distinguishing between these conditions, aligning with the Diagnostic and Statistical Manual for Mental Disorders (DSM-5 and previously DSM-IV) published by the American Psychiatric Association. According to the DSM-5, ADHD is not categorized as a learning disorder because it does not specifically impact academic skills such as reading, writing, language learning, or math.[2,3] While both ADHD and ASD can affect learning, they are separate neurodevelopmental disorders with distinct diagnostic criteria. In Canada, ADHD affects approximately 4-6% of adults and 5-7% of children, for a total of around 1.8 million Canadians.[4] Symptoms typically emerge in early childhood or during the early school years and may impact one or two students in every classroom.

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[1] NILD Canada (n.d.). Types of Learning Disabilities. Link: https://nildcanada.org/types-of-learning-disabilities/
[2] Reader M (2020). Learning Disabilities What Educators Need to Know. Link: https://www.foothillsacademy.org/community/articles/ld-educators-need-to-know
[3] Idao (Learning Disabilities Association of Ontario). Attention-deficit hyperactivity disorder (ADHD). Link: https://www.ldao.ca/introduction-to-ldsadhd/what-is-adhd/#:~:text=ADHD%20is%20the%20most%20common,if%20there%20are%20academic%20difficulties
[4] CADDAC (n.d.). About ADHD. Link: https://caddac.ca/about-adhd/

Diagnosing learning disabilities involves a comprehensive process that includes ruling out other conditions such as intellectual disabilities, ADHD, or mental health concerns. Additionally, many persons with learning disabilities may meet diagnostic criteria for other disorders, due to common genetic origins. Common diagnoses alongside learning disabilities include ADHD, depressive disorders, anxiety disorders, language disorders, ASD, developmental coordination disorder (DCD), and behavioral disorders.[1] Thus, conducting a thorough assessment is essential when observing academic difficulties in persons with ADHD or any learning disability.

Criteria for a Diagnosis of Learning Disabilities

A learning disability is diagnosed when specific criteria are met, to the exclusion of other factors that may impair functioning. According to "Guidelines for Diagnosis and Assessment of Children, Adolescents, and Adults with Learning Disabilities" from Ontario Psychological Association (OPA), all of the following criteria must be met to make a diagnosis of learning disability (Ontario Psychological Association, 2018)[2].

A. History of academic functioning below the level typically expected for individuals of the same chronological age, or the need for excessive time or support to develop or maintain typical levels of academic functioning.

B. Below average academic achievement (i.e., at least one standard deviation below the mean) in at least one of:

Reading
- Word identification or pseudo-word reading;
- Fluency in reading individual words or text; and/or
- Timed or untimed literal or inferential reading comprehension.

Writing

[1] Reader M (2020). Learning Disabilities What Educators Need to Know. Link: https://www.foothillsacademy.org/community/articles/ld-educators-need-to-know

[2] Ontario Psychological association (2018). Guidelines for Diagnosis and Assessment of Children, Adolescents, and Adults with Learning Disabilities. Link: https://www.psych.on.ca/getmedia/9710b802-aae3-4b6e-a215-789f2bfe59c5/OPA-Guidelines-for-Diagnosis-and-Assessment-of-Learning-Disabilities-03-2020.pdf

- Production fluency for handwriting or typing;
- Spelling from dictation and in text;
- Sentence structure;
- Conventions of print; and/or
- Vocabulary; ideation; organization of written text.

Mathematics

- Calculation, including but not limited to numeracy, algebra, geometry and calculation fluency;
- Applications such as the understanding of time, money, measurement, data analysis; and/or
- Word problem-solving including geometry and data interpretation.

C. Evidence that the difficulties in reading, writing or mathematics are logically related to deficits in psychological processes. These include:

- phonological processing;
- orthographic processing;
- rapid automatized naming;
- memory;
- processing speed;
- receptive language;
- expressive language;
- visual-spatial abilities;
- visual-motor integration; and
- executive functioning.

D. At least average abilities essential for thinking and reasoning.

E. Evidence that the difficulties in reading, writing, or mathematics cannot be accounted for primarily by factors such as:

- Other conditions or disorders (e.g., intellectual disabilities, uncorrected visual or auditory acuity, physical or chronic health disabilities, other neurodevelopmental disorders, or internalizing or externalizing disorders);
- Environmental factors (e.g., psychosocial adversity, inadequate or inappropriate educational instruction);
- Insufficient motivation or effort; and
- Cultural or linguistic diversity.

As noted, learning disabilities may co-occur with various other conditions or disorders. Additionally, one must be mindful of the inherent variability in assessing and diagnosing a learning disability due to advances in research, new diagnostic criteria for Learning Disorders in the Fifth Edition of the Diagnostic and Statistical Manual (DSM-5) of the

American Psychiatric Association (2013), and the definition adopted by the LDAC in 2002 and ratified in 2015.

Steps for Assessment and Diagnosis of Learning Disabilities

Below we provide an overview of the typical steps involved in diagnosing learning disabilities, as outlined in the "Guidelines for Diagnosis and Assessment of Children, Adolescents, and Adults with Learning Disabilities" (Ontario Psychological Association, 2018):[1]

1. Identification of Academic Impairment: Determine if there is a history of academic functioning below age expectations or if excessive time/support is needed for typical academic functioning.

2. Identification of Risk Factors: Explore developmental, health, educational, or contextual factors that may pose risks for learning disabilities and other learning difficulties.

3. Academic Achievement Assessment: Utilize individual standardized achievement tests to assess academic performance in areas like reading, writing, and mathematics.

4. Assessment of Cognitive Processes: Evaluate basic psychological and cognitive processes relevant to the specific difficulties in reading, writing, or mathematics experienced by the individual.

5. Assessment of Thinking and Reasoning Abilities: Evaluate general thinking and reasoning abilities to ensure they are at least average.

6. Rule Out Other Factors: Assess and rule out other factors that could explain the observed pattern of results, including factors like effort, motivation, and compliance with instructions.

7. Evaluation of Social, Emotional, and Behavioral Aspects: Assess social, emotional, and behavioral strengths and difficulties commonly associated with persons with learning disabilities.

[1] Ontario Psychological association (2018). Guidelines for Diagnosis and Assessment of Children, Adolescents, and Adults with Learning Disabilities. Link: https://www.psych.on.ca/getmedia/9710b802-aae3-4b6e-a215-789f2bfe59c5/OPA-Guidelines-for-Diagnosis-and-Assessment-of-Learning-Disabilities-03-2020.pdf

8. Formulation and Diagnostic Statement: Develop a formulation and diagnostic statement based on the established criteria for a diagnosis of learning disabilities.

9 Identification of Supports and Interventions: Identify evidence-based and realistic supports and interventions that are required to address the identified learning difficulties.

10. Communication of Results and Recommendations: Communicate the results of the assessment, the diagnosis of learning disabilities, and the recommended supports and interventions to relevant stakeholders.

In a work context, having a better understanding of the needs of persons learning disability is helpful for both the individual and the workplace. It increases awareness and helps the worker advocate for appropriate supports and accommodations.

Benefit of Identification of Learning Disabilities

It is generally accepted that early intervention is a sensible approach for children with learning disabilities, as it is with any special needs. Identifying difficulties early in childhood and using evidence-based approaches to address those difficulties can deliver significant social and economic benefits. This is particularly true for problems likely to escalate over time, limit the life chances of the individual, and result in significant costs to society. The rationale for evidence-based early intervention (both early in life and early in the onset of problems) is now widely accepted as part of public policy across health, education, and social care.[1]

Amongst children, early diagnosing of learning disabilities is crucial as it allows for the provision of interventions to support them before they are negatively impacted throughout their academic years and into their working life.[2] While statistics reveal there

[1] Cooper V, Emerson E, Glover G, Gore NJ, Hassiotis A, Hastings R, Knapp MR, McGill P, Oliver C, Pinney A, Richards C. Early intervention for children with learning disabilities whose behaviour challenges. Briefing Paper. Challenging Behaviour Foundation. 2014.
[2]Melbourne Child Psychology & School Psychology Service (n.d.) Why is Early Intervention for Learning Difficulties so Critical? Link: https://melbournechildpsychology.com.au/blog/importance-of-early-intervention-for-learning-difficulties/

is almost a 10% difference in incidence rates between school-aged children and youth and youth/adults aged 15 years and older, this is connected to the early identification of learning disabilities.[1]

Learning disabilities can be identified as early as late kindergarten or grade 1. Yet, as seen int in the data, the identification rates for children and youth under 15 are much lower than for individuals aged 15 and over. So, while the exact incidence rate of learning disabilities in Canada may be difficult to determine, the data tells us that there are significant issues with the early identification of learning disabilities. As noted, early identification is optimal to minimize the negative impacts of learning disabilities. Thousands of Canadian children and youth wait years to receive needed support. Missing out on early identification negatively impacts a person's self-confidence and academic and life trajectories. Early evidenced-based interventions significantly reduce these impacts.[2,3]

Findings from a longitudinal study in the US provide comprehensive insights into the educational and employment outcomes of youth with disabilities, including those with learning disabilities, over several years post-high school. The findings underscore the critical role that early diagnosis and intervention play in shaping positive trajectories for these individuals. By tracking a large, nationally representative sample, the study demonstrates that early identification and targeted support significantly enhance the likelihood of successful transitions into post-secondary education and employment. Specifically, students who received early intervention services were more likely to pursue higher education, gain competitive employment, and achieve greater independence compared to their peers who did not receive such support. These outcomes highlight the necessity of implementing early and consistent support

[1] LDS (n.d.). How Common are Learning Disabilities? Link: https://ldsociety.ca/how-common-are-learning-disabilities/
[2] LDS (n.d.). How Common are Learning Disabilities? Link: https://ldsociety.ca/how-common-are-learning-disabilities/
[3] Cooper V, Emerson E, Glover G, Gore NJ, Hassiotis A, Hastings R, Knapp MR, McGill P, Oliver C, Pinney A, Richards C. Early intervention for children with learning disabilities whose behaviour challenges. Briefing Paper. Challenging Behaviour Foundation. 2014.

mechanisms to improve long-term prospects for persons with learning disabilities.[1]

Similarly, a comprehensive US report provides a detailed analysis of the educational and employment outcomes for persons with learning disabilities, emphasizing the importance of early intervention.[2] The report illustrates how early diagnosis, and targeted educational strategies can significantly improve academic performance and future employment prospects. It presents data showing that students with learning disabilities who receive early and appropriate interventions are more likely to graduate from high school, pursue post-secondary education, and secure meaningful employment. The report also discusses the economic benefits of early intervention, noting that persons with learning disabilities who are supported early on are less likely to require long-term social services and are more likely to contribute positively to the economy. These findings advocate for the implementation of early screening and intervention programs as part of public policy to enhance the educational and employment outcomes for persons with learning disabilities.

The distinction between diagnosed and suspected learning disabilities is important because many learners remain in the suspected rather than diagnosed category due to a lack of funding for students with learning disabilities in Canada's public and independent schooling systems. Many students who have suspected learning disabilities wait years to receive a psychoeducational assessment that confirms a diagnosis. These assessments are administered by a psychologist and cost between $2,000-$3,500 (CAD). The cost of these necessary assessments poses significant barriers to individuals and families attempting to access these assessments both within

[1] Newman L, Wagner M, Cameto R, Knokey AM, Shaver D. Comparisons across Time of the Outcomes of Youth with Disabilities up to 4 Years after High School. A Report of Findings from the National Longitudinal Transition Study (NLTS) and the National Longitudinal Transition Study-2 (NLTS2). NCSER 2010-3008. National Center for Special Education Research. 2010 Sep. https://files.eric.ed.gov/fulltext/ED512149.pdf

[2] Cortiella C, Horowitz SH. The state of learning disabilities: Facts, trends and emerging issues. New York: National center for learning disabilities. 2014 Aug 13;25(3):2-45. https://www.myschoolpsychology.com/wp-content/uploads/2014/02/2014-State-of-LD.pdf

and outside the school system.[1, 2]

Amongst adults, there can be advantages to identification and accommodation for both the worker and employer. Many employers are willing to accommodate in a supportive yet confidential and professional manner. Consequently, it is strongly recommended that post secondary students disclose their need for support as they transition into the labour market. Needless to say, there are many excellent support programs for student with learning disabilities in community colleges and universities.[3]

[1] LDS (n.d). How Common are Learning Disabilities? Link: https://ldsociety.ca/how-common-are-learning-disabilities/
[2] Cooper V, Emerson E, Glover G, Gore NJ, Hassiotis A, Hastings R, Knapp MR, McGill P, Oliver C, Pinney A, Richards C. Early intervention for children with learning disabilities whose behaviour challenges. Briefing Paper. Challenging Behaviour Foundation. 2014.
[3] LDAC (n.d.). Adult and assessment process. Link: https://www.ldac-acta.ca/causes/for-adults/#1513271506777-b40f212d-648a

Supporting Persons with Learning Disabilities in the Labour Market

Employment is vita to income security, purpose, and social inclusion for many working age adults, including persons with learning disabilities. Despite ongoing efforts to facilitate the transition of students in the world of work, including those with learning disabilities, there remain persistent knowledge gaps regarding how best to address the challenges persons with disabilities face in employment.[1,2,3]

Employers face many decisions when hiring persons with learning disabilities, including supervisor/manager skill requirements, turnover rates, costs of workplace adjustments, process flexibility, staff and customer reactions, legal requirements, and corporate social responsibility. Myths about the employment abilities of persons with learning disabilities further complicate these decisions. Employers need a business case for hiring persons with learning disabilities—anti-discrimination legislation alone is not enough. Legislation and funded supports help level the playing field, but employers need to select workers for job roles based on merit, not charity, so need to see the value in hiring persons with learning disabilities. [4,5]

