

### **Module 9: Handwriting**

Today, this module will be exploring handwriting in the context of students in Prep to Year 3. This module will unpack the skills needed for handwriting, including:

Motor skills

Perceptual skills

Functional writing skills

Despite the increased use of technology today, handwriting remains one of the most efficient forms of written communication (Feder & Majnemer, 2007; Stevenson & Just, 2014).

Handwriting allows us to document things with permanency and remains a key skill required for schooling and employment. Although many children now enter school with some handwriting skills, 10-30% will present with ongoing handwriting difficulties.

By year three, handwriting should move from being a skill being learnt, to an automatic and organised tool, which is used for the recording and development of ideas. Legible and functional handwriting requires fine motor coordination, cognitive and perceptual skills and language skills. Without these skills, handwriting may affect future performance at school and when entering the workforce. For more information about our foundations for learning framework, please refer to module 4.

For students with language disorder, handwriting difficulties may come in-hand with other challenges they face during development such as motor and coordination difficulties (Dockrell, Geoff & Vincent, 2009). Also, the high cognitive demands placed on students during handwriting tasks may be impacted by an already reduced language system (Ellis Weismer, Evans & Hesketh, 1999; Montgomery, 2000; Windsor & Hwang, 1999). Such difficulties would lead to reduced length of texts and higher levels of errors than typically developing peers.

The first section of this module will explore the motor skills required for handwriting. The motor domain influencing a student's performance in the classroom includes: integrating early reflexes, muscle tone, balance and posture, crossing over the imaginary midline of the body, using both hands in a coordinated way, as well as fine and gross motor skills and oral and visual motor skills. Children with motor difficulties may present in many ways. They may have difficulty maintaining a good posture, may appear tired or restless, may appear uncoordinated or unbalanced, may not walk well, or may not be able to use their hands and fingers well to manage dressing, eating or handwriting.

To learn about the different areas of the motor domain influencing handwriting, click on the sections below.

When thinking about motor skills, it is important to consider posture. Poor posture while handwriting at a desk may increase difficulty of handwriting for a student and lead to poor handwriting legibility. Some common causes of postural difficulty include poor motor tone and limited core stability. Generally, good posture includes the student having their feet flat on the floor, knees at a 90 degree angle, back up straight (leaning slightly forwards), their bottom touching the back of the chair, elbows resting on the desk, paper being stabilised by their helper hand and neck and shoulders relaxed.

Before students can develop more advanced handwriting skills such as pencil grasp, it is essential they have mastered the foundational skills of handwriting. These are referred to as 'pre-writing skills' and 'fine motor skills'. Pre-writing skills describes the patterns of movement that a student needs to shape letters and numbers. For example, knowing to use a page left to right and top to bottom, drawing clockwise and anticlockwise circles, diagonal lines, curved lines and zig zags (Dockrell, Geoff & Vincent, 2009). Being able to draw any of these patterns without thinking, will make forming letters and numbers easier for students.

Fine motor skills refer to the ability for a student to coordinate all the small muscles in their fingers. Examples of fine motor skills are the ability to manipulate objects within your hand (e.g. play with a paperclip with one hand), grasp objects using your fingers (e.g. slotting a coin into a piggy bank), use two hands together with one leading (e.g. opening a jar) and use both hands together (e.g. clapping). A student with poor fine motor skills may complain of having sore or tired hands and may be unable to complete age-appropriate tasks such as doing up buttons, opening a pencil case or holding a pencil.

It is essential students have established a right or left hand dominance to develop a functional pencil grasp. Generally, students have an awareness of which hand is their "leading hand" and which one is their "helper hand" by 4-5 years of age, allowing them to coordinate movements of both hands for everyday tasks. If by the first few years of school a student is still frequently swapping between hands during schoolwork, they will experience difficulties in learning to write. Both hands need to work together to complete everyday tasks.

By around year 2, students should be at a point of developing a functional grasp. While a dynamic tripod grasp (which is holding a pencil with the thumb, pointer and index finger while the wrist is resting on the desk) is an ideal grasp, current research supports the use of less common grasps, so long as the students' handwriting is functional (Zivani & Wallen 2006; Donica, Goins & Wagner, 2013). This means a student can:  
hold a pencil without fatiguing their hands and fingers  
adequately control movements of a pencil  
achieve legible and timely handwriting.

It is important to consider a student's sensory needs when investigating how they develop a functional pencil grasp. Sensory awareness of the fingers, