

Module 6

Supporting Students with
 *Nonverbal
Learning
Disabilities*

This module provides information about the characteristics of students with nonverbal learning disabilities (NLD) along with the interventions and adaptations to support their learning.

● Key Ideas in this Module

- A nonverbal learning disability (NLD) can be difficult to identify and easy to overlook.
- Common characteristics of a NLD include rote verbal strengths, nonverbal challenges, and difficulty with mathematics, reading comprehension, and interpersonal and social skills.
- The verbal strengths of students with NLD can be used to help them learn how to understand and manage daily activities.
- Effective interventions for NLD include direct instruction, strategy instruction, and appropriate adaptations.

● Key Terminology

- **Comorbidity** refers to the presence of more than one mental health diagnosis occurring in an individual at the same time.
- **Neuropsychology** is the branch of psychology that deals with the relationship between the nervous system, especially the brain, and mental functions such as language, memory, and perception.
- The **right-hemispheric function** is the part of the brain that processes non-verbal, performance-based information including visual-spatial, organizational, and evaluative processing functions.
- A **syndrome** is a group of symptoms that consistently occur together or a condition characterized by a group of associated symptoms.

● What is a Nonverbal Learning Disability?

NLD is a syndrome characterized by a pattern of strengths and challenges thought to be due to dysfunction in the right hemisphere of the brain. It is not recognized as a formal diagnosis with agreed-upon diagnostic criteria. Educators do not need a diagnosis, however, to address the difficulties of NLD. Educators can implement interventions and adaptations as soon as they become concerned about a student's learning progress.

NLD affects nonverbal learning. Nonverbal or visual information processing skills are more specific to the right brain and rely on the gathering and synthesizing of information

from many sensory sources simultaneously. Dysfunction in the right hemisphere of the brain causes an inability to take these multiple pieces of information and put them together to form a single integrated picture.

Because the challenges of NLD may be profound or mild, different students display different characteristics. The disorder does not change over time; however, as the demands for abstract reasoning and deeper understanding increase in upper early years and in senior years, the severity of the disorder may become more pronounced. NLD is neurologically based, which means it is life-long.

NLD is a syndrome that is often misunderstood, misdiagnosed, or missed. Identification is further complicated by the fact that the symptoms of NLD are similar to those of other disorders, such as attention deficit hyperactivity disorder (ADHD), mathematics disorder (MD), and autism spectrum disorder (ASD). It is also important to remember that more than one disorder can occur at the same time (comorbidity).

- **NLD vs. ADHD:** Students with NLD display less impulsivity and greater problems with interpersonal and social skills (and earlier onset) than students with ADHD. Students with NLD also have more problems with mathematics and reading comprehension, and are more likely to internalize stress leading to anxiety or depression. Students with NLD often have difficulty maintaining attention to tactile and visual stimuli. Because much of the teaching in the early years is visual and requires hands-on (tactile) exercises, these students' difficulties are often misinterpreted as a primary failure in attention.
- **NLD vs. MD:** Students with NLD have more problems with interpersonal relations, social skills, organization, and conceptual thinking than students with MD.
- **NLD vs. ASD:** Student's with NLD do not have the same difficulties with symbolic play, obsessions, repetitive behaviour, and emotional lability (mood changes) as students with ASD.

● Characteristics of a Student with a Nonverbal Learning Disability and Strategies for Supporting Them

NLD can be difficult to identify because of the range of areas impacted and the similarity to other conditions. In this document, the strengths and challenges faced by a student with NLD are presented in four general categories.

1. Verbal functioning
2. Nonverbal functioning
3. Academic functioning
4. Social/Emotional Functioning

● Supporting Verbal Functioning in a Student with a Nonverbal Learning Disability

Strong language skills are often equated with competence. The high volume of speech output, well-developed vocabulary, and word-recognition skills demonstrated by a student with NLD often leads people to overestimate their ability. They may be able to recall an excessive number of facts and details and to repeat verbatim segments of text; however, their speech contains little in the way of meaningful content and tends to be straightforward, repetitive, and rote.