Evidence on the costs and benefits of employing persons with disabilities is often qualitative and lacks concrete monetary estimates, though various benefits have been

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[1] Southward JD, Davis MT. Summary of performance: Bridging the transition from high school to post-secondary education for students with SLD. Preventing School Failure: Alternative Education for Children and Youth. 2020 Aug 3;64(4):316-25.
[2] Tompa E, Imam S, Varickanickal J, Mofidi A, Gewurtz R, Irvin E, Southey B. 2022. Addressing Knowledge Gaps about Skills of Persons with Disabilities: A Literature Review and Key Informant Interviews. Report prepared for the Office of Skills for Success, Employment and Social Development Canada. 106 pp
[3] Tompa E, Buettgen A, Padkapayeva K, Yazdani A, Dufour J, Mahood Q. Feasibility study and needs assessment for a Canadian searchable online resource for workplace accommodation for persons with disabilities.
[4] Mencap (2019). Factsheet 1: Learning disability and employment. lInk: https://www.mencap.org.uk/sites/default/files/2019-11/2019.097%20LDWW2019_Factsheets_v2.pdf
[5] Mencap (2017). Good for business. The benefits of employing people with a learning disability. Link: https://www.base-uk.org/sites/default/files/knowledgebase/Business%20case%20for%20employing%20people%20with%20a%20learning%20disability.pdf

identified. These include access to a larger pool of recruits, lower absenteeism, better punctuality, improved loyalty, and savings on recruitment and training costs. Additionally, workers with disabilities are reliable, reduce worker's compensation costs, improve access for customers with disabilities, enhance staff relations and productivity, make businesses more representative of the community, and fostering a fair and inclusive public image.[1]

In this section we synthesize knowledge drawn from peer-reviewed and grey literatures to provide guidance on supporting persons with learning disabilities in preparing for, securing, and maintaining employment. While focusing on best practices for employment, we emphasize the importance of a life course perspective, which includes skills training and education. Consequently, we discuss practices applicable in training settings and the transition from school to work. Accommodating persons with learning disabilities should begin early in life to ensure a smoother transition.

In what follows, we provide a list of Canadian and international best practices for supporting persons with learning disabilities in the labour market, organized under the following headings:

- Learning, training and skills development;
- Performance measurement and skills assessment; and
- Promotion and career advancement.

The foundations of this chapter are built on the structure outlined in three documents related to best practices for supporting persons with learning disabilities in the labour market. [2,3,1]

[1] Beyer S, Beyer A. A systematic review of the literature on the benefits for employers of employ-ing people with learning disabilities. Mecap, 2017. Available at: https://www.mencap.org.uk/sites/default/files/2017-06/2017.061%20Benefits%20of%20employing%20PWLD%255b1%255d%20(1).pdf
[2] U.S. Department of Labor (2009). Learning Disabled in Employment and Training Programs. Link: https://www.dol.gov/sites/dolgov/files/ETA/publications/91-learning.pdf
[3] Beyer et al., (2004). LABOr Project: Reflections on Good Practice in Vocational Training and Employment

Learning, Training and Skills Development

Persons with learning disabilities often require special training to develop their abilities in work settings and improve their career opportunities.[2,3,4,5] According to the National Center for Learning Disabilities (NCLD), there are five common reasons persons with learning disabilities experience challenges at work:[6,7]

- Efficiency: Slow pace of work, difficulties with organization;
- Accuracy: High error rate associated with reading tasks and/or written correspondence;
- Sequencing of Tasks: Problems following instructions or completing projects with multiple steps;
- Time Management: Trouble with planning, being on time or meeting deadlines; and
- Social Skills: Problems with meeting new people, with professional interactions and with discussing the impact of learning disabilities on tasks to be completed.

Different methods are used to address and tackle the specific challenges that persons with learning disabilities might face in their training and employment. These include compensatory strategies, which help individuals learn and apply adaptive techniques to

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for People with Learning Disabilities. Link: https://www.choiceforum.org/docs/LABOrGoodPracticeGuide.pdf

[1] U.K. Department of Health (2001). Valuing people: a new strategy for learning disability for the 21st century: a white paper. Link: https://assets.publishing.service.gov.uk/media/5a7b854740f0b62826a041b9/5086.pdf

[2] Romualdez AM, Yirrell K, Remington A. Exploring participants' views on a supported work internship program for autistic and learning-disabled young people. International Journal of Disability Management. 2020 Jan;15:e3.

[3] Kaya C, Hanley-Maxwell C, Chan F, Tansey T. Differential vocational rehabilitation service patterns and outcomes for transition-age youth with autism. Journal of Applied Research in Intellectual Disabilities. 2018 Sep;31(5):862-72.

[4] Tuffrey-Wijne I, Lam CK, Marsden D, Conway B, Harris C, Jeffrey D, Jordan L, Keagan-Bull R, McDermott M, Newton D, Stapelberg D. Developing a training course to teach research skills to people with learning disabilities. "It gives us a voice. We CAN be researchers!". British Journal of Learning Disabilities. 2020 Dec;48(4):301-14.

[5] Ugalde L, Santiago-Garabieta M, Villarejo-Carballido B, Puigvert L. Impact of interactive learning environments on learning and cognitive development of children with special educational needs: A literature review. Frontiers in psychology. 2021 Apr 29;12:674033.

[6] Marianne Mooney and Heidi Silver-Pacuilla (2010). Literacy, Employment and Youth with Learning Disabilities. Aligning Workforce Development Policies and Programs. National Institute for Literacy. Link: https://lincs.ed.gov/publications/pdf/LiteracyEmployment2010.pdf

[7] https://www.ldao.ca/introduction-to-ldsadhd/articles/about-lds/possibilities-and-pitfalls-employment-and-learning-disabilities/

navigate their disabilities effectively. Ideally, if remedial education and occupational training are successful, persons with learning disabilities can be productively employed if they are able to compensate for their disability in their daily work situation.

In the following sections, we delve into various facilitators aimed at equipping persons with learning disabilities with the necessary tools for success, both in academics and professional life.

Basic Skills Remediation

The basic skills deficiencies of persons with learning disabilities, such as reading, writing and math, can be addressed in several ways. Persons with mild learning disabilities can often benefit from direct teaching using standard classroom approaches, similar to persons without learning disabilities. However, if the disability is severe, the instructional approaches should be modified. Specific techniques include, but are not limited to:

- Understanding a person's learning style;
- Combining basic skills instruction with functional applications; and
- Modifying teaching methods to accommodate the specific disability.[1,2,3]

Understanding a persons' learning style

There are many different types of learning styles. Some people may have multiple types, while others can be clearly classified as just one type.[4] Accommodation for persons with learning disabilities typically requires assessing their learning style, identifying strengths and weaknesses, and employing specific instructional approaches

[1] U.S. Department of Labor (2009). Learning Disabled in Employment and Training Programs. Link: https://www.dol.gov/sites/dolgov/files/ETA/publications/91-learning.pdf
[2] Learning disabilities association of America (n.d.). Successful Strategies for Teaching Students with Learning Disabilities. https://ldaamerica.org/info/successful-strategies-for-teaching-students-with-learning-disabilities/
[3] Wissell S, Karimi L, Serry T, Furlong L, Hudson J. Leading Diverse Workforces: Perspectives from Managers and Employers about Dyslexic Employees in Australian Workplaces. International Journal of Environmental Research and Public Health. 2022 Sep 22;19(19):11991.
[4] Flowers Health Institute (n.d.). Types of Learning Disabilities and Learning Differences Link: https://jflowershealth.com/learning-disabilities-and-learning-differences/

tailored to their unique needs. Without incorporating special instructional techniques, there is a high likelihood that persons with learning disabilities will become frustrated, fail or drop out of traditional classroom programs.

Learning styles can be broadly categorized into visual, auditory, kinesthetic, and tactile. Each style is distinct in how individuals prefer to absorb information. Once an individual's strongest mode of learning has been identified, then certain teaching approaches can be implemented.[1,2,3,4] Key learning styles include:

- Visual: The visual learner is comfortable with books and graphs.
- Auditory: The auditory learner tends to be a talker. Memorizes easily but performs poorly on group tests and tends to have a poor perception of time and space.
- Kinesthetic: The kinesthetic learner learns best by moving and touching. Numbering lines for illustrating arithmetical differences and outlines before writing can often help these learners.
- Tactile: The tactile learner has trouble with one-to-one correspondence, rote computing, and sequencing at any level. This learner needs concrete objects for learning and has difficulty learning abstract symbols. Diagrams and other illustrations can help establish associations with numbers and symbols.

Multi-sensory approach

Most instruction for students with learning disabilities uses a multi-sensory approach adapted to an individual's learning style. This approach involves engaging multiple senses—sight, sound, touch, and sometimes even taste and smell—to enhance learning and retention. Recognizing that persons with learning disabilities may require diverse sensory inputs to process information effectively, the multi-sensory approach

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[1] U.S. Department of Labor (2009). Learning Disabled in Employment and Training Programs. Link: https://www.dol.gov/sites/dolgov/files/ETA/publications/91-learning.pdf
[2] Flowers Health Institute (n.d.). Types of Learning Disabilities and Learning Differences Link: https://jflowershealth.com/learning-disabilities-and-learning-differences/
[3] Handler SM, Fierson WM, Section on Ophthalmology and Council on Children with Disabilities, American Academy of Ophthalmology, American Association for Pediatric Ophthalmology and Strabismus, and American Association of Certified Orthoptists. Learning disabilities, dyslexia, and vision. Pediatrics. 2011 Mar 1;127(3): e818-56.
[4] Berninger VW, O'Malley May M. Evidence-based diagnosis and treatment for specific learning disabilities involving impairments in written and/or oral language. Journal of Learning Disabilities. 2011 Mar;44(2):167-83.

integrates various modalities such as visual, auditory, kinesthetic, and tactile methods to enhance comprehension and learning.[1]

Multi-sensory approaches are also often used by occupational therapists working with clients with a severe or profound and multiple learning disabilities. A recent systematic literature review conducted by Humpheson (2024) delves into the outcomes of sensory approaches for adults facing severe or profound multiple learning disabilities.[2] This comprehensive study, encompassing peer-reviewed research articles from January 1990 to April 2021, provides compelling evidence supporting the use of sensory approaches for persons with learning disabilities, underscoring their potential for enhancing outcomes within this client group. Despite acknowledged limitations, the evidence consistently indicates that sensory approaches contribute to improved participation, communication, and attention amongst persons with learning disabilities, while also effectively reducing challenging behaviors. The findings from this review underscore the positive impact of sensory approaches for adults, showcasing significant reductions in challenging behaviors and stress, coupled with enhancements in engagement, attention, and communication.

Combining basic skills instruction with functional applications

Basic skills can also be taught to persons with learning disabilities in “functional” settings. This functional approach to basic skills instruction may be particularly relevant for persons with learning disabilities who also have employment difficulties. For example, basic reading, writing and math instruction could include practice in filling out forms, learning how to not only read but follow written directions, interpret transportation schedules and comprehend bank statements. It also suggests techniques that could be incorporated into pre-employment or job search training components.[3,1,2]

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[1] Humpheson J. Sensory approaches for adults with severe or profound and multiple learning disabilities: A systematic literature review. British Journal of Occupational Therapy. 2024 Jan.
[2] Humpheson J. Sensory approaches for adults with severe or profound and multiple learning disabilities: A systematic literature review. British Journal of Occupational Therapy. 2024 Jan.
[3] U.S. Department of Labor (2009). Learning Disabled in Employment and Training Programs. Link: https://www.dol.gov/sites/dolgov/files/ETA/publications/91-learning.pdf

Modifying instruction methods to accommodate the leaning disabilities

Instructors working with persons with learning disabilities should develop alternative strategies and techniques that help such persons respond to, or overcome, their limitations. In addition, students themselves can learn these techniques and adopt them as part of their own compensatory strategies for learning and for performing on the job. Numerous publications offer valuable insights into effective approaches for students with learning disabilities to overcome their academic difficulties. Some of these approaches may be adapted for workplace settings relatively easily. Examples of some of the more common instructional guidelines include:

- Breaking down projects, procedures, and concepts into their smallest components;
- Providing many opportunities for repetition, reviewing and overlearning;
- Allowing extra time for testing; and
- Making sure the person has acquired one skill before presenting the next skill in the sequence of learning tasks.[3,4]

Education Plans for Youth with Disabilities

Embracing a life course perspective, from early diagnosis to supportive employment, is essential. Early accommodation of persons with learning disabilities ensures smoother transitions. Many articles highlight the importance of adapting teaching methods and creating employment pathways for these individuals. We view the "education plan" as a key component of special educational needs systems. The importance of such a plan in facilitating the transition from education to work cannot be overstated. A well-structured

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[1] Gouvernement du Québec (2005). A Practical Guide for Teaching Adults with Learning Difficulties. Ministère de l'Éducation. Link: https://www.education.gouv.qc.ca/fileadmin/site_web/documents/temp/DFGA/Alphabetisation/41-3018a.pdf

[2] Gouvernement du Québec (1998). A guide to customized literacy training. Third edition. Link: https://www.education.gouv.qc.ca/fileadmin/site_web/documents/temp/DFGA/Alphabetisation/38-2943-02A.pdf

[3] U.S. Department of Labor (2009). Learning Disabled in Employment and Training Programs. Link: https://www.dol.gov/sites/dolgov/files/ETA/publications/91-learning.pdf

[4] Learning disabilities association of America (n.d.). Successful Strategies for Teaching Students with Learning Disabilities. https://ldaamerica.org/info/successful-strategies-for-teaching-students-with-learning-disabilities/

education plan ensures that students with learning disabilities receive tailored support and resources throughout their academic journey, helping them develop essential skills and knowledge.[1] Below, we provide some examples of these plans. In Canada, the adaptation of teaching methods to accommodate persons with learning disabilities is encompassed within the broader framework of the Individual Education Plan (IEP). Similarly, in the United States, the Summary of Performance (SOP) serves as another example of planning within the educational system.

Individual Education Plan in Canada

In Canada, the adaptation of teaching methods to accommodate persons with learning disabilities in the educational system falls under the broader umbrella of the Individual Education Plan (IEP). IEP is carefully crafted to meet the unique learning needs of students with disabilities within the educational system.

IEP goes by different names in various provinces and territories, such as Special Education Plan (SEP), Individualized Program Plan (IPP), Student Support Plan (SSP), and Individual Support Services Plan (ISSP). Recognized as a legal working document by the Human Rights Commission, the IEP (or its equivalent term in different provinces) serves as a comprehensive guide for educators, parents, and, where applicable, students themselves.[2] **Table 4** provides direct links to the IEP or its equivalents across Canada.

[1] Hunter J, Runswick-Cole K, Goodley D, Lawthom R. Plans that work improving employment outcomes for young people with learning disabilities. British Journal of Special Education. 2020 Jun;47(2):134-51.
[2] https://dystoniacanada.org/individual-education-plan-iep-1#:~:text=Individual%20Education%20Plan%20(IEP)%2C,province%20names%20vary)%20as%20a

Table 4. The Individual Education Plan across Canada

Province/ Territory	Education Plan	Website
Alberta	IPP & ISP	https://education.alberta.ca/instructional-supports/individualized-program-plan-ipp/everyone/ippisp-overview/
British Columbia	IEP	http://www.inclusionbc.org/parent-s-handbook-inclusive-education/planning-your-child-s-education/individual-education-plans-i-3
Manitoba	IEP	https://www.edu.gov.mb.ca/k12/specedu/iep/
New Brunswick	IEP	https://www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/Resource/GuidelinesStandardsEducationalPlanningStudentsWithExceptionalities.pdf
Newfoundland	IEP	https://www.ed.gov.nl.ca/edu/forms/studentsupport/sdmodel.html
Northwest Territories	IEP	http://cacl.ca/wp-content/uploads/sites/3/2013/07/NWT-Guidelines.pdf
Nova Scotia	IPP	https://www.ednet.ns.ca/docs/individualprogramplanreview.pdf
Nunavut	IEP	http://www.assembly.nu.ca/sites/default/files/TD%20137-4(3)%20EN%20Reaching%20and%20Teaching%20All%20Students-A%20Model%20to%20Guide%20the%20Practice%20of%20Inclusive%20Education%20in%20Nunavut.%20Final%20Report%20of%20the%20External%20Review%20of%20Inclusive%20Education.pdf
Ontario	IEP	http://www.edu.gov.on.ca/eng/general/elemsec/speced/individu.html
Prince Edward Island	IEP	https://www.princeedwardisland.ca/en/information/education-early-learning-and-culture/special-educational-needs
Quebec	IEP	http://www.education.gouv.qc.ca/fileadmin/site_web/documents/dpse/adaptation_serv_compl/GuideUtili_CanevasPlanInterv_a_1.pdf
Saskatchewan	IIP	https://www.saskatchewan.ca/residents/education-and-learning/prek-12-education-early-learning-and-schools/supporting-students-with-additional-needs
Yukon	IEP	http://www.education.gov.yk.ca/support.html

Summary of Performance Tool used in United States

In the United States, the Summary of Performance (SOP) serves as a critical tool in the transition process for students with disabilities, particularly those grappling with specific learning disabilities. As these students approach the culmination of their high school years, the SOP emerges as a pivotal mandate under the Individuals with Disabilities

Education Improvement Act of 2004. Designed to provide a comprehensive overview of a student's educational achievements, functional capabilities, and recommendations for their post-secondary endeavors, the SOP holds immense significance. Yet, despite its intended purpose, the SOP landscape is marked by notable variations across states, leading to potential gaps in support for transitioning students.[1]

Despite the pivotal role instructors play in assisting persons with learning disabilities through development of alternative strategies and provision of support, there is a notable scarcity of published literature regarding their current level of competency. One study, conducted in the United States and focused on language teachers in English as a Foreign Language (EFL) settings, sought to address this gap. The study's objectives were threefold: firstly, to ascertain whether the EFL instructors involved in the study had received training in identifying and accommodating students with learning disabilities; secondly, to delineate the specific types of training received by instructors who had undergone such training; and finally, to gauge the effectiveness of the training in enhancing these instructors' competence in supporting students with learning disabilities. Data for the study were collected through a comprehensive survey administered to both current and former EFL instructors. The findings underscored a prevalent lack of training amongst the surveyed instructors for accommodating learning disabilities, with a majority expressing a lack of confidence in assisting students with such disabilities. The study's recommendations emphasize the imperative of raising awareness amongst administrators and educators in EFL contexts about the identification and accommodation of learning disabilities. The study provides suggestions on how EFL instructors can independently enhance their understanding of learning disabilities.[2]

Supporting Social and Communication Skill Development

[1] Southward JD, Davis MT. Summary of performance: Bridging the transition from high school to post-secondary education for students with SLD. Preventing School Failure: Alternative Education for Children and Youth. 2020 Aug 3;64(4):316-25.
[2] Sowell J, Sugisaki L. An exploration of EFL teachers' experience with learning disability training. Latin American Journal of Content & Language Integrated Learning. 2020 Aug 28;13(1).

Persons with learning disabilities often struggle with social and communication skills regardless of whether their disability directly impacts those areas.[1,2] A survey of employers conducted by the Ontario Ministry of Labour revealed that they cite 'lack of social skills' as the main reason for termination of employment.[3] This finding highlights how social skills deficits can be a serious impediment to employment for persons with learning disabilities. Lack of social and communication skill can be attributed to increased social anxiety and other psychological co-morbidity related to the stigmatization or past exclusion of these individuals (Diaz-Garolera, 2019).[4]

Persons with learning disabilities may be less observant in their social environment, may misinterpret the social behavior of others at times, and may not learn as easily from experiences or social “cues” as their friends. Some children may exhibit an immaturity and social ineptness due to their learning disability. While seeking acceptance, their eagerness may cause them to try too hard in inappropriate ways. According to the Learning Disabilities Association of America, following are some commonly observed behavioral characteristics in persons with learning disabilities:[5]

- Inability to interpret environment and social cues;
- Poor judgment and little thought about logical consequences;
- Poor impulse control;
- Need for immediate gratification;
- Inability to set realistic priorities and goals;
- Inappropriate conclusions due to deficient reasoning ability;

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[1] Romualdez AM, Yirrell K, Remington A. Exploring participants’ views on a supported work internship program for autistic and learning-disabled young people. International Journal of Disability Management. 2020 Jan;15: e3.

[2] Mencap (2008). Your guide to Communicating with people with profound and multiple learning disabilities (PMLD). Link: https://www.jpaget.nhs.uk/media/186401/Communicating_with_people_with_PMLD__a_guide__1_.pdf

[3] IDAO (n.d.). Possibilities and Pitfalls: Employment and Learning Disabilities. Link: https://www.ldao.ca/introduction-to-ldsadhd/articles/about-lds/possibilities-and-pitfalls-employment-and-learning-disabilities/#:~:text=A%20survey%20of%20employers%20conducted,who%20have%20this%20particular%20deficit.

[4] Diaz-Garolera G, Pallisera M, Fullana J. 2019. Developing Social Skills to Empower Friendships: Design and Assessment of a Social Skills Training Programme, International Journal of Inclusive Education. DOI: https://10.1080/13603116.2019.1625564

[5] Learning disabilities association of America (n.d.). Social Skills and Learning Disabilities. Link: https://ldaamerica.org/info/social-skills-and-learning-disabilities/

- Illogical reasons for actions;
- Inability to develop meaningful relationships with others;
- Immature and “bossy” behavior; and
- Low frustration tolerance resulting in disruptive behavior.

Direct instruction in social skills training is highly recommended to help persons with learning disabilities cope with their lack of social perception.

The Mencap (n.d.) guide on communicating with persons with learning disabilities serves as an introduction to understanding how such persons communicate. The guide offers practical examples of effective communication strategies, empowering someone to improve their interactions when engaging with this community. The following are key strategies outlined in the guide:[1,2]

- In person: Many persons with a learning disability prefer face to face and one to one communication;
- In writing: Use bigger text and bullet points and keep writing at a minimum. Too much colour can make reading harder for someone as well; and
- On the phone: Speak slowly and clearly, using easy to understand words.

Following are some additional tips that can be useful:

- Find a good place for the communications, somewhere without distraction;
- If talking to a large group, be aware that some people may find this difficult;
- Ask open ended questions, questions that do not have a simple yes or no answer;
- Check with the person to ensure a clear understand of what they are saying e.g., "the TV is not working? Is that right?";
- If the person wants to take someone to show them something, go with them;
- Watch the person, they may tell someone things by their body language and facial expressions;
- Learn from experience, one will need to be more observant and not feel awkward about asking parents or carers for their help;

[1] Mencap (n.d.) Communicating with people with a learning disability. Link: https://www.mencap.org.uk/learning-disability-explained/communicating-people-learning-disability
[2] Mencap (2008). Your guide to Communicating with people with profound and multiple learning disabilities (PMLD). Link: https://www.jpaget.nhs.uk/media/186401/Communicating_with_people_with_PMLD__a_guide__1_.pdf

- Try drawing, even if the drawing is not great, it might still be helpful;
- Take time, do not rush communication;
- Use gestures and facial expressions, e.g., if one is asking if someone is happy or unhappy, make your facial expression unhappy to reinforce what one is saying;
- Be aware that some people find it easier to use real objects to communicate, but photos and pictures can be help too; and
- Remember, all communication is meaningful, but one may need to work harder to understand.[1]

In relation to communications, it is important to understand and respect the preferences the person.

The findings of a study commissioned by Health Education England undertaken in Kent, Surrey, and Sussex sought to underscore the significance of a positive attitude and skilled support in promoting independence and amplifying voices. Notably, this evaluation, with its larger sample size, adds depth to previous research, revealing significant differences in perspectives across age groups. These results have important implications for staff recruitment, service matching, and training.[2]

The tips mentioned above align closely with studies on the key employability skills for disabled youth and young adults, including those with intellectual and developmental disabilities. While these are distinct target groups, the limited literature on learning disabilities requires drawing on related knowledge from other related areas that could be transferrable. On this note, we draw on a study from Singaporean, where professionals are charged with developing and delivering job training services to improve employment prospects for persons with intellectual and developmental disabilities as they enter the workforce. The results of interviews undertaken in the study indicate that soft skills such as attitude, dependability, stamina, flexibility, and communication hold greater value. These findings emphasize the necessity of incorporating training in these skill domains when preparing youth and young adults with

[1] Mencap (n.d.) Communicating with people with a learning disability. Link: https://www.mencap.org.uk/learning-disability-explained/communicating-people-learning-disability
[2] Davies J, Matuska G. Workforce development: perspectives from people with learning disabilities. Tizard Learning Disability Review. 2018 Dec 12;23(4):165-72.

intellectual and developmental disabilities to successfully obtain and maintain employment.[1]

Employer Training for Supporting Persons with Learning Disabilities

Much of the literature has focused on supply-side employment approaches, operating under the assumption that improvements in general and specific employability skills will enhance employment outcomes for persons with disabilities. While the literature suggests that persons with learning disabilities often benefit from specialized training to refine their skills and foster career growth, the issue of employment for this demographic extends beyond mere training deficiencies. Supply-side approaches cannot be overlooked. Critical factors such as organizational norms and culture, employer needs, and the dynamic nature of the labour market need to be considered.[2]

Employer training and awareness play pivotal roles in supporting persons with learning and other disabilities in the workplace.[3,4] A study in the United States emphasized the need for increased employer training to enhance understanding of disabilities and accommodation issues. The study surveyed human resource professionals and supervisors from organizations with a reputation for not fully complying with the Americans with Disabilities Act. It sought to identify the challenges these organizations experienced with employing workers with disabilities and to formulate strategies and policy changes for improvement. Respondents cited lack of awareness, cost concerns, and fear of legal liability as primary issues.[5]

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[1] Scheef AR, Walker ZM, Barrio BL. Salient employability skills for youth with intellectual and developmental disabilities in Singapore: the perspectives of job developers. International Journal of Developmental Disabilities. 2019 Jan 1;65(1):1-9.
[2] Chen X, Wu JR, Grenawalt TA, Mpofu N, Chan F, Tansey TN. Employer practices for customized training for onboarding of people with disabilities. Rehabilitation Research, Policy, and Education. 2023 Mar 9;37(1):10-22.
[3] Houtenville A, Kalargyrou V. (2012). People with disabilities: Employers' perspectives on recruitment practices, strategies, and challenges in leisure and hospitality. Cornell Hospitality Quarterly. Feb;53(1):40-52.
[4] Kaye HS, Jans LH, Jones EC. (2011) Why don't employers hire and retain workers with disabilities? Journal of Occupational Rehabilitation 21, 526-536.
[5] Kaye HS, Jans LH, Jones EC. Why don't employers hire and retain workers with disabilities? Journal of occupational rehabilitation. 2011 Dec; 21:526-36.

Another study in the US delved into the adoption of quality job indicators and employer training aimed at improving their ability to assist students with learning challenges in securing and maintaining employment. The quality indicators implemented include requiring the student to be on time, providing on-the-job training and retraining, problem solving assistance, one-on-one supervision, providing verbal and written communication, allowing flexible scheduling, frequent breaks as needed and positive reinforcement in the form of verbal praise. Through collaboration with a university, state workforce commission, school district, and employers, the study sought to facilitate the integrating these essential indicators via training of employers. Analysis of qualitative data derived from employer surveys and interviews demonstrated a significant majority of employers successfully incorporating these quality job indicators, notably concerning time management, on-the-job training, problem-solving, and communication. Employers acknowledged the efficacy of the training in fostering positive support for individuals facing learning challenges in workplace settings, underscoring the need for ongoing training and support mechanisms in work environments.[1]

Technology Innovations for Learning Disabilities Support

In the dynamic field of technology, it is noteworthy how new hardware and software are constantly emerging. These advancements offer promising avenues to enhance the labour market participation of persons with disabilities.[2]

Assistive technology refers to devices and services that are used to increase, maintain, or improve the capabilities of a persons with a disability. While the phrase assistive technology may make one think of computers and computerized devices, assistive technology can also be very low-tech. For example, pencil-grips (the molded plastic grips that slip over a pencil) are considered an assistive technology. Some assistive technologies that help persons with learning disabilities includes computer programs and tablet applications that provide text-to-speech (e.g., Kurzweil 3000), speech-to-text

[1] Brendle JL, Lock RH, Smith LA. Quality job indicators for individuals with learning disabilities. Journal of Vocational Education & Training. 2019 Apr 3;71(2):201-17.
[2] LD @ School (n.d.). Assistive Technology for Students with Learning Disabilities. Link: https://www.ldatschool.ca/assistive-technology/

(e.g., Dragon Naturally Speaking), word prediction capabilities (e.g., WordQ), and graphic organizers (e.g., Inspiration).[1] **Appendix 3** provides more information on a number of these tools and applications.

Recent research has investigated the effectiveness of brain-rewiring techniques within virtual reality (VR) environments, representing a groundbreaking intervention for persons with learning disabilities and various other disorders (i.e., cognitive impairments, autism, ADHD, depression, etc.). VR-assisted methods such as hypnosis and neurolinguistic programming have shown positive outcomes across conditions, underscoring VR's therapeutic potential.[2]

Another noteworthy example is a recent study exploring the use of video modeling to support students with disabilities in mathematics education. This research focused on teaching geometry word problems to secondary students with learning disabilities in mathematics through video modeling. Using a single-subject multiple baseline design, significant improvements in problem-solving performance were observed for some students.[3]

The convergence of medical science and cutting-edge technologies is profoundly impacting persons with disabilities. Breakthroughs in genetic research are unraveling the intricate neurological and genetic underpinnings of disabilities, leading to more precise and impactful interventions.[4] Innovations like brain-computer interfaces (BCIs) and assistive communication devices are empowering individuals with physical and communicative challenges to engage more seamlessly with their surroundings. Recent strides in assistive technologies tailored for children with learning disabilities show

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[1] LD Online (n.d.). Assistive Technology at Work. Link: https://www.ldonline.org/ld-topics/assistive-technology/assistive-technology-work

[2] Drigas A, Mitsea E, Skianis C. Virtual reality and metacognition training techniques for learning disabilities. Sustainability. 2022 Aug 16;14(16): p.10170.

[3] Satsangi R, Hammer R, Bouck EC. Using video modeling to teach geometry word problems: A strategy for students with learning disabilities. Remedial and Special Education. 2020 Sep;41(5):309-20.

[4] Mascheretti S, De Luca A, Trezzi V, Peruzzo D, Nordio A, Marino C, Arrigoni F. Neurogenetics of developmental dyslexia: from genes to behavior through brain neuroimaging and cognitive and sensorial mechanisms. Translational psychiatry. 2017 Jan;7(1): pp. e987-e987.

immense promise, particularly in augmenting communication and learning.[1] These advancements not only elevate the quality of life for these individuals but also foster more inclusive and accessible societies.

Performance Measurement and skills Assessment

Unrealistic workplace expectations such as unreasonable deadlines, high performance pressure, and lack of clear instructions can significantly impact persons with learning disabilities, exacerbating stress, diminishing confidence, and raising the likelihood of burnout. A recent study on dyslexic adults' employment experiences sheds light on enduring challenges, such as exhaustion, burnout, and reluctance to disclose one's condition.[2] By establishing reasonable expectations, employers can create an environment that support the full participation of workers with learning disabilities and increases the likelihood of career success.

Despite growing acknowledgment of the importance of appropriately contextualized performance measurement and skills assessment, the literature on this topic for this demographic remains limited, indicating a crucial gap in both peer-reviewed and grey literatures.

A key starting point is defining the essential functions of a job. Essential functions are the specific duties necessary to do a particular job. Defining essential functions calls for analyzing the purpose or goal of the job rather than simply listing the tasks the job has usually entailed. This means looking at what is meant to be accomplish, not the way it is done. Following are a variety of questions to consider when looking to assess the

[1] Judge S, Randall N, Goldbart J, Lynch Y, Moulam L, Meredith S, Murray J. The language and communication attributes of graphic symbol communication aids–a systematic review and narrative synthesis. Disability and Rehabilitation: Assistive Technology. 2020 Aug 17;15(6):652-62.
[2] Wissell S, Karimi L, Serry T, Furlong L, Hudson J. "You Don't Look Dyslexic": Using the Job Demands—Resource Model of Burnout to Explore Employment Experiences of Australian.

essential function of a job based on an article titled "Best Practices and Accommodations for Various Learning Disabilities":[1]

- If a task a worker is sometimes asked to perform is not essential to the job, can it be trade with or reassign to another worker?
- Can the way this task is performed be changed?
- Is this task essential?
- Is there any equipment or technical device that would aid in the performance of the task?
- Is the use of equipment absolutely necessary for the economic and safe performance of the task, or can it be eliminated?
- If it is customary to perform a certain task at a certain time, is that schedule important?
- Is it imperative that this position be full-time, or can the duties be pared down to accommodate a part-time worker?
- Must all the tasks be performed at the place of business during the regular business hours?

One should also determine whether the worker can fulfill the job's requirements in practice, rather than assuming the worst.

As an employer, one may be vaguely aware of what a learning disability may be, and the obligation to provide reasonable accommodations, but one may not know how to match an accommodation with and worker's specific needs. Accommodations during the interview and competition process require making changes to the process to ensure that persons with learning disabilities can compete fairly and equitably.

Promotion and Career Advancement

Career development and advancement can be challenging for many, but the challenges can be particularly onerous for persons with learning disabilities. These challenges are often apparent from the outset of the employment journey. Research evidence indicates that despite efforts to support transitions to work, students with learning disabilities still

[1] youth2youth (n.d.). Best Practices and Accommodations for Various Learning Disabilities. Link: http://www.youth2youth.ca/en/employers/best-practices-and-accommodations-for-various-learning-disabilities

do not achieve positive postsecondary outcomes at the same rate as their nondisabled peers.[1,2,3] Ensuring smooth transitions and career advancement for persons with disabilities involves creating an inclusive work environment where workers are supported throughout their employment journey.

Dr. S. M. Bruyère, a prominent figure in disability studies and the academic director of the Yang-Tan Institute on Employment and Disability, explored factors that can hinder career development and advancement for persons with learning disabilities and neurodiversity. Four key factors identified are:[4,5]

- Stereotyping and stigma affecting opinions about a person's competence, limiting chances for growth; and
- Membership in another minority group, resulting in multiple stigmas.
- Nature of the disability identity (e.g., present since birth, later diagnosis, specific type)
- The person's own engagement in self-limiting behaviors (e.g., choosing not to participate in career advancement opportunities)

To counter these factors, organizations need to faster an inclusive work environment. Specific mean to achieve this include:

- Clear job descriptions with clear performance expectations and timelines;
- Training for supervisors on:
    - Equitable opportunities for career development,
    - Regular feedback, and
    - Ways to approach behavior/performance issues; and
- Mentorship systems, buddy systems, facilitating social networking, etc.

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[1] Weiss MP, Faggella-Luby M. Transition services for students with learning disabilities. InSpecial education transition services for students with disabilities 2019 Nov 26 (pp. 15-33). Emerald Publishing Limited.
[2] Theobald RJ, Goldhaber DD, Gratz TM, Holden KL. Career and technical education, inclusion, and postsecondary outcomes for students with learning disabilities. Journal of Learning Disabilities. 2019 Mar;52(2):109-19.
[3] Wissell S, Karimi L, Serry T, Furlong L, Hudson J. "You Don't Look Dyslexic": Using the Job Demands—Resource Model of Burnout to Explore Employment Experiences of Australian Adults with Dyslexia. International Journal of Environmental Research and Public Health. 2022 Aug 28;19(17):10719.
[4] Bruyère SM, Neurodiversity in the Workplace. Yang-Tan Institute on Employment and Disability, ILR School. IDEA Webinar Friday, January 26, 2024 (Email: smb23@cornell.edu)
[5] Bruyère SM, Colella A, editors. Neurodiversity in the workplace: Interests, issues, and opportunities. Taylor & Francis; 2022 Jul 1.

An inclusive work environment can significantly impact retention, career development, and performance management. Consequently, creating an inclusive work environment with reasonable accommodations is more than just a legal or ethical requirement; it is a strategic investment.[1,2,3]

Implementing reasonable accommodations can foster an environment where the skills and talent of workers with disabilities is optimally leveraged and can boost productivity and job satisfaction. Accommodations can help break down barriers and potentially improving career opportunities. In the following section, we highlight common areas where persons with learning disabilities may require accommodations.

Workplace Flexibility

Workplace flexibility refers to "the ability of workers to make choices influencing when, where, and for how long they engage in work-related tasks".[4] This definition draws attention to two separate domains of workplace flexibility. First is spatial flexibility referring to the location of work, demonstrated through work arrangements such as working from home (also known as telecommuting, teleworking and remote work). Second is temporal flexibility, which refers to a choice regarding the distribution of worked hours.[5] A flexible work environment also includes an environment or assignment that allows an individual to draw upon their strengths.

Flexibility can also encapsulate communications style. For example, a person with a

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[1] Beyer S, Beyer A. A systematic review of the literature on the benefits for employers of employing people with learning disabilities. Mecap, 2017. Available at: https://www.mencap.org.uk/sites/default/files/2017-06/2017.061%20Benefits%20of%20employing%20PWLD%255b1%255d%20(1).pdf

[2] Social Enterprise Kent (n.d.). Unlocking Potential: The Benefits of Employing Disabled Workers. Link: https://sekgroup.org.uk/news/why-employing-disabled-workers-is-such-a-great-investment/

[3] Lindsay S, Cagliostro E, Albarico M, Mortaji N, Karon L. A systematic review of the benefits of hiring people with disabilities. Journal of occupational rehabilitation. 2018 Dec; 28:634-55.

[4] Jeffrey Hill E, Grzywacz JG, Allen S, Blanchard VL, Matz-Costa C, Shulkin S, Pitt-Catsouphes M. Defining and conceptualizing workplace flexibility. Community, Work and Family. 2008 May 1;11(2):149-63.

[5] Kirby A, Gibbon H. Dyslexia and employment. Perspectives on Language and Literacy. 2018;44(1):27-31.

learning disability may prefer verbal rather than written communications (for dyslexic workers), repetition or clarification of instructions (for persons with auditory perceptual problems), and color-coded tiles and a well-organized environment (for persons with visual perceptual problems who may have difficulty finding objects).[1]

The literature indicates that workplace flexibility not only enhances the productivity of persons with disabilities but also provides valuable support for those at an elevated risk of stress and anxiety.[2,3,4] Offering less rigid work arrangements, such as remote work or adjusted hours, and communications forms that meet the needs of individuals can help them manage their challenges more effectively.[5]

Time Management

In situations where time management challenges affect the worker's ability to meet deadlines and produce work to a required standard, employers with a lack of knowledge about learning disabilities could misinterpret this as a performance concern and may mistakenly initiate a formal performance management procedure. A number of general strategies that could be considered by employers include:[6]

- Development of policies and procedures to ensure jobs are advertised fairly and interview and onboarding processes are not biased against the person with learning disabilities;
- Provision of awareness training for staff;

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[1] U.S. Department of Labor (2009). Learning Disabled in Employment and Training Programs. Link: https://www.dol.gov/sites/dolgov/files/ETA/publications/91-learning.pdf

[2] Giovanis E. The relationship between flexible employment arrangements and workplace performance in Great Britain. International Journal of Manpower. 2018 Apr 3;39(1):51-70.

[3] Bento JP, Kuznetsova Y. Workplace adaptations promoting the inclusion of persons with disabilities in mainstream employment: a case-study on employers' responses in Norway. Social Inclusion. 2018;6(2):34-45.

[4] Kalmanovich-Cohen H, Stanton SJ. How can work from home support neurodiversity and inclusion? Industrial and Organizational Psychology. 2023 Mar;16(1):20-4.

[5] InclusionHub (2023). How to Create Accessible Workplaces for Employees with Cognitive & Learning Disabilities. Link: https://www.inclusionhub.com/articles/how-to-create-accessible-workplaces-for-employees-with-cognitive-learning-disabilities#:~:text=Flexibility%20is%20critical%20when%20accommodating,their%20neurodivergent%20challenges%20more%20effectively .

