



# AN INQUIRY INTO CURRENT TREATMENT AND MANAGEMENT STRATEGIES FOR CHILDREN WITH LEARNING DISABILITIES: REVIEW

ANDREW GARAS [1], KYOBIN HWANG [1], SUNNY KIM [1], TONEY LIEU [1], NICHOLAS LUM [1], MUHAMMAD RASHID [1], JUSTIN SZYMCAK [1], ILZIBA YUSUP [1]

[1] BACHELOR OF HEALTH SCIENCES (HONOURS), CLASS OF 2023, MCMASTER UNIVERSITY

## ABSTRACT

Currently, approximately four to six percent of all Canadian children and youth have a learning disability. Three well-explored categories of learning disabilities are dyslexia, dyscalculia, and dysgraphia. Learning disabilities can affect all aspects of a youth's life and development, including social-emotional, cognitive, physical, and behavioural-moral domains. Options to treat and manage learning disabilities are currently divided into compensatory strategies and remedial treatments, including drilling and practice, task analysis, computer aids, faded support, and multisensory instruction. Different types of community-supports are also available to supplement treatment and management options. As a newly recognized field, research on learning disabilities has seen major developments within the last few decades, with significant changes during the COVID-19 pandemic. COVID-19 has impacted the health of children and youth with learning disabilities and changed the accessibility of education. However, despite the developments in the field, gaps and critiques persist in the research. This paper aims to review the current literature on treatments, community supports, and management strategies for learning disabilities in Canada and discuss the impacts of COVID-19. Reviewing existing data and gaps in the literature will help provide a holistic overview of the current state of the literature on learning disabilities in children and youth in Canada.

*Disclosure: It is important to note that learning disabilities are not an indication of a child's ability to achieve excellence relative to their peers. Children with learning disabilities have different learning styles that need to be considered to ensure a conducive educational environment.*

## INTRODUCTION

The Learning Disabilities Association of Canada defines learning disabilities as “a number of disorders which may affect the acquisition, organization, retention, understanding, or use of verbal or nonverbal information. [1] Across school boards, regions, and countries, many definitions share three criteria: (1) learning disabilities refers to a heterogeneous group of disabilities in any one or combination of skill domains (e.g., listening, speaking, reading comprehension, arithmetic calculation); (2) there is a discrepancy between performance in the skill domain(s) and global intelligence; (3) underperformance in the specific skill domain(s) are not due to environmental, cultural, or economic disadvantages.[2]

Statistics Canada reports 3.2 percent of Canadian children as having a learning disability according to the 2006 Participation and Activity Limitation Survey.<sup>3</sup> The etiology of learning disabilities has not been fully established.[4-5] However, modern theories postulate that learning disabilities arise from both genetic and environmental influences.[6] Genetic influences would include atypicality in genes which leads to a disruption in proper function.[6] Environmental influences, on the other hand, are tied to a myriad of factors which include, but are not limited to chronic anxiety and malnutrition. [7]

There are three well-explored learning disabilities: dyslexia, dyscalculia, and dysgraphia.[8] Dyslexia is a neurodevelopmental disorder characterized by difficulty reading due to problems identifying speech sounds and learning how they relate to letters and words.[9-10] Individuals with dyslexia experience difficulty decoding and manipulating language, ultimately manifesting as difficulties in reading and speech.[11] Dysgraphia is defined as difficulty with clearly and correctly communicating through written language.[12]

This can include difficulty spelling by sound, trouble with orthographic (i.e., visual) representations of words, mixing up letter formations, and difficulty understanding how words can be joined to make phrases.[12] Dyscalculia is characterized by difficulty applying basic arithmetic.[13] These difficulties are often associated with impaired processing of numbers and quantities.[13]

These learning disabilities are associated with many comorbidities including Tourette's syndrome, schizophrenia, epilepsy, language/communication disorders, attention deficit hyperactivity disorder (ADHD), developmental coordination disorder, and conduct disorder.[14] An intersection occurs between ADHD and dyslexia, with 25 to 40 percent of children with ADHD or dyslexia meeting the criteria for the other. [15] 20 to 60 percent of those with dyscalculia also have co-occurring disorders such as dyslexia or ADHD.[16]

This paper aims to review the current literature on treatments, community supports, and management strategies for learning disabilities in Canada and discuss the impacts of COVID-19. The focus of this review will be three learning disabilities: dyslexia, dysgraphia, and dyscalculia.

## METHODOLOGY

This review was conducted using databases including Ovid MEDLINE, PubMed, and ERIC. Grey literature sources were also searched. The search strategy was limited to English-language peer-reviewed articles and conducted in a Western (preferably Canadian) context. There was no restriction on the year of publication since the review aimed to understand the historical progression of learning disabilities from data inception to the present time. Terms related to community support, treatment management and COVID-19 were used in combination with learning disabilities to conduct the searches (see Appendix 1).

## RESULTS

*Disclosure: Understanding the nature of learning disabilities is the first step to helping a child find success at school and beyond. Learning disabilities and management strategies mentioned in this review are well documented, however, every child is different and the strategies may not apply to all.*

### I. Community Support

Learning disabilities carry social implications for children and their relationships with peers, especially in schools. One study from school districts near Toronto, Canada, reported that grade 4-6 children with learning disabilities experienced friendships with higher levels of conflict and lower levels of validation than their peers without learning disabilities.[17]

A scoping review focused on children with neurodevelopmental disabilities (NDD) found that loneliness in children with NDD is positively correlated with depressive symptoms, and that these impacts can extend into adulthood.[18]

Self-defeating thoughts – characterized as negative thoughts about oneself – are also common in children with learning disabilities.[19] Parents are encouraged to combat such negative self-talk among their children and praise their efforts daily.[19] It is important that children feel their efforts are being recognized, despite the difficulties they may experience.[19] It is helpful if parents proactively identify children's needs and appropriate support, whether it be necessary accommodations at school or home.[19] However, the identification and consequent diagnosis of learning disabilities in school settings can be quite challenging, especially in the case of dyslexia.[20] Although schools do not suggest interventions for children struggling in the first and second grades, research shows that dyslexia is already clear in first grade, and the earlier the intervention, the better.[20]

As such, schools play a critical role in academically and emotionally supporting children with learning disabilities. A study conducted by Rapus-Pavel et al. outlined a five-stage framework that can be applied when working with students.[21] The first layer of support is from teachers providing additional help, such as spending extra time explaining concepts or sharing helpful learning tools, to students in a classroom.[21] Students can also seek assistance from the school's counselling service, which works at in depth to discover the student's strengths and weaknesses.[21] The counselling service can conduct more thorough diagnostic procedures to help formulate a learning plan for the individual..[21] Based on their discretion, the counselling service can request an expert opinion from an appropriate institution that specializes in learning disabilities.[21] From there, an individualized program, such as the Individualized Education Program (IEP) in Canada, is developed and implemented in the student's education.[21-22] The goal of an IEP for students with learning disabilities is to provide a program that maximizes their ability to access the curriculum and to demonstrate their learning. Therefore, it may be necessary at times to modify learning expectations to bridge knowledge/skill gaps.[23] The IEP reflects the unique learning profile of the student and the severity of the student's learning disability.[24] When formulating a student's IEP, it is critical to gain a holistic understanding of the child's diagnosis, strengths, and needs, to determine what accommodations—specific teaching strategies, human supports, and/or individualized equipment—would be most appropriate for the student.[23]

### II. Treatment/Management

Treatment and management for learning disabilities often take on an individualized approach unique to each

student.[25] There are various treatment strategies for dyslexia, dyscalculia, and dysgraphia. These strategies can be divided into compensatory strategies and remedial treatments.[26]

Compensatory strategies share many similarities between various learning disabilities. They allow students to work around a problem and focus more of their attention on completing academic content. Common compensatory strategies include using computer aids such as spell checkers or speech-to-text recognition programs, allowing for extra time on assessments or shortening their length, and providing note-taking resources such as buddy systems or allowing for the recording of lecture material.[27-29]

A common remedial treatment strategy for dysgraphia is the supervised use of drilling and practice to help correct handwriting, pencil positioning, and pencil grip. Ediger (2002) published some techniques for teaching and assessing handwriting skills.[30] There is also evidence to suggest that drills and exercises that help build the muscles used in fine motor activities can improve handwriting.[31] This strategy has been successful in various “Handwriting Clubs” detailed by Keller (2001). [32] One study suggested that improving fine and gross motor skills together can help improve handwriting skills. Dikowski (1994) suggested that strengthening and drilling hand-eye coordination can improve handwriting tasks.[33]

Dyslexia and dyscalculia share many management strategies, such as task analysis, explicit instruction, and multisensory instruction. Task analysis is the process of breaking down a difficult task into small sequential steps, which is a helpful tool for students to complete tasks more systematically. A teacher may break down a reading task into steps to do before, during, and after the task to assist the student through task analysis.[34] Explicit instruction is a helpful teaching style that guides students through a lesson via the following steps: (1) explaining the purpose, (2) verbalizing thoughts, (3) interactive guided examples, and (4) independent practice.[35]

Multisensory instruction is a culmination of the task analysis and explicit instruction, with an additional multisensory component (auditory, visual, kinesthetic/tactile sensory). [36] Multisensory Structured Language (MSL) refers to this strategy as it applies to dyslexia, and commonly includes pictures, audio recordings, and tactile elements as its multisensory component.[36] Concrete to Representational to Abstract sequence of instruction (CRA) refers to the strategy as it applies to dyscalculia, and commonly includes physical manipulators (such as counters) and drawings as its multisensory component.[36] MSL has shown benefits such as increased engagement and knowledge retention amongst students.[36]

Another common strategy used amongst educators is

faded support.[34] This is a gradual process of training an individual to become more independent in completing a particular task.[34] The process begins by having an instructor guide the individual through a task step-by-step.[34] After the first demonstration, the instructor will guide the individual through a select few steps, and allow them to attempt the rest of the steps by themselves.[34] This is repeated until the individual can complete the task independently.[34] A strength of faded support is that the incremental process supports memory retention, and errors are minimized due to the high degree of supervision and facilitation.[34] However, the individual is prone to feelings of frustration and stress through this strategy, emphasizing the importance of consistent emotional support from the instructor.[34]

### III. Impact of Covid-19

The recent emergence of the novel SARS-CoV2 Coronavirus and the subsequent pandemic has impacted lives across the world, forcing many countries to adopt measures such as quarantines.[37] With changes in the delivery of education and health-related services, it begs the question of how these changes have affected those with learning disabilities.

The major impact of COVID-19 on education has been the transition from in-person classes to virtual learning platforms. Studies have indicated that these online classrooms can have varying effects: engaging in virtual environments can have a very positive impact on individuals with learning disabilities, while non-engaging classrooms have an extremely negative effect on their learning.[38-39] A study by Parsons et al. (2017) determined that the success of virtual environments was based on the following factors: correspondence, representativeness, expedience, and relevance. [40] It is important for educators to consider factors when working with students with learning disabilities to foster a conducive learning environment.[38]

The pandemic has also had a notable impact on the mental health of students with learning disabilities. In a study by Soriano-Ferrer et al (2021), children with dyslexia exhibited increased levels of depression and state anxiety during the quarantine compared to before. [41] According to ratings from a questionnaire administered to parents during the study, children with dyslexia scored significantly ( $p=0.001$ ) higher during quarantine than before on the following measures: emotional symptoms, conduct problems, and hyperactivity-inattention.[41]

Waitlists for elementary students to access learning assessments have also increased in Canada due to the COVID-19 pandemic.[42] Some children and youth have to wait up to two years before getting a psycho-educational assessment, required for additional classroom support. Experts in the field state that timely intervention is crucial to preventing further barriers to learning as children age and COVID-19 has significantly decreased access.[42]

## DISCUSSION

### I. Results

Community and family members play a substantial role in supporting children and youths with learning disabilities. The level of support received from parents/guardians, teachers, and counselors can significantly change the experience for a child. Schools are important settings where various management strategies can be employed. Although, the COVID-19 pandemic has drastically changed the school environment as learning delivery transitioned from in-person to virtual. The transition has decreased some barriers, such as improving accessibility, while erecting others. It is necessary to consider these changes when adapting and implementing treatment and management options outlined above. It is also necessary to consider the gaps in literature to determine where research is lacking for future focus.