Until we give it meaning, language is simply an array of letters and sounds. Meaning is comprised of the literal meaning of words and often a visual association or sense of what that word conveys. Without being able to create a visual representation, students with NLD store language in memory as discrete units of information in a literal and concrete manner. There is no visual or emotional sense of meaning attached. This affects the student's ability to comprehend the deeper and more integrated function of language.

Additionally, much of our interpersonal and social communication depends on our ability to understand not only what is being said but also the intent or the meaning behind what is being said. We rely on subtle nonverbal cues to help us understand the intended meaning. For example, if someone says 'just a minute', we understand they will be with us shortly. For a student with NLD this means exactly 60 seconds.

Because students with NLD are unable to recognize nonverbal aspects of conversation, they are also unable to replicate them. This leads to their speech having a stilted quality and their conversation can often be inappropriate for the situation. This limits the ability of students with NLD to interact socially, engage in meaningful conversation, enjoy humour, recognize sarcasm, and understand the 'nuances' of language.

Educators can support the verbal functioning of students with NLD by:

- Teaching them to use their verbal strengths to understand their own experiences.
- Providing verbal mediation (talk their way through) for nonverbal experiences, including their interactions with others when appropriate.
- Teaching them to watch for and interpret indications from others that they may be talking too much or that their communication is ineffective in some other way.

● Supporting Nonverbal Functioning in a Student with a Nonverbal Learning Disability

The inability to process and integrate multiple pieces of nonverbal information affects students with NLD in a number of ways. It limits their ability to recognize patterns and make connections based on similarities and differences. This impedes understanding of cause and effect, prediction, generalization, discovery learning, trial and error learning, problem solving, flexible thinking (adapting to new by connecting with known), and critical thinking.

Teachers may find that students with NLD work well within established routines but have difficulty when adapting to new situations or novel material. Adaptation is the ability to change behaviour in response to sensory feedback from the environment. Because students with NLD are limited in their ability to understand and integrate information entering through multiple sensory channels simultaneously, there is a tendency to over rely on rote and previously learned behaviours. New experiences, such as unexpected activities or encountering a substitute teacher, can create anxiety for students with NLD as they lack the necessary skills to adapt to change.

Perceptual-visual difficulties make it difficult for students with NLD to visualize problems in order to solve them. For example, a mechanic may be able to visualize a problem with an engine but not be able to put it into words. The opposite is true of a student with NLD: the student is able to describe things but cannot visualize the problem.

For many students with NLD a lack of gross motor coordination can lead to social rejection as they “get in the way”, bump into people and objects, and are generally unaware of the way their body occupies space. Others may be well coordinated but struggle in team sport situations where there is continuous, complex, multi-sensory information that needs to be processed.

As the concept and sense of time involves the integration and coordination of different kinds of information from different sensory input, students with NLD tend to “be out of time.” They have difficulty estimating the time it takes to complete tasks, have trouble reading an analog clock, and struggle with planning and organizing.

Educators can support the nonverbal functioning of students with NLD. Educators can:

- Teach students to interpret nonverbal cues such as facial expressions and gestures.
- Teach and practise organization; provide verbal cues to help with organization; allow extra time.
- Help students cope with their lack of visual-spatial orientation and directional concepts by planning out daily activities and providing students with a written copy.
- Prepare students for changes in routine and transitions by providing written schedules to the students and parents.
- Develop a plan to slowly increase students’ tolerance for the unknown; implement the plan in a safe and controlled manner, including teaching self-talk skills to help students manage novel situations.
- Have an occupational therapist provide sensory integration therapy to help normalize the reactions of sensory overload.
- Teach the connections between cause and effect relationships and help students find ways to anticipate these.
- Support generalization by using language to connect new situations to old learning.
- Avoid power struggles to deal with inappropriate behaviour; taking away privileges is not an effective strategy.