[6] Kirby A, Gibbon H. Dyslexia and employment. Perspectives on Language and Literacy. 2018;44(1):27-31.

- Training for line managers to understand how to provide appropriate support;
- Identifying workplace champions to promote inclusion and demonstrate success at all levels;
- Setting up support networks within the organization;
- Having peer support mentors to provide ad hoc support;
- Offering accessible application processes; and

Specific strategies could include:

- Offering an extended induction phase;
- Shared information plans on agreed adjustments between the employer and worker;
- Options for flexible working hours or work settings;
- IT adaptations including software and hardware; and
- Regular short review meetings to monitor progress.

Mentorship

The literature also suggests that adults with learning disabilities benefit from the use of job counselors, job coaches and mentors. For students with learning disabilities with no prior work experience, job coaches and mentors can help to smooth the transition from school to work.[1,2] The responsibilities of the job coach in such cases may included making sure the individual is job-ready: i.e., making sure the individual can meet the job schedule, and making sure the employer knows what to expect of the worker. Depending on the nature and severity of the learning disabilities, the responsibilities of a job coach could include explaining the nature of the learning disabilities, the needs of the worker with learning disabilities, the strengths and weaknesses of the potential worker, and special accommodation needs such as scheduling or identifying work conditions that would allow the persons with learning disabilities to perform productively on the job.[3] As noted earlier, mentorship, buddy systems and peer support in the

[1] Beetham J, Okhai L. Workplace dyslexia & specific learning difficulties—Productivity, engagement and well-being. Open Journal of Social Sciences. 2017 Jun 9;5(6):56-78. https://www.scirp.org/journal/paperinformation?paperid=76910
[2] U.S. Department of Labor (2009). Learning Disabled in Employment and Training Programs. Link: https://www.dol.gov/sites/dolgov/files/ETA/publications/91-learning.pdf
[3] U.S. Department of Labor (2009). Learning Disabled in Employment and Training Programs. Link: https://www.dol.gov/sites/dolgov/files/ETA/publications/91-learning.pdf

workplace are invaluable ways ensure a worker with a disability continues to advance in their employment journey.

Unique Employment Challenges for Persons with Learning Disabilities and Diverse Identities

The literature consistently highlights that marginalized identities can lead to heightened barriers and increased experiences of discrimination.[1,2] For persons with learning disabilities who may belong to one or more different racial, ethnic, gender, or socioeconomic backgrounds, an additional layer of complexity is introduced, potentially giving rise to additional challenges.[3,4] These individuals may encounter unique and compounded barriers that have not been thoroughly investigated. The main objective of this chapter is to delve into challenges experienced by persons with learning disabilities who belong to other marginalized groups. To achieve this, we provide an overview of key findings from both peer-reviewed and grey literature.

Discrimination Complaints by Category

Statistics on complaints received by the Canadian Human Rights Commission and their provincial/territorial counterparts provide insights into the magnitude of the issue in Canada. While we do not have publicly available data specifically on learning disability-related complaints belong to multiple marginalized groups, individual data on each aspect were identified.[5]

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[1] Youmans A, Kutsyuruba B, Butler A, Godden L. Marginalized Youth and Their Journey to Work: A Review of the Literature. Education. 2023 Oct 27;3(1-2023):61-82. https://www.researchgate.net/profile/Benjamin-Kutsyuruba/publication/375083497_Marginalized_Youth_and_Their_Journey_to_Work_A_Review_of_the_Literature/links/654125cb3cc79d48c5bdd109/Marginalized-Youth-and-Their-Journey-to-Work-A-Review-of-the-Literature.pdf

[2] Itano-Boase M, Wijesingha R, Cukier W, Latif R, Hon H. Exploring Diversity and Inclusion in Work-Integrated Learning: An Ecological Model Approach. International Journal of Work-Integrated Learning. 2021;22(3):253-69.

[3] Griendling LM, VanUitert VJ, Kennedy MJ, Rodgers WJ, Romig JE, Mathews HM, Peeples KN. Intersectionality in inclusive science classrooms: Enhancing student performance via multimedia teacher professional development. Journal of Special Education Technology. 2023 Mar;38(1):23-36.

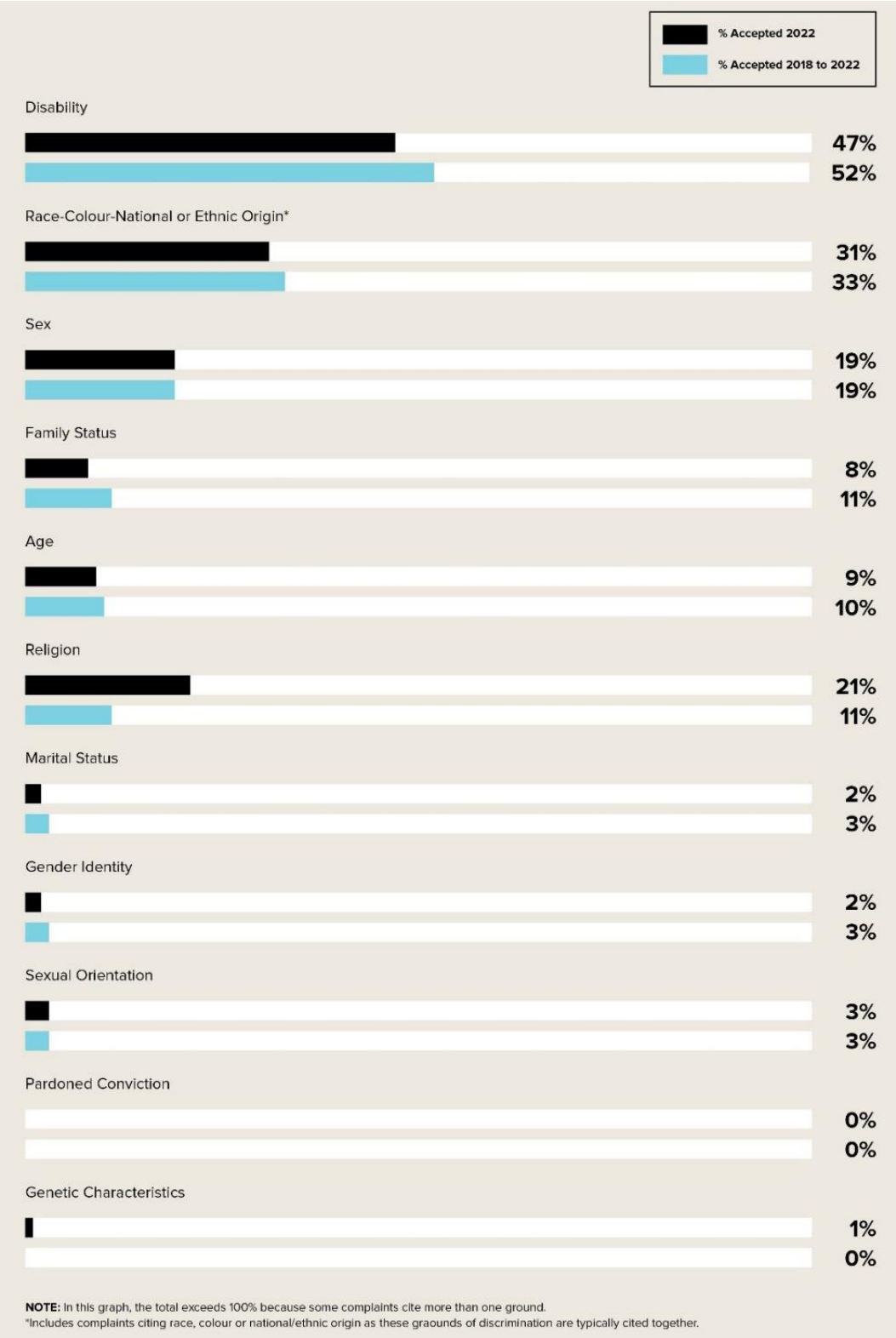
[4] Shier M, Graham JR, Jones ME. Barriers to employment as experienced by disabled people: A qualitative analysis in Calgary and Regina, Canada. Disability & society. 2009 Jan 1;24(1):63-75.

[5] Canadian Human Right Commission, 2022. Link: https://chrcreport.ca/by-the-numbers.html

Figure 5 shows that disability-related complaints formed over half of all discrimination complaints reported to the Canadian Human Rights Commission between 2018 and 2021. Following these types of complaints, complaints based on race, colour, national, or ethnic origin represent the next substantial portion, constituting 33% of the total discrimination complaints during the same period. Subsequently, complaints related to sex (19%), family status (11%), age (10%), and religion (11%) followed in sequence. Notably, the remainder of the claims collectively constituted less than 10% of the total complaints.

It's noteworthy that based on Canadian Human Rights Commission, 31% of accepted complaints in 2022 underlined the importance of intersectionality by citing more than one ground of discrimination. The data further reveals that the complaints were predominantly categorized into two main types, with 61% pertaining to employment-related issues and the remaining 39% associated with service-related concerns.

Figure 5. The proportion of complaints accepted by the ground of discrimination in 2022



Source: *Canadian Human Right Commission, 2022. Link: https://chrcreport.ca/by-the-numbers.html*

Employment Challenges Faced by Persons with Learning Disabilities

As highlighted in the preceding section, persons with disabilities face barriers in securing employment and career development. Following is evidence from published literature on the employment challenges faced by persons with learning disabilities, particularly those with other marginalized identities, and the impact these challenges have on their ability to secure and maintain employment.

Discrimination and Bias: Discrimination may have a significant negative impact on the lives of persons with a learning disability.[1,2,3] Persons with learning disabilities are more likely to face discrimination in the workplace, particularly when their disability intersects with other aspects of marginalized identity such as race, gender, sexual orientation, it can compound the discrimination and bias they experience.[4]

Educational Disparities: Persons with learning disabilities may face educational disparities and unequal access to resources. When such individuals have other marginalized identities, such as being a person of color or part of the LGBTQ+ community, these disparities can further limit employment opportunities and career growth.[5,6,7]

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[1] McMahon MC, McMahon BT, West SL, Conway JP. Workplace discrimination and learning disabilities in America: Characteristics of charging parties and employers. Journal of Vocational Rehabilitation. 2016 Jan 1;45(3):295-300.
[2] Wickenden M. Disability and other identities—how do they intersect? Frontiers in Rehabilitation Sciences. 2023;4.
[3] Mencap (n.d.). Stigma and discrimination can become. https://www.mencap.org.uk/learning-disability-explained/research-and-statistics/stigma-and-discrimination-research-and
[4] McMahon MC, McMahon BT, West SL, Conway JP. Workplace discrimination and learning disabilities in America: Characteristics of charging parties and employers. Journal of Vocational Rehabilitation. 2016 Jan 1;45(3):295-300.
[5] Shifrer D, Callahan RM, Muller C. Equity or marginalization? The high school course-taking of students labeled with a learning disability. American Educational Research Journal. 2013 Aug;50(4):656-82.
[6] Leung E. Examining Learning Disabilities in Schools through an Intersectional and Equitable Lens. Learning Disabilities-Neurobiology, Assessment, Clinical Features and Treatments. 2019. Link: https://www.intechopen.com/chapters/77919
[7] Misciagna S, editor. Learning Disabilities: Neurobiology, Assessment, Clinical Features and Treatments. BoD–Books on Demand; 2022 Mar 30.

Communication Barriers: Disability-related barriers to communication refers to the challenges faced by persons with disabilities in effectively exchanging information, ideas, or feelings with others.[1] Literature indicates that learning disabilities can affect communication skills[2,3] and individuals with other marginalized identities may face additional challenges in expressing themselves effectively.[4,5] Individuals with other marginalized identities, particularly those with disabilities like autism spectrum disorder, face unique challenges beyond societal stereotypes and power dynamics. They must navigate communication difficulties that significantly hinder their ability to express their thoughts and experiences effectively.[6] This could impact their ability to navigate workplace dynamics, advocate for themselves, or participate in professional development opportunities.

Networking Challenges: Networking is a crucial aspect of career development in many fields, but persons with learning disabilities and other marginalized identities may find it more challenging to build professional relationships. While research highlight's the role for mentors in improving work outcomes for persons with disabilities,[7] access to support networks may be limited for these individuals with. This can include access to mentorship opportunities, professional development programs, and other avenues for career advancement.[8]

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[1] Disability Barriers to Communication. Link: https://www.examples.com/english/disability-barriers-to-communication.html
[2] Kazemi R, Momeni S, Abolghasemi A. The effectiveness of life skill training on self-esteem and communication skills of students with dyscalculia. Procedia-Social and Behavioral Sciences. 2014 Feb 21;114: 863-6.
[3] Communication Skills and Adults with Learning Disabilities: Eliminating Professional Myopia
[4] Saxe A. The theory of intersectionality: A new lens for understanding the barriers faced by autistic women. Canadian Journal of Disability Studies. 2017 Nov 24;6(4):153-78.
[5] Wickenden M. Disability and other identities—how do they intersect? Frontiers in Rehabilitation Sciences. 2023;4.
[6] Saxe A. The theory of intersectionality: A new lens for understanding the barriers faced by autistic women. Canadian Journal of Disability Studies. 2017 Nov 24;6(4):153-78.
[7] New research highlights role for mentors in improving work outcomes for individuals with disabilities. Link: https://www.evidencebasedmentoring.org/new-research-highlights-role-mentors-improving-work-outcomes-individuals-disabilities/
[8] Sally Lindsay (2018). Mentoring for youth with disabilities. Link: https://nationalmentoringresourcecenter.org/wp-content/uploads/2021/01/Mentoring_for_Youth_with_Disabilities_Population_Review.pdf

Lack of Awareness and Accommodations: Intersectionality is not simply about recognising different categories of identity, but understanding how they intersect and influence each other.[1] Employers may lack awareness about the specific needs and accommodations required for persons with learning disabilities, particularly when considering the intersectionality identities of workers. For example, a recent study published by Michigan Retirement and Disability Research Center at University of Michigan in 2022, examined whether persons with disabilities who are non white are less likely to receive workplace accommodations than other persons with disabilities in the United States, controlling for individual characteristics as well as industry and occupation. Their result suggested there are differences by race/ethnicity in the likelihood of receiving accommodations.[2] This can result in a failure to provide necessary support, hindering the individual's performance and career advancement.

Stereotyping and Stigma: Stigma and stereotype are common issues for many marginalized groups. Research has demonstrated that persons with learning disabilities are vulnerable to stigmatization.[3,4,5,6] Research also indicated that stereotypes about certain identities may perpetuate negative perceptions of persons with learning disabilities. For example, persons with learning disability might face additional stereotypes that exacerbate the stigma associated with their racial or ethnic

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[1] Michaelmauro (n.d.) Understanding Intersectionality in the Workplace: A Comprehensive Guide. Link: https://www.michaelmauro.co.uk/thought-leadership/understanding-intersectionality-in-the-workplace-guide

[2] Brucker, Debra L., Megan Henly, and Andrew Houtenville. 2022. “Investigating Racial and Ethnic Disparities in the Provision of Workplace Accommodations in the United States.” Ann Arbor, MI. University of Michigan Retirement and Disability Research Center (MRDRC) Working Paper; MRDRC WP 2022-442. Link: https://mrdrc.isr.umich.edu/publications/papers/pdf/wp442.pdf

[3] Haft SL, Greiner de Magalhães C, Hoeft F. A systematic review of the consequences of stigma and stereotype threat for individuals with specific learning disabilities. Journal of Learning Disabilities. 2023 May;56(3):193-209.

[4] Daley SG, Rappolt-Schlichtmann G. Stigma consciousness among adolescents with learning disabilities: Considering individual experiences of being stereotyped. Learning Disability Quarterly. 2018 Nov;41(4):200-12.

[5] Bedini LA. " Just sit down so we can talk:" perceived stigma and community recreation pursuits of people with disabilities. Therapeutic Recreation Journal. 2000 Jan 24;34(1):55-68.

[6] Michaelmauro (n.d.) Understanding Intersectionality in the Workplace: A Comprehensive Guide. Link: https://www.michaelmauro.co.uk/thought-leadership/understanding-intersectionality-in-the-workplace-guide

backgrounds, making it more challenging to be accepted and integrated into the workplace.[1]

Mental health and overall well-being: Persons with learning disabilities who belong to other marginalized groups deal with issues sometimes referred to as "double minority" or "intersectional invisibility." These issues which mainly arise from the intersection of discrimination and challenges associated with each identity, may affect mental health and overall well-being and quality of life for these individuals.[2]

Inclusive Strategies for Supporting Intersectional Identities in the Workplace

Navigating the intricate intersectional identities of persons with learning disabilities poses a multifaceted challenge, often unaddressed by conventional research. Research on the experiences of persons with learning disabilities and other marginalized identities remains scarce. Nonetheless, fostering inclusive workplace environments necessitates a nuanced understanding of intersectionality and proactive strategies. Following are tailored practices for persons with learning disabilities:

- Train hiring managers on unconscious bias and inclusive interviewing techniques;
- Establish clear diversity and inclusion goals and integrate them into the company's strategic plan;
- Provide skills training and educational resources to help workers advance in their careers;
- Offer necessary accommodations, such as assistive technologies and ergonomic workstations, to support diverse needs;
- Advocate for policies that promote equality and inclusion in the workplace, while fostering stakeholder collaborations, raising community awareness; and
- Advocating for policies and legislation that promote inclusion in education and employment opportunities.

[1] Iqtadar S, Hern DI, Ellison S. " If It Wasn't My Race, It Was Other Things Like Being a Woman, or My Disability": A Qualitative Research Synthesis of Disability Research. Disability Studies Quarterly. 2020 Jun 4;40(2).
[2] Wiseman P, Watson N. Because I've got a learning disability they don't take me seriously. Violence, wellbeing, and devaluing people with learning disabilities. Journal of Interpersonal Violence. For readers interested in individuals with ID as their own narrators of their experiences. 2021.

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CONCLUSIONS

Skills and employment support for persons with learning disabilities should be addressed from a life course perspective, encompassing early diagnosis, accommodation in training and skills development, school-to-work transition, and supportive employment throughout the employment journey. Key stakeholders in this process include parents and caregivers, education systems, vocational training agencies, and employers, each playing a crucial role in ensuring the success of persons with learning disabilities. Bellow we provide some recommendations for creating more equitable and inclusive employment and skills training opportunities, drawing from insights gathered from both the peer-reviewed and grey literature. Under this section, we summarize the highlights identified in the previous section, providing a cohesive and comprehensive overview of the key findings from the study.

Early Diagnosis and Intervention

- Enhance awareness: Educate parents, caregivers, and educators about the signs of learning disabilities to ensure early diagnosis.
- Access to resources: Provide accessible resources and support services for early diagnosis and intervention, including assessments by qualified professionals.
- Individualized support plans: Develop personalized support plans for children diagnosed with learning disabilities, tailored to their specific needs and strengths.

Inclusive Education

- Inclusive curriculum: Implement a universal design that accommodates diverse learning styles and abilities, ensuring all students have equal access to education.

- Educator training: Provide specialized training for educators to effectively support students with learning disabilities, recognizing that students may have diverse learning styles.
- Assistive technologies: Provide access to assistive technologies and tools that facilitate learning for students with learning disabilities.

School-to-Work Transitions

- Transition planning: Begin transition planning early, involving students, parents, educators, and vocational training professionals to create a comprehensive transition plan.
- Internships and work experience: Develop partnerships with local businesses to provide internships and work experience opportunities for students with learning disabilities.
- Career counseling: Offer career counseling and guidance services tailored to the strengths and interests of students with learning disabilities.
- Job placement services: Create job placement services that work closely with employers to find suitable job matches for persons with learning disabilities.

Volunteering and Work Experiences

- Volunteering opportunities: Consider coordinating volunteer opportunities in not-for-profit organizations, which can offer rewarding and valuable experiences for persons with learning disabilities.
- Time-limited work experience: Ensure that persons with learning disabilities do not volunteer indefinitely for commercial organizations. Good practice dictates that such placements be temporary and take the form of time-limited work experience placements, serving as a forerunner to paid, career employment.

Employer Strategies for Inclusion

- Inclusive hiring practices: Encourage employers to adopt inclusive hiring practices, including reasonable accommodations and non-discriminatory policies.
- Clear job descriptions and performance expectations: Provide clear job descriptions and outline performance expectations and timelines to help workers understand their roles and responsibilities, contributing to a more inclusive environment.
- Workplace accommodations: Ensure the workplace is equipped with necessary accommodations, such as modified workspaces and required assistive technologies to support workers with learning disabilities.
- Workplace flexibility: Recognize the importance of workplace flexibility in accommodating workers with learning disabilities. Providing options such as remote work (spatial flexibility) or adjusted hours (temporal flexibility) can help individuals manage their neurodivergent condition more effectively, reducing stress and anxiety while enhancing productivity.
- Mentorship: Implement mentoring systems and facilitate social networking opportunities to create a supportive environment where workers can connect with peers, receive guidance, and build professional relationships. These initiatives foster inclusivity by promoting collaboration and mutual support amongst team members.
- Supervisor's training: Offer training for supervisors on equitable opportunities for career development, providing regular feedback, and addressing behavior or performance issues. Equipping supervisors with these skills ensures they can effectively support all workers, regardless of background or ability.

Empowering Employment Strategies

- Job matching: Instead of assigning jobs based solely on altruism or sympathy, ensure a successful outcome by considering the business needs. It is worth

taking the time to explore potential roles and job carving opportunities, facilitating the matching of suitable worker to business needs.

- Vocational training programs: Establish vocational training programs tailored specifically for workers with learning disabilities, with a focus on practical skills development to enhance employability.
- On-the-job support: Provide comprehensive on-the-job support, including job coaching and mentorship, to assist workers with learning disabilities in achieving success in the workplace.

Building Inclusive Communities

- Stakeholder collaboration: Foster collaboration between parents, schools, vocational training agencies, and employers to create a seamless support network for persons with learning disabilities.
- Community awareness: Raise community awareness about the abilities and potential of persons with learning disabilities to reduce stigma and promote inclusion.
- Policy advocacy: Advocate for policies and legislation that promote inclusive education and employment opportunities for persons with learning disabilities.

The above recommendations, if adopted, offer the potential to move towards a more equitable and inclusive educational system and labour market that supports rewarding learning opportunities and employment experience for persons with learning disabilities. This comprehensive approach spans all stages of life—from early education, to transition into adulthood and employment, to career advancement—ensuring a seamless and empowering journey. The proposed accommodations can help foster an environment where workers with disabilities can fully utilize their skills and talent, leading to heightened productivity, job satisfaction, and equal of opportunity in career, jobs and work for all working age adults.

APPENDICES

Appendix 1. Glossary of Key Terms

Disability: Disability means any impairment, including a physical, mental, intellectual, cognitive, learning, communication or sensory impairment—or a functional limitation—whether permanent, temporary or episodic in nature, or evident or not, that, in interaction with a barrier, hinders a person's full and equal participation in society. https://www.canada.ca/en/employment-social-development/programs/disability/arc/reference-guide.html#h2.1

Barrier: Physical, architectural, technological, attitudinal and other socially constructed factors that hinders the full and equal participation in society of persons with an impairment, including a physical, mental, intellectual, cognitive, learning, communication or sensory impairment or a functional limitation.

Facilitators: Physical, architectural, technological, attitudinal and other socially constructed factors that favour, facilitate, or help the full and equal participation in society of persons with an impairment, including a physical, mental, intellectual, cognitive, learning, communication or sensory impairment or a functional limitation.

Social Construction: An object, event concept, practice or other humanly created phenomenon whose purpose and value are built on assumptions upheld, usually tacitly, by members of a society or group.

Discrimination: Situations in which a person with a disability is treated less favorably than a person without the disability in the same or similar circumstances.

Reasonable Accommodations: Necessary and appropriate modification and adjustments not imposing a disproportionate or undue burden, where needed in a

particular case, to ensure to persons with disabilities the enjoyment or exercise on an equal basis with others of all human rights and fundamental freedoms.

Universal Design: Design of physical and virtual environments and products that are accessible to all people regardless of age, disability or other personal factors.

GBA Plus Analysis: intersectional analysis that goes beyond biological (sex) and socio-cultural (gender) differences to consider other factors, such as age, disability, education, ethnicity, economic status, geography (including rurality), language, race, religion, and sexual orientation.

Social location: A combination of categories, factors, or attributes such as gender, race, age, ability, immigration status, language, sexual orientation, employment, and religion that determine their norms, values, and memberships.

Multi-sensory approach: This approach to teaching persons with learning disabilities involves stimulating multiple senses—sight, sound, touch, and sometimes even taste and smell—to optimize learning and retention. Recognizing that persons with learning disabilities may require diverse sensory inputs to process information effectively, the multi-sensory approach integrates various modalities such as visual, auditory, kinesthetic, and tactile methods to enhance comprehension and learning.

Intersectionality: Interaction of social categories which shape one's social location and experience.

Quality of Life (QOL): Umbrella term which captures multiple dimensions related to objective and subjective measures of physical, mental, emotional, and social functioning within one’s life.