### II. Gaps in Literature

Considering the relative novelty of SARS-CoV2, it is unsurprising that the body of literature about the pandemic's impact on students with learning disabilities is scarce. Soriano-Ferrer et al (2021) specifically noted a lack of research into the impact of COVID-19 on individuals with dyslexia.[41]

A significant gap includes a lack of research done on populations that not only accurately reflect the cultural diversity of students with learning disabilities, but also seeks to determine how students of particular cultural groups may be affected differentially.[43] In other terms, there is a need to research learning disabilities with cultural competency. Cultural competency is a concept that seeks to understand ways in which sociocultural factors influence outcomes.[44] These factors may include health beliefs, lifestyle behaviours, and nuances affecting power dynamics in a clinical setting. In a research setting, understanding the intricacies of cultural competency will help inform questions regarding the type of problems to study, the target sample population, the particular outcomes chosen for the study, and the interpretation of results.[43] Contextualizing this research will provide more clarity on how learning disabilities may affect children of various cultures, which can assist us in identifying culture-appropriate treatment and management strategies.[43]

As well, there is a need for studies centred around behaviour-focused interventions rather than academic intervention, as working towards maintaining behavioural changes may be necessary to improve social outcomes.[45] When it comes to interventions, there is also a significant gap concerning students who respond minimally to research-based protocols. To combat this, caregivers increase the duration of treatment or allocate students into smaller groups for intervention.

However, there is a lack of research focused on improving an understanding of the characteristics of minimally responsive learners. Such research would provide more direction in strengthening remediation efforts.[46]

### II. Schools of thought/controversies

Despite current advancements in the field, there remains numerous controversies. Through highlighting these controversies a more accurate depiction of the field is obtained.

One controversy regarding learning disabilities is their definitions and their relationship to receiving support in medical and educational settings.[47] As discussed previously, learning disabilities are complex conditions that can have various causes and manifest themselves in different ways. Trying to define complex conditions such as learning disabilities can be difficult and often misses out on the individual aspect of each child. Yet these definitions are currently critical to the decision to provide resources to these children. For example, Canadian universities are required to provide reasonable accommodations for individuals with learning disabilities as long as those resources do not cause undue hardship on these universities.[48] Given that these universities have limited funding allocated to such programs, having unclear definitions of learning disabilities creates a struggle to properly allocate resources to effectively benefit individuals who need it most.

This issue has been raised at various universities across North America.[49] During a speech to the public, then provost Boston University Jon Westing, declared that "If we fail to recognize the existence of severe learning disorders, we will demand from individuals more than they can give, and we will have inhumane schools that fail to develop the talents that slow learners can develop.... On the other hand, if we err on the side of being too general and too inclusive in our definitions of learning disability, we debase the idea altogether.[50] Two years after his statements Boston University was involved in a class-action lawsuit, *Guckenberger v. Boston Univ*, from students with learning disabilities claiming that school policies had "discriminated against the learning-disabled."[51] Various other publications discuss similar flaws and misinterpretations of the definitions of learning disabilities.[52-53] Consensus on the definitions for various learning disabilities still has not been reached, and debate is still ongoing.[54-55]

This raises the question: what is the best way to decide if students need access to the resources in the first place? When a student is granted access to these resources, how much do academic programs need to be altered to accommodate them, and who will say so? In a world of finite resources, how can one best accommodate the most students?

Highly-cited papers recommending reforms to special

education programs and perspectives on learning disabilities made their entrances in the 1960s and 1970s. Special Education as Developmental Capital by Evelyn Deno presented arguments against the current system and alternative strategies.[56] In this paper, Deno critiqued the validity of categorically grouping students with disability labels that are often too simplistic to encompass individual factors. A similar stance was taken by researcher Lloyd Dunn, who argued that the process of determining a label presented as working to find out what is “wrong” with the child. Instead, Dunn recommended that schools eliminate disability labels and diagnostic procedures to allow special educators to be responsible for their own clinical or diagnostic teaching. [57] Integrated and individualized programming is a concept recommended by Evelyn Deno’s (1970) “continuum of services” model where children receive more specialized services on a case-by-case basis.[58]

Dyslexia continues to raise controversy in both practice and education policy.[58] In 2018, two counties in England - Staffordshire, and Warwickshire - announced new guidelines that would no longer differentiate children with dyslexia and children with difficulties in literacy. They utilized a pioneering approach that focused on teaching children to read and write 100 of the most commonly used English words, accounting for 53 percent of all written English.[59] The approach was tested in a study, which found reading difficulties were reduced by nearly 20%.[60] However, the move received severe backlash from parents and dyslexia advocates around the world, suggesting millions of children diagnosed with dyslexia may lose valuable additional support and services.[59] By contrast, academic, and local authority educational psychologists advocated for the move, citing dyslexia as scientifically vague which continues to socially exclude children.[49] Following the controversy, both counties discontinued the guidance. [59]

Despite the British context of this controversy, it is relevant to Canada and other countries because there is a growing need for evidence-based support for dyslexia in school settings.[61] Joe Elliot continues to be one of the strongest critics, suggesting the current system is not supported by evidence. Elliot also suggests that the system entrenches inequality, as children from poorer backgrounds less likely to be diagnosed.[61] In his controversial book, *The Dyslexia Debate* (2014), he argues it is not possible to separate poor readers into clear causal groups at present time, based on biological or cognitive phenomena. A 2017 independent review of optimizing school behaviour also described dyslexia as an "over-diagnosed crypto-pathology." [60] There is a wide push to end the dyslexia label worldwide, and instead replace it with detailed descriptors that address specific reading difficulties.[61]

## CONCLUSION

Viewpoints on learning disabilities in practice and

research have transformed in Western contexts, particularly due to the COVID-19 pandemic. Novel perspectives and practices only continue to emerge, highlighting the importance of continuous investigation in the field. Management strategies have received a lot of attention and scrutiny over the pandemic, amid a continuous push in recent years to make treatments for learning disabilities more comprehensive, accessible, and all-inclusive.

## Appendix 1: Search Strategies

<b>Community support</b>	(learning disabilit* OR dyscalculia* OR dysgraphia* OR dyslexia*) AND (communit* support* OR social support*)
<b>Treatment and management</b>	(learning disabilit* OR dyscalculia* OR dysgraphia* OR dyslexia*) AND (treat* OR manage* OR therap* OR intervention*)
<b>COVID-19</b>	(learning disabilit* OR dyscalculia* OR dysgraphia* OR dyslexia*) AND ((COVID* OR coronavirus* OR quarantine* or SARS-CoV-2*))