Teachers should:

- Provide direct instruction and guided practice as students are learning a new strategy.
- Gradually transfer responsibility for defining purpose and selecting strategies to the student.
- Provide monitoring and feedback.

● Supporting Academic Functioning in a Student with a Nonverbal Learning Disability

Students with NLD are slow to develop phonics skills but once developed they do well with word decoding, spelling, and memory for rote material. Verbatim memory for oral and written material may be outstanding. Often the student amasses a stockpile of factual information that is impressive for his or her chronological age. This can be misleading as we assume a deeper understanding accompanies these well-developed verbal skills. Because reading comprehension and higher-level abstract reasoning depend on integrating both the surface and deeper meaning of language, students with NLD often struggle in these areas. Their written compositions may be disorganized or consist of strung-together facts. They may be unable to draw conclusions or make inferences.

Mathematics is about the relationships between quantities, space, structure, and time. Learning mathematics is based on understanding patterns and relationships between these abstract concepts. Because of the challenges associated with non-verbal information processing, students with NLD typically struggle with most aspects of mathematics, including concepts of time, money skills, measurement, number alignment, mathematics signs, and spatial concepts. These students can follow step-by-step processes but have difficulty varying from established routines.

Students with NLD may have difficulty acquiring motor tasks such as handwriting, cutting with scissors, or tying shoelaces, but once mastered fluency is not an issue. Additionally, the challenges with visual spatial integration may lead to problems in geography (because of a difficulty with maps and graphs), in art, and in team sports.

Students with NLD are typically more academically successful in the early years where the demands for success are more rote and require less interpretation and integration of information. As they progress through the school years, they may need an IEP to support their learning through appropriate adaptations and may need support in developing coping skills to manage their daily stress.

Educators can support the general academic functioning of students with NLD. Educators can:

- Provide direct instruction in learning strategies.
- Provide access to and direct instruction in the use of appropriate assistive technology.
- Write out and number multi-step directions and break tasks into manageable segments.
- Break down and explain abstract ideas in detail that students can recall.

- Address students' excessive questions by explaining that there is only time to answer a specific number of questions right now (e.g., three) but that more can be answered later.
- Keep in mind that a student's vocabulary and recall of facts may give an exaggerated sense of competency (assess students level of understanding by having them rephrase information in their own words).
- Teach students how to use private speech to initiate, direct, or maintain behaviour.
- Teach students how to self-monitor to reduce symptoms of inattention and impulsive behaviour.
- Recommend adapted physical education with an emphasis on functional recreational activities (e.g., swimming, yoga, walking) and/or occupational therapy to enhance the perceptual and psychomotor skills necessary for group sports.
- Encourage individual sports like karate, or track and field.

Educators can support students with NLD through adaptations to assessment by providing:

- Opportunities to read aloud during tests;
- A scribe for tests;
- Additional time for assignments and tests.

● Supporting Specific Skills: Mathematical Reasoning

Mathematical reasoning skills include solving complex word problems, equations, graphing, relations, and functions. Educators can support these skills in students with NLD by providing:

- Strategies to make learning more concrete (e.g., use manipulative materials and break down word problems);
- Direct instruction in the use of strategies to break down complex solutions (e.g., use cue cards or formula sheets with step-by-step examples and sequential templates with multi-step solutions);
- Direct instruction in the use of strategies to enhance pattern recognition (e.g., use many examples of patterns for practise and estimate before problem-solving);
- Direct instruction in the use of strategies to enhance comprehension (e.g., create a mathematics vocabulary list, simplify terms when practising new problems, use a partner to generate ideas, create a file system for main sub-topics);
- Direct instruction in the use of Assistive Technology to free up mental energy for mathematics reasoning (e.g., calculator with auditory feedback—go to www.ehow.com/print/about_7219521_assistive-technology-dyscalculia.html—and calculator with printout);

- Direct instruction in the use of Assistive Technology for breaking down complex solutions (http://en.wikibooks.org/wiki/Assistive_Technology_in_Education/Mathematics_Class);
- Direct instruction in the use of Assistive Technology to make learning more concrete (e.g., virtual math websites).
 1. Cool Math Sites: www.coolmath.com/teachers/.
 2. National Library of Virtual Manipulatives: <http://nlvm.usu.edu/en/nav/vlibrary.html>.