Dyslexia: Persons with dyslexia usually have trouble making the connection between letters and sounds and with spelling and recognizing words.[1] Persons with dyslexia often show other signs of the condition. These may include:

- Having a hard time understanding what others are saying
- Difficulty organizing written and spoken language
- Delay in being able to speak
- Difficulty expressing thoughts or feelings
- Difficulty learning new words (vocabulary), either while reading or hearing
- Trouble learning foreign languages
- Difficulty learning songs and rhymes
- Slow rate of reading, both silently and out loud
- Giving up on longer reading tasks
- Difficulty understanding questions and following directions
- Poor spelling
- Problems remembering numbers in sequence (for example, telephone numbers and addresses)
- Trouble telling left from right

The TED Talk titled "What is dyslexia?" by Kelli Sandman-Hurley provides valuable supplementary information on understanding dyslexia.[2]

Dysgraphia: A child who has trouble writing or has very poor handwriting and does not outgrow it may have dysgraphia. This disorder may cause a child to be tense and twist awkwardly when holding a pen or pencil. Other signs of this condition may include:

- A strong dislike of writing and/or drawing
- Problems with grammar
- Trouble writing down ideas
- Losing energy or interest as soon as they start writing
- Trouble writing down thoughts in a logical sequence
- Saying words out loud while writing
- Leaving words unfinished or omitting them when writing sentences

[1] NICHD (2018). What are some signs of learning disabilities? Link: https://www.nichd.nih.gov/health/topics/learning/conditioninfo/signs
[2] https://www.ted.com/talks/kelli_sandman_hurley_what_is_dyslexia?language=en

The TED-Ed Student Talk titled "What is dysgraphia?" by Abigail Lee provides valuable supplementary information on understanding dysgraphia.[1]

Dyscalculia: Signs of this disability include problems understanding basic arithmetic concepts, such as fractions, number lines, and positive and negative numbers. Other symptoms may include:

- Difficulty with math-related word problems
- Trouble making change in cash transactions
- Messiness in putting math problems on paper
- Trouble with logical sequences (for example, steps in math problems)
- Trouble understanding the time sequence of events
- Trouble describing math processes

The TED Talk titled "Slipping Through the Net?" by Jo Page provides valuable supplementary information on understanding dyslexia, dysgraphia and dyscalculia.[2]

[1] https://www.youtube.com/watch?v=CPib1uyhcsA
[2] https://www.ted.com/talks/jo_page_slipping_through_the_net

Appendix 2. Data Extraction Table

Author(s)	Title	Source	Jurisdiction	Population	Disability
I. Tuffrey-Wijne; C. K. K. Lam; D. Marsden; B. Conway; C. Harris; D. Jeffrey; L. Jordan; R. Keagan-Bull; M. McDermott; D. Newton; D. Stapelberg	Developing a training course to teach research skills to persons with learning disabilities: It gives us a voice. We CAN be researchers!	British Journal of Learning Disabilities	United Kingdom	Learning disability	Learning disability
J. Peltokorpi; S. Hoedt; T. Colman; K. Rutten; E.-H. Aghezzaf; J. Cottyn	Manual assembly learning, disability, and instructions: an industrial experiment	International Journal of Production Research	The Netherlands	Sheltered workplace	Illiterate, psychosocial, cognitive
S. Wissell; L. Karimi; T. Serry; L. Furlong; J. Hudson	Leading Diverse Workforces: Perspectives from Managers and Employers about Dyslexic Employees in Australian Workplaces	International Journal of Environmental Research and Public Health	Australia	Worked in Australia within an Australian-owned company to keep the research focus within the Australian context, (ii) held a management position and/or position at a leadership level (iii) had a minimum of 10 workers within their organisation. It would	Dyslexia

Author(s)	Title	Source	Jurisdiction	Population	Disability
				be expected that with over 10 workers one would be dyslexic based on prevalence rates (iv) had worked in that organisation for more than three years and (v) had managed staff that had disclosed they had dyslexia.	
J. L. Brendle; R. H. Lock; L. A. Smith	Quality job indicators for persons with learning disabilities	Journal of Vocational Education and Training	United States of America	Fifty-six school-age students	Students were identified as learning disabled in the areas of reading only (13 students), math only (18 students), writing only (3), reading and math (9 students), reading and writing (12 students) and reading, writing and math (1 student)
A. M. Romualdez; K. Yirrell; A.	Exploring Participants' Views on a Supported	International Journal of	United Kingdom	Young adults	Autistic and learning

Author(s)	Title	Source	Jurisdiction	Population	Disability
Remington	Work Internship Program for Autistic and Learning Disabled Young People	Disability Management			disability
R. Flower; D. Hedley; J. Spoor; C. Dissanayake	An alternative pathway to employment for autistic jobseekers: A case study of a training and assessment program targeted to autistic job candidates	Journal of Vocational and Education and Training	Australia	Adults	Autism
S. Burke; T. Bresnahan; T. Li; K. Epnere; A. Rizzo; M. Partin; R. Ahlness; M. Trimmer	Using Virtual Interactive Training Agents (ViTA) with Adults with Autism and Other Developmental Disabilities	Journal of Autism and Developmental Disorders	United States of America	Not Reported	70% of the participants were diagnosed with autism spectrum disorders 65% had an intellectual disability and 25% reported the presence of other disabilities
L. Clouder; M. Karakus; F. Polat	Environmental interventions supporting autistic transition-age youth employability: A scoping review	Research in Autism Spectrum Disorders	Articles written in English	Autistic individuals between 15 and 29 years of age	Autism
J. Davies; G. Matuska	Workforce development: perspectives from persons with learning disabilities	TIZARD Larning Disabilities	United Kingdom	The consultation was funded by Health Education England	Learning disability

Author(s)	Title	Source	Jurisdiction	Population	Disability
		Review		working across Kent Surrey and Sussex and conducted by the Foundation for People with Learning Disabilities.	
J. Sowell; L. Sugisaki	An Exploration of EFL Teachers' Experience with Learning Disability Training	Latin American Journal of Content and Language Integrate D-LACLIL	United States of America	EFL teachers	Learning disability
J. Smith	Creative Self-Efficacy: An Essential Transition Skill for Students with Learning Disabilities	Intervention in School and Clinic	United States of America	Students with learning disability	Learning Disability
L. Ugalde; M. Santiago-Garabieta; B. Villarejo-Carballido; L. Puigvert	Impact of Interactive Learning Environments on Learning and Cognitive Development of Children with Special Educational Needs: A Literature Review	Frontiers in Psychology	Spain	Students with learning disability	Learning Disability
A. Drigas; E. Mitsea; C. Skianis	Virtual Reality and Metacognition Training Techniques for Learning Disabilities	Sustainability	Greece	Persons with learning disability	Learning disability
W. Li; T. Ni; Y. Zhang; D. Wang; S. Parrado	Can persons with disabilities obtain income by using skills learned from vocational trainings?	Higher Education Skills and Work-Based	China	Persons with learning disabilities	Learning disability

Author(s)	Title	Source	Jurisdiction	Population	Disability
	Evidence from mainland China	Learning			
K. Maki; S. Adams	A current landscape of specific learning disability identification: Training, practices, and implications	Psychology in the Schools	United States of America	Students with learning disability	Learning Disability
M. Contreras-Ortiz; P. Marrugo; J. Ribon	E-Learning Ecosystems for People with Autism Spectrum Disorder: A Systematic Review	IEEE Access	Columbia	Students with Autism	Autism
M. Weiss; M. Faggella-Luby	Transition Services for Students with Learning Disabilities	Special Education Transition Services for Students with Disabilities	United States of America	Higher educated students with learning disabilities	Learning disability
M. Itano-Boase; R. Wijesingha; W. Cukier; R. Latif; H. Hon	Exploring diversity and inclusion in work-integrated learning: An ecological model approach	International Journal of Work-Integrate D-Learning	Canada	Work-integrated learning applicant data interviews with employers.	Students from diverse groups (women, racialized persons, persons with disabilities, and Indigenous persons)
H. Blake; J. Hanson; L. Clark	The importance of an inclusive alumni network for ensuring effective transitions into employment and future destinations for persons with learning	British Journal of Learning Disabilities	United Kingdom	Education providers	Learning disability

Author(s)	Title	Source	Jurisdiction	Population	Disability
	disabilities				
A. Morina; G. Biagiotti	Inclusion at university, transition to employment and employability of graduates with disabilities: A systematic review	International Journal of Educational Development	Systematic Review	Graduates with disabilities including learning disabilities	Visible and invisible disabilities including learning disabilities
V. Tomas; S. Hsu; S. Kingsnorth; E. Anagnostou; B. Kirsh; S. Lindsay	Development and Usability Testing of a Web-Based Workplace Disability Disclosure Decision Aid Tool for Autistic Youth and Young Adults: Qualitative Co-design Study	JMIR Formative Research	Canada	Autistic Youth	Autism
S. Wissell; L. Karimi; T. Serry; L. Furlong; J. Hudson	You Don't Look Dyslexic: Using the Job Demands-Resource Model of Burnout to Explore Employment Experiences of Australian Adults with Dyslexia	International Journal of Environmental Research and Public Health	Australia	Adults with Dyslexia	Dyslexia
S. Dueker; J. Day	Using standardized assessment to identify and teach prerequisite numeracy skills to learners with disabilities using video modeling	Psychology in the Schools	United States of America	Learners with disability	Autism and learning disabilities
J. Boyle; R. Joyce	Using Smartpens to Support Note-Taking Skills of Students with Learning Disabilities	Intervention in School and Clinic	United States of America	Students with learning disability	Learning disability
A. Elfakki; S.	An Efficient System Based	Electronics	Saudi	Students with learning	Learning

Author(s)	Title	Source	Jurisdiction	Population	Disability
Sghaier; A. Alotaibi	on Experimental Laboratory in 3D Virtual Environment for Students with Learning Disabilities		Arabia	disability	disability
R. Joyce; J. Boyle	Improving Note-Taking Skills for Students with Disabilities Through a Smartpen Intervention	Journal of Special Education Technology	United States of America	Students with a learning disability	Learning disability
C. Billard; C. Jung; A. Munnich; S. Gassama; M. Touzin; A. Mirassou; T. Willig	External Validation of BMT Computerized Test Battery for Diagnosis of Learning Disabilities	Frontiers in Pediatrics	France	Five cognitive domains: written language; mathematical cognition; oral language; handwriting, drawing, and visuospatial construction; and attention and executive functioning	Learning disability
W. Alghabban; R. Hendley	Adaptive E-Learning and Dyslexia: An Empirical Evaluation and Recommendations for Future Work	Interacting with Computers	Saudi Arabia	Arabic learners	Dyslexia
M. Young; C. Courtad; K. Douglas; Y. Chung	The Effects of Text-to-Speech on Reading Outcomes for Secondary Students with Learning Disabilities	Journal of Special Education Technology	United States of America	Secondary students with learning disability	Learning disability
M. Howell; P. Langdon; J.	'There isn't a checklist in the world that's got that on	Journal of Intellectual	United Kingdom	Special needs teachers of students	Autism

Author(s)	Title	Source	Jurisdiction	Population	Disability
Bradshaw	it': Special needs teachers' opinions on the assessment and teaching priorities of pupils on the autism spectrum	Disabilities		with Autism	
D. Liu; C. Lory; Q. Lei; W. Cai; Y. Mao; X. Yang	Using Explicit Instruction and Virtual Manipulatives to Teach Measurement Concepts for Students with Autism Spectrum Disorder	Journal of Special Education	China	Students with Autism	Autism
R. Cerezo; E. Fernández; C. Gómez; M. Sánchez-Santillán; M. Taub; R. Azevedo	Multimodal Protocol for Assessing Metacognition and Self-Regulation in Adults with Learning Difficulties	JOVE-Journal of Visualized Experiments	United States of America		Learning disability
M. Zannikos; E. McCallum; A. Schmitt; K. Pearson	A Comparison of the Taped Spelling Intervention and Cover, Copy, and Compare for Students with Learning Disabilities	Journal of Behavioral Education	United States of America	Students with learning disabilities	Learning disability
M. Matre; D. Cameron	A scoping review on the use of speech-to-text technology for adolescents with learning difficulties in secondary education	Disability and Rehabilitation Assistive Technology	Norway - Scoping Review	Adolescents with learning disabilities	Learning disability
D. Kiegaldie; L. Shaw; S. Hunter; J. Davis; H. Siddel; M. O'Brien	An integrated practical placement programme for students with disability: A pilot study	Journal of Intellectual Disabilities	Australia	Students with learning disabilities	Students with a learning disability
F. W. Grp; T.	Using the five to fifteen-	European	Sweden	Adults with	Neurodevelop

Author(s)	Title	Source	Jurisdiction	Population	Disability
Hirvikoski; S. Lajic; J. Jokinen; E. Renhorn; A. Trillingsgaard; B. Kadesjö; C. Gillberg; J. Borg	collateral informant questionnaire for retrospective assessment of childhood symptoms in adults with and without autism or ADHD	Child and Adolescent Psychiatry		neurodevelopmental disorders	mental disorders
S. Young; J. Hollingdale; M. Absoue; P. Bolton; P. Branney; W. Colley; E. Craze; M. Dave; Q. Deeley; E. Farrag; G. Gudjonsson; P. Hill; H. Liang; C. Murphy; P. Mackintosh; M. Murin; F. O'Regan; D. Ougrin; P. Rios; N. Stover; E. Taylor; E. Woodhouse	Guidance for identification and treatment of persons with attention deficit/hyperactivity disorder and autism spectrum disorder based upon expert consensus	BMC Medicine	United Kingdom	Persons with attention deficit/hyperactivity disorder and autism spectrum disorder	Attention deficit/ hyperactivity disorder and autism spectrum disorder
J. Lawson; J. Turnnidge; A. Latimer-Cheung	An Exploration of the Content and Quality of Online, Text-Based Coach Development Programs Specific to Parasport	International Sports Coaching Journal	Literature review - Canada	Disability coaches	Persons with disabilities
A. Griffen	Exploratory Evaluation of	Health	United	Persons with	Persons with

Author(s)	Title	Source	Jurisdiction	Population	Disability
	Inclusion Wheel Model for Public Health Practice to Include People with Disabilities: Implications for Leadership and Training to Serve the Whole Community	Promotion Practice	States of America	disabilities	disabilities
X. Chen; J.-R. Wu; T. A. Grenawalt; N. Mpofu; F. Chan; T. N. Tansey	Employer Practices for Customized Training for Onboarding of People with Disabilities	Rehabilitation Research, Policy, and Education	Scoping review - United States of America	Persons with disabilities in the workplace	Persons with disabilities
C. Marelle; E. Vinoski Thomas; C. Donehower Paul	A Survey of Wireless Technology Supporting Persons with Intellectual and Developmental Disabilities in the Workplace	Journal of Special Education Technology	United States of America	Persons with intellectual and developmental disabilities in the workplace	Intellectual and developmental disabilities
A. Buncher; R. Ward; A. Kinkade; B. Pflug	From Intern to Skills Trainer: The Journey of One Individual to Competitive, Integrated Employment	Insights into Learning Disabilities	United States of America	Persons with intellectual and developmental disabilities	Intellectual and developmental disabilities
M. R. Wicker; T. N. Davis; J. M. Hrabal	Use of Technology in Vocational Skills Training for Persons with Intellectual and Developmental Disabilities: A Systematic Review	Education and Training in Autism and Developmental Disabilities	Systematic Review - United States of America	Persons with intellectual and developmental disabilities	Intellectual and developmental disabilities
K. Rolander; E. Severson-Irby; H.	Inclusive Virtual Instruction: A Case Study of a Bridge	COABE Journal: The	United States of	Adult learners with disabilities	Disabled persons