- Official definition of learning disabilities: LDAC-Acta [Internet]. LDAC. 2018 [cited 2022Jan7]. Available from: <https://www.ldac-acta.ca/official-definition-of-learning-disabilities/>
- Lyon GR, Fletcher JM, Shaywitz SE, Shaywitz BA, Fongesen JK, Wood FB, Schulte A, Olson R. Rethinking learning disabilities. Rethinking special education for a new century. 2001 May;29:87.
- Prevalence of learning disabilities: LDAC. The Learning Disability Association of Canada [Internet]. LDAC. Learning Disabilities Association of Canada; 2018 [cited 2022Mar26]. Available from: <https://www.ldac-acta.ca/prevalence-of-learning-disabilities/>
- Lagoe L. Learning Disabilities: Definitions, Epidemiology, Diagnosis, and Intervention Strategies. *Pediatric Clinics of North America*. 2008 Dec 15;61(6):1259–68.
- Al-Mahrezi A, Al-Futaisi A, Al-Mamari W. Learning Disabilities. *Sultan Qaboos Univ Med J*. 2016 May;16(2):129–31.
- Domínguez O, Carugno P. Learning Disability. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 [cited 2021 Oct 24]. Available from: <http://www.ncbi.nlm.nih.gov/books/NBK55571/>
- Mayron LW. Ecological Factors in Learning Disabilities. *J Learn Disabil*. 1978 Oct;11(8):495–505.
- Learning disorders in children [Internet]. Centers for Disease Control and Prevention. Centers for Disease Control and Prevention; 2021 [cited 2022Mar26]. Available from: <https://www.cdc.gov/ncehd/childdevelopment/learning-disorder.html>
- Lyon GR, Shaywitz SE, Shaywitz BA. A definition of dyslexia. *Annals of dyslexia*. 2003 Jan;53(1):1–4.
- Snowling MJ, Hulme C, Nation K. Defining and understanding dyslexia: past, present and future. *Oxford Review of Education*. 2020 Jul 3;16(4):501–15.
- Hulme C, Snowling MJ. Reading disorders and dyslexia. *Current opinion in pediatrics*. 2016 Dec;28(6):731.
- Chung PJ, Patel DR, Nizam I. Disorder of written expression and dysgraphic definition, diagnosis, and management. *Transl Pediatr*. 2020;9(Suppl 1):S16-S24. doi:10.21037/tp.2019.11.01
- Von Aster MG, Shavel RS. Number development and developmental dyscalculia. *Developmental medicine & child neurology*. 2007 Feb;49(2):191–198.
- Considering coexisting conditions or comorbidity [Internet]. Learning Disabilities Association of Ontario - LDAC. [cited 2022 Feb 2]. Available from: <https://www.ldac.ca/introduction-to-ldacdb/articles/about-lds/considering-coexisting-conditions-or-comorbidity-2/>
- Boada R, Willcutt EG, Pennington BF. Understanding the comorbidity between dyslexia and attention-deficit/hyperactivity disorder. *Topics in Language Disorders*. 2012 Jul 1;32(3):264–81.
- Kaufmann L, von Aster M. The diagnosis and management of dyscalculia. *Deutsches Arzteblatt International*. 2012 Nov;109(45):767.
- Wiener J, Schneider BH. A multisource exploration of the friendship patterns of children with and without learning disabilities. *Journal of abnormal child psychology*. 2002 Apr;30(2):27–41.
- Nowicki EA, Brown JD, Dare L. Educators' evaluations of children's ideas on the social exclusion of classmates with intellectual and learning disabilities. *Journal of Applied Research in Intellectual Disabilities*. 2018 Jan;41(1):154–63.
- Sutton J, Shieffs M. Dyslexia: 10 strategies. *Teach Journal of Christian Education*. 2016;10(2):5.
- Parents Guide to Dyslexia. Child Mind Institute. [cited 2021 Nov 22]. Available from: <https://childmind.org/guide/parents-guide-to-dyslexia/>
- Rapis-Pavel J, Vitale HS, Reje T. Schoolwork of Adolescents with Dyslexia: Comparison of Adolescents', Mothers' and Teachers' Perspectives. *International Journal of Special Education*. 2018;33(2):261–78.
- Positive behaviour supports [Internet]. [cited 2022 Jan 20]. Available from: <https://www.alberta.ca/positive-behaviour-supports.aspx>