For additional information and strategies, please see [Module 5: Supporting Students with Mathematics Disabilities](#).

● Supporting Specific Skills: Mathematical Calculation

Mathematical calculation skills include computation, fractions, decimals, plotting, measurement, proportion, money, and percentages. Educators can support these skills in students with NLDs by providing:

- Strategies to make learning more hands-on, such as using concrete manipulatives, practising with real-life items (e.g., tape measures, measuring cups), practising examples that relate to students' real-life experiences, building models;
- Direct instruction in the use of strategies to breakdown complex solutions (e.g., cue cards or formula sheets with step-by-step examples);
- Direct instruction in the use of strategies for practising procedural memory (e.g., teachers typically model strategy use for students, the use of sequential templates for mapping multi-step directions, or the use of a key math fact legend that translates operations into words);
- Direct instruction in the use of strategies for creating organizational structures and self-monitoring (e.g., checking/re-checking calculations, graph paper to line up numbers, subdividing answer sheets into boxes, highlighting operational signs);
- Permission to use a calculator for tests;
- Permission to use a math vocabulary reference sheet for tests;
- Direct instruction in the use of assistive technology to provide support for memory (e.g., a calculator with a printer, a calculator with voice output, graphing calculators, calculating software) (see www.nonverballearningdisabilities.wikispaces.com/2.+Instructional+Adaptations);
- Direct instruction in the use of assistive technology for creating organizational structures such as spread sheets, graphing/charting software, and graphing calculators (see www.ldonline.org/article/6114/);

- Direct instruction in the use of assistive technology for strengthening procedural memory, (e.g., mathematical software to drill basic operations, virtual math websites that show step-by-step problem solving) (see www.disabilityissues.ca/english/Linkdocs/LDResour.pdf).

For additional information and strategies, go to [Module 5](#): Supporting Students with Mathematics Disabilities.

● Supporting Specific Skills: Reading Comprehension

Reading comprehension involves the ability to form visual pictures of what is read to create a 'whole picture', linking new information with previous knowledge, identifying main ideas, inferring meaning, and summarizing. Educators can support comprehension in students with NLDs by providing:

- Direct instruction in the use of strategies for identifying main ideas (e.g., underlining/highlighting key words, using a graphic organizer to track information and create overview, asking questions to highlight key information, summarizing key points);
- Direct instruction in the use of strategies for making the reading process more active (e.g., reading aloud, previewing and questioning, using chapter summary notes or study guides);
- Direct instruction in the use of assistive technology for identifying main ideas; text-to-speech software with highlighting features: (see www.donjohnston.com/products/read_outloud/, www.texthelp.com/, www.kurzweiled.com/, www.freedomscientific.com/lsg/products/wynn.asp).

For additional information and strategies, please see [Module 3](#): Supporting Students with Reading Disabilities.

● Supporting Specific Skills: Written Expression

Written expression involves the abilities to brainstorm, plan, and organize ideas. Educators can support written expression in students with NLDs by providing:

- Direct instruction in the use of strategies for organizing and planning written work (e.g., using templates and samples, creating outlines, mind mapping, using a partner to generate initial ideas, etc.);
- Direct instruction in the use of a system for organizing topics and supporting topics (graphic organizers);
- Direct instruction in the use of assistive technology for planning and organizing written work; organizational software for mind maps (see www.donjohnston.com/products/draft_builder/, and www.inspiration.com/);

- Direct instruction in the use of assistive technology for the initial generation of ideas (e.g., recording device, voice recognition) (see www.inspiration.com/, www.donjohnston.com/products/draft_builder/, www.nuance.com/dragon/index.htm, and www.gogsoftware.com/);
- Direct instruction in the use of an assignment calculator to break down large projects into manageable tasks (see www.lib.umn.edu/help/calculator/ and <http://apps.library.ryerson.ca/assignment-calculator/>).

For additional information and strategies, please see [Module 4: Supporting Students with Learning Disabilities in Written Expression](#).

● Supporting Specific Skills: Handwriting

Handwriting involves spatial-organizational fine motor activity. Educators can support handwriting in students with NLDs by:

- Providing direct instruction in the use of strategies for completing written work (e.g., provide templates with a limited number of well-spaced prompts; provide teacher prepared lecture guides to minimize the need for note taking);
- Providing assistance with folding, cutting with scissors, arranging material in a visual-spatial manner (maps, graphs, mobiles, etc.);

Providing direct instruction in the use of assistive technology for production of written work (e.g., text-to-speech software) (see www.donjohnston.com/products/write_outloud/index.html, www.inspiration.com/, www.donjohnston.com/products/draft_builder/index.html, www.nuance.com/dragon/index.htm, and www.gogsoftware.com/);

- Using multiple-choice questions rather than essay questions when testing content knowledge.

For additional information and strategies, please see:

- [Module 4: Supporting Students with Learning Disabilities in Written Expression](#).
- *Success for All Learners: A Handbook on Differentiating Instruction: A Resource for Kindergarten to Senior 4 Schools* is a handbook on differentiating instruction and a support document released by Manitoba Education and Advanced Learning which provides blackline masters to support reading and writing across the curriculum. It is available at www.edu.gov.mb.ca/k12/cur/elements.html.

● Supporting Social-Emotional Functioning in a Student with a Nonverbal Learning Disability

Research has shown that more than 65% of the intent of average conversation is conveyed non-verbally (e.g., tone of voice, facial expressions, body posture, etc.). For students with NLDs, who are unable to interpret non-verbal information, social functioning becomes a significant concern. Because their behaviour and verbal interaction style differ from their peers, they are frequently excluded, teased, or persecuted and do not understand why. Students with NLDs often have difficulty developing relationships and close personal attachments. This can lead to social isolation, withdrawal, low self-worth, and an increased risk for anxiety and depression (Rourke, 1989).

Life can be demanding and difficult for students with NLDs and most of the unusual behavioural responses typically seen represent an attempt at compensation. Students with NLDs want to learn, fit in, and succeed. Educators can help these students discover the ways in which they learn, address their challenges through explicit and direct instruction, support their learning needs, and help them utilize their strengths.

Educators can support the social/emotional functioning of students with NLDs by doing the following:

- Teach students relaxation skills to cope with anxiety.
- Help students to develop an understanding of NLDs.
- Provide direct instruction in social skills, such as making eye contact, greeting others, requesting assistance, respecting personal space, not interrupting others, and so forth.
- Provide direct instruction in functional perceptual skills such as reading facial expressions and understanding gestures.
- Create and use social stories and social scripting to help students make and keep friends.
- Explore the possibility of pragmatic language therapy (Speech and Language Pathologist) to address topic maintenance, verbal self-monitoring, and appropriate social communication.
- Educate others to understand and accept that some students may have difficulty making eye contact because of difficulty processing visual and auditory information at the same time.
- Arrange single-peer social activities rather than unstructured or group events.
- Provide direct instruction/explanation in understanding humour, sarcasm, and slang.

Be confident and hopeful;
effective intervention can
affect a positive difference.

● Reference

Rourke, B. P. *Nonverbal learning disabilities: The syndrome and the model*. New York, NY: Guilford Press, 1989.