Author(s)	Title	Source	Jurisdiction	Population	Disability
Massey	Program for Adult Learners Who Have Disabilities	Resource for Adult Education	America		
M. Munyaradzi; A. Arko-Achemfuor; K. Quan-Baffour	An Exploration of Comprehensive Student Support Systems in Technical Vocational Education and Training Colleges for Students with Disability	Community College Journal of Research and Practice	South Africa	Students with disabilities	Disability
S. L. Burke; T. Li; A. Grudzien; S. Garcia	Brief Report: Improving Employment Interview Self-Efficacy Among Adults with Autism and Other Developmental Disabilities Using Virtual Interactive Training Agents (ViTA)	Journal of Autism and Developmental Disorders	United States of America	Adults with Autism and Other Developmental Disabilities	Autism and other developmental disabilities
S. M. Hayward; R. L. Flower; K. E. Denney; S. Bury; A. L. Richdale; C. Dissanayake; D. Hedley	The Efficacy of Disability Employment Service (DES) Providers Working with Autistic Clients	Journal of Autism and Developmental Disorders	Australia	Autism	Autism
D. M. Raymaker; M. Sharer; J. Maslak; L. E. Powers; K. E. McDonald; S. K. Kapp; I. Moura; A. Wallington; C.	Don't Wanna Just Be Like a Cog in the Machine: Narratives of Autism and Skilled Employment	Autism: The International Journal of Research and Practice	United States of America	Autistic persons with skilled training	Autism

Author(s)	Title	Source	Jurisdiction	Population	Disability
Nicolaidis					
M. A. Barczak; H. I. Cannella-Malone	Self-Management of Vocational Skills for People with Significant Intellectual Disabilities: A Systematic Review	Journal of Intellectual Disabilities	Systematic Review - United States of America	Persons with intellectual and developmental disabilities	Intellectual and developmental disabilities
E. D. de Klerk; J. M. Palmer	Technology Inclusion for Students Living with Disabilities through Collaborative Online Learning during and beyond COVID-19	Perspectives in Education	South Africa	Students living with disabilities	Disability
G. Johnsson; M. Lincoln; A. Bundy; K. Bulkeley	Experience of an Interactive, Autism-Specific Online Professional Development Training and Support Programme Delivered to Regional and Remote Areas	Open Learning	Australia	Students with Autism	Autism
R. Carballo; B. Morgado; M. D. Cortés-Vega	Transforming Faculty Conceptions of Disability and Inclusive Education through a Training Programme	International Journal of Inclusive Education	Spain	Disability	Disability
K. Crane; M. Gramlich; R. G. Luecking; P. B. Gold; T. Morris	Staff Capacity Building and Accountability in Transition Services	Career Development and Transition for Exceptional Individuals	United States of America	Youth with disabilities	Disability
E. Graybill; E. V.	Supporting the	International	United	Persons with	Disability

Author(s)	Title	Source	Jurisdiction	Population	Disability
Thomas; K. Baker; S. Truscott; M. Crenshaw; A. Heggs Lee; D. Crimmins	Participation of Persons with Disabilities in a Graduate-Level Leadership Training Program: Lessons Learned through a Case Study Approach	Journal of Disability, Development and Education	States of America	disabilities	
M. Liu; D. P. Bryant; E. Kiru; M. Nozari	Geometry Interventions for Students with Learning Disabilities: A Research Synthesis	Learning Disability Quarterly	United States of America	Students with learning disabilities	Learning disability
N. K. Villante; D. C. Lerman; S. Som; J. C. Hunt	Teaching Adults with Developmental Disabilities to Problem Solve Using Electronic Flowcharts in a Simulated Vocational Setting	Journal of Applied Behavior Analysis	United States of America	Adults with developmental disabilities	Developmental disabilities
S. Bi	Gifted Students with Learning Disabilities: A Review of Differentiated Teaching Approaches	Journal on Educational Psychology	India	Gifted students with learning disabilities	Gifted and learning disability
S. Thaha Abdullateef	Learning Disability: Working Hard, yet Achieving Low (A Case Study of At-Risk EFL Learners)	Reading & Writing Quarterly	Saudi Arabia	Persons with learning disabilities	Learning disability
A. B. Özbek; C. Ergül	Effectiveness of Comprehension Strategies Mobile App (COSMA) on Reading Comprehension Performances of Students with Learning Disabilities	Journal of Special Education Technology	Turkey	Students with learning disabilities.	Learning disability

Author(s)	Title	Source	Jurisdiction	Population	Disability
J. R. Morris; E. M. Hughes; J. D. Stocker; E. S. Davis	Using Video Modeling, Explicit Instruction, and Augmented Reality to Teach Mathematics to Students with Disabilities	Learning Disability Quarterly	United States of America	Students with learning disability	Learning disability
A. L. McGrath; M. Tejero Hughes	Experiences of a Student with Learning Disability in Science: Supporting Students to Enhance Learning	Journal of the American Academy of Special Education Professionals	United States of America	Student with Learning Disability	Learning disability
R. Satsangi; R. Hammer; E. C. Bouck	Using Video Modeling to Teach Geometry Word Problems: A Strategy for Students with Learning Disabilities	Remedial and Special Education	United States of America	High school students with specific learning disability	Specific learning disability

Appendix 3. List of Applications

Name	Description	Disability	Link
WordQ	At its core, WordQ provides contextual word prediction, feedback, and proofreading. It's not a word processor unto itself, but instead, it's designed to work in conjunction with the users' word processor of choice. And while most modern word processors such as Microsoft Word can easily spot simple spelling errors, these word processors are not designed to effectively handle contextual spelling or complex grammar proofing. WordQ is designed to fill that gap by providing powerful, contextually based spelling and grammar feedback that goes far beyond the scope of a traditional word processor. The app also offers speech recognition and feedback, making it a perfect choice for auditory learners and for those who struggle with text-based disabilities.	Text based disabilities	[1]
EquatIo	Made for today's tech-focused classrooms, this Chrome browser extension lets you type, handwrite, or dictate equations, formulas and more directly on your computer or Chromebook. Then add your expression with a click of a button to Google Docs, Forms, Slides, Sheets and Drawings. Trainees don't need to know any complicated math code or programming languages like LaTeX.		[2]
Graspable Math	This plug-in interacts with mathematical expressions you find on Wikipedia or any other webpage. Use this plugin to open a sidebar that lets you work on any algebra on the page. After you drag and drop formulas into the sidebar or enter them directly, you can then interact with the terms to create algebraic derivations, allowing users to drag text and Wikipedia images of math		[3]

[1] https://mathetmots.com/ca-en/wordq?wickedsource=google&wickedid=383760208559&wtm_term=word%20q&wtm_campaign=6521818290&wtm_content=86776603388&wickedplacement=&wickedkeyword=word%20q&gad_source=1&gclid=Cj0KCQjwsPCyBhD4ARIsAPaaRf3m8t3aKRp6dJNaRnpOKlYKk3Al2953AQXWf45jGrkvijkelkJxjVIaAtIrEALw_wcB

[2] https://chromewebstore.google.com/detail/equatio-maths-made-digita/hjngolefdpdnooamgdldlkjgmdcmcjnc?pli=1

[33] https://activities.graspablemath.com/

Name	Description	Disability	Link
	expressions into the plug-in sidebar to make them interactive.		
Talking Calculator (IOS)	Talking Calculator takes mathematical equations and translates them into an audio format, allowing users with visual difficulties to experience a simple and accessible alternative to a standard calculator. This app also offers optional VoiceOver integration, allowing users to experience the full functionality of the program, without ever having to look at the screen.		[1]
MyScript Calculator (IOS + Android)	MyScript Calculator is a handwriting-based calculator that allows you to write and calculate mathematical equations by hand. The app will translate the symbols and numbers into digital text and instantly deliver the results. MyScript calculator is simple and intuitive and offers export options which allow you to bring your calculations into other documents and apps.		[2]
Panther Math Paper (IOS)	Created under the standards of universal design, this virtual graph paper app is designed to be used by anyone – even those with significant motor disabilities. The app also offers advanced magnification options, the ability to lock equations, as well as a full range of advanced math tools.		[3]
ModMath (IOS)	Designed with Dysgraphic users in mind, ModMath assists students in acquiring math skills from basic arithmetic to complex algebraic equations. Designed as a piece of virtual graph paper, this app lets you type and solve math problems right onto the touch screen of an iPad.	Dysgraphic users	[4]
Photomath – Camera Calculator (IOS + Android)	Photomath allows users to point their camera toward a math problem and Photomath will show the result with detailed step-by-step instructions, allowing users to have math problems broken down for them.		[5]
Reading/Scan	Reading pens, sometimes called “pen scanners” do exactly that; they are	Print	[1]

[1] https://apps.apple.com/us/app/talking-calculator/id424464284
[2] https://apps.apple.com/us/app/myscript-calculator/id1304488725
[3] https://apps.apple.com/us/app/math-paper/id547090551
[4] https://apps.apple.com/us/app/modmath/id821892964
[5] https://apps.apple.com/us/app/photomath/id919087726

Name	Description	Disability	Link
ning Pens	designed to scan text which can then be imported onto a PC through a USB or Bluetooth connection. These devices are ideal for digitally converting text-based documents so that they can be enlarged, read out loud, translated, or simply converted into a digital format. print based text into digital text, or into an audio recording for immediate playback Translate text	Disabilities	
Digital Notetaking Pens	Digital pens are writing pens designed specifically for capturing what you write or draw on any surface and transferring it to your computer, tablet or phone, eliminating the need for keeping the paper. They also transcribe written notes by converting handwritten notes into on-screen text, saving the user from re-typing their notes and making them easy to edit, save or share. Task: □ Write or draw on paper and transfer automatically to digital format. □ Transcribes handwritten notes	Executive Functioning and Organization Challenges	[2]
Recording Pens	These pens, often known as SmartPens allow users to record and playback audio in addition to their primary task. Recordings can then be uploaded, shared, and stored. Some recording pens feature built in speakers, while others require the user to sync or upload audio files via desktop/laptop, iOS, or Android. They also often have the added feature of capturing written content and transferring them to digital formats and even transcribing handwriting into text. These pens do, however, require special paper to perform their magic. Task: □ Capture notes from meetings, classes, and other interactions via audio and/or paper. □ Create visual and auditory instructions that can be repeated	Notetaking Challenges	[3]
Action Blocks	Action Blocks is a tool that allows users to create accessible shortcuts through		[1]

[1] https://www.irislink.com/EN-CA/c1870/Compare-IRIS-digital-pens.aspx
[2] https://www.irislink.com/EN-CA/c1870/Compare-IRIS-digital-pens.aspx
[3] https://us.livescribe.com/

Name	Description	Disability	Link
	their smartphone, making it even easier for persons with disabilities or cognitive differences to fully utilize their device. The app was developed by Google and it's completely free, making it essentially one button push away from being a built-in feature.		
Microsoft Edge Accessibility features	**Enlarge Text** – To enlarge text, you can either go into the settings to manually adjust your zoom level or, you can use your keyboard. Shortcuts: Ctrl + Scroll wheel up/down = Zoom in/out Ctrl + zero (0) = Reset zoom level to default Ctrl + plus sign (+) = Zoom in by 25% **Read Aloud** – Edge has the ability to read web content out loud. To activate read aloud, right click on an open web page and select Read aloud. Shortcuts: Ctrl + Shift + U = Start or stop Read aloud **Immersive Reader** – Immersive reader will not only read content out loud, but it'll also display highlighted text in a clean, distraction free window. You can access this feature by simply clicking on Enter Immersive Reader from your address bar or via the shortcut listed below. Shortcut: F9 = Enter or exit Immersive Reader **Generate Image Descriptions** – For users with visual impairments, image descriptions help give context to the content they are reading online. However, not every website has visual descriptions set up. Turning this feature on will cause Microsoft Edge to automatically generate descriptions for unlabeled images on any website. **High Visibility Outline** – The high visibility focus indicator is another tool for users with visual impairments. With this feature on, any element that you focus on will be outlined in black and white. **Keyboard Surfing** – Whether or not you have mobility challenges, using your		[2]

[1] https://play.google.com/store/apps/details?id=com.google.android.apps.accessibility.maui.actionblocks
[2] These options can be managed through Settings and more > Settings > Accessibility.

Name	Description	Disability	Link
	keyboard to browse the web is an efficient way of accessing the internet. Shortcuts: F6 = Move focus to the next browser pane Shift + F6 = Move focus to the previous browser pane Ctrl + F6 = Move focus to the web content pane **Caret Browsing** – Turn this feature on to browse using only your cursor. Shortcuts: F7 = Turn caret browsing on or off **High Contrast** – Turning this feature on changes the color scheme of your web page to a high contrast palette that is easier to read. Shortcuts: Left Alt + Left Shift + Print Screen = Turn high contrast mode on or off **Caption Customization** – Edge can even close caption certain sites, making the web even easier to use without sound.		

https://www.neilsquire.ca/category/latest-news/technology-news