- Identification of and program planning for students with learning disabilities [Internet]. Ontario Ministry of Education. 2021 [cited 2022 Mar 24]. Available from: <https://www.edu.gov.on.ca/eng/general/elementary/learning/for0203.pdf>
- Identification of and program planning for students with learning disabilities [Internet]. Ontario Ministry of Education. 2021 [cited 2022 Mar 26]. Available from: <https://www.ontario.ca/document/education-ontario-policy-and-program-direction/policy-program-memorandum-84r4f-6>
- Görgenken EL, Compton DL, Fuchs LS, Wagner RK, Willcutt EG, Fletcher JM. Understanding, educating, and supporting children with specific learning disabilities: 50 years of science and practice. *Am Psychol*. 2018 Jan;73(1):57–71. doi:10.1037/amp000152. Epub 2019 May 13. PMID: 31058104; PMCID: PMC6585103.
- Richards R. (1999). The source for dyslexia and dysgraphia
- Reis SM, McGuire JM, Neu TW. Compensation strategies used by high-ability students with learning disabilities who succeed in college. *Gifted Child Quarterly*. 2000 Apr;44(2):129–34.
- Cruz SC. Learning Strategies for Adults. *Compensations for Learning Disabilities*. Wall & Emerson, Inc., 3220 South Main St., PO Box 418686, Middletown, OH 45114-8686; 1991.
- Reis SM, Rulien LM. Compensation strategies used by high-ability students with learning disabilities. In *Students with both gifts and learning disabilities 2004* (pp. 155–198). Springer, Boston, MA.
- Ediger M. *Assessing Handwriting Achievement*. 2001.
- Crouch AL, Jakubec JJ. Dysgraphia: How It Affects A Student's Performance and What Can Be Done About It. *TEACHING Exceptional Children Plus*. 2007.
- Dikowski TJ. Educational Interventions for Visual-Motor Deficiencies that Affect Handwriting in School-Aged Children, 1994.
- Keller M. Handwriting Club: Using Sensory Integration Strategies to Improve Handwriting. *Intervention in School and Clinic*. 2001 Sep 1;37(1):9–12.
- Browder, D. M., Jimenez, B. A., & Trella, K. (2012). Grade-aligned math instruction for secondary students with moderate intellectual disability. *Education and Training in Autism and Developmental Disabilities*, 47(3), 373–388.
- Gersten R, Beckmann S, Clarke B, Foegen A, Marsh L, Star JR, et al. *Assisting Students Struggling with Mathematics: Response to Intervention (RTI) for Elementary and Middle Schools*. NCEE 2009-4060 [Internet]. What Works Clearinghouse. What Works Clearinghouse; 2009 [cited 2022 Feb 3]. Available from: <https://eric.ed.gov/?id=ED504995>
- Witzel B, Mize M. Meeting the Needs of Students with Dyslexia and Dyscalculia. *SRATE Journal*. 2018;27(1):31–9
- Veleau TP, Meyer CG. The COVID-19 epidemic. *Trop Med Int Health*. 2020 Mar;25(3):278–80.
- Perretto DR, Carta SM, Canalella S, Masala I, Masala ML, Piras P, Piras P, Masala G. The Use of Distance Learning and E-Learning in Students with Learning Disabilities: A Review on the Effects and some Hint of Analysis of the Use during COVID-19 Outbreak. *Clinical Practice and Epidemiology in Mental Health: CP & EMH*. 2021;17:92.
- Basham JD, Blackford J, Marino MT. Opportunity in Crisis: The Role of Universal Design for Learning in Educational Redesign. *Learning Disabilities: A Contemporary Journal*. 2020;18(1):7–19.
- Parsons TD, Carlew AR, Magtoto J, Stonecipher K. The potential of function-led virtual environments for ecologically valid measures of executive function in experimental and clinical neuropsychology. *Neuropsychological rehabilitation*. 2017 Jul 1;27(5):777–807.
- Soriano-Ferrer M, Murte-Soriano MR, Beguey J, Piedra-Martinez E. Psychosocial Challenges in Spanish Children With Dyslexia and Their Parents' Stress During the COVID-19 Pandemic. *Frontiers in Psychology*. 2021 May 28;12:2005.
- McGinn D. Aphonos C. Wait-list for learning assessments balloons during the pandemic [Internet]. *The Globe and Mail*. *The Globe and Mail*; 2021 [cited 2022Mar26]. Available from: <https://www.theglobeandmail.com/canada/article-wait-list-for-learning-assessments-balloons-during-the-pandemic/>
- Klingner JK, Boardman AG. Addressing the “Research Gap” in Special Education Through Mixed Methods. *Learning Disabilities Quarterly*. 2011 Aug 1;34(3):208–18.
- Chiu J. Culturally competent health care. *Public Health Rep*. 2000;115(1):25–33.
- McKenna JW, Flower A, Kyung Kim M, Cullis S, Haring C. A systematic review of function-based interventions for students with learning disabilities. *Learning Disabilities Research & Practice*. 2015 Feb;30(1):35–28.
- Miller B, Vaughn S, Freund LS. Learning disabilities research studies: Findings from NICHD-funded projects. *Journal of Research on Educational Effectiveness*. 2014 Jul 3;7(2):229–31.
- Kavale KA, Forness SR. What definitions of learning disability say and don't say: a critical analysis. *J Learn Disabil*. 2000;33(3):239–256. doi:10.1177/002221940003300303
- Canada Eand SD. Government of Canada [Internet]. Making an accessible Canada for people with disabilities - Canada.ca / Gouvernement du Canada; 2022 [cited 2022Feb8]. Available from: <https://www.canada.ca/en/employment-social-development/programs/accessible-canada.html>
- Rose B. Americans with Disabilities Act - court cases and studies [Internet]. ada\_cases - Disability Support Services | CSUE. Disability Support Services; 2020 [cited 2022Mar26]. Available from: [https://www.fullerton.edu/dss/faculty\\_staff/ada\\_cases.php#f-text=Summary%20Guckenberger%20&xampertext=A%20class%20action%20u%20to%20requirement%20for%20students%20with%20LD](https://www.fullerton.edu/dss/faculty_staff/ada_cases.php#f-text=Summary%20Guckenberger%20&xampertext=A%20class%20action%20u%20to%20requirement%20for%20students%20with%20LD)
- Siegel LS. Issues in the definition and diagnosis of learning disabilities: A perspective on Guckenberger v. Boston University. *Journal of Learning Disabilities*. 1999 Sep;32(4):204–14.
- Guckenberger v. Boston University. 974 F. supp. 106 (D. Mass. 1997) [Internet]. *Justia Law*. *Justia Law*; 1997 [cited 2022Mar26]. Available from: <https://law.justia.com/cases/federal/district-courts/FSupp/974/106/1450834/>
- Conkhandt WM. Definition: A major issue in the field of learning disabilities. *Journal of Rehabilitation*. 1984 Apr 1;50(2):7.
- Jones SA, Wallace D. National joint committee on learning disabilities. *Encyclopedia of Special Education: A Reference for the Education of Children, Adolescents, and Adults with Disabilities and Other Exceptional Individuals*. 2013 Dec 30.
- Micak J, Fletcher JM. The critical role of instructional response for identifying dyslexia and other learning disabilities. *Journal of Learning Disabilities*. 2020 Sep;53(5):45–53.
- Wagner RK, Edwards AA, Malkowski A, Schatschneider C, Joyner RE, Wood S, Zirps FA. Combining old and new for better understanding and predicting dyslexia. *New directions for child and adolescent development*. 2019 May;2019(163):11–23.
- Deno E. Special education as developmental capital. *Exceptional children*. 1970 Nov;37(3):229–37.
- Deno E. Special education as developmental capital revisited: A quarter century appraisal of means versus ends. *The Journal of Special Education*. 1994 Jan;27(4):375–92.
- Kirby P. Dyslexia debated, then and now: A historical perspective on the dyslexia debate. *Oxford Review of Education*. 2020 Jul 3;16(4):472–86.
- Kate S. The battle over dyslexia. *The Guardian* [Internet]. 2020 Sep 17 [cited 2022 Feb 1]; Available from: <https://www.theguardian.com/news/2020/sep/17/battle-over-dyslexia-warwickshire-staffordshire>
- Solity JE. Instructional psychology and teaching reading: Ending the reading wars. *The Educational and Developmental Psychologist*. 2020 Dec;37(2):125–32.
- Elliot JG, Görgenken EL. *The dyslexia debate*. Cambridge University Press; 2014 Mar 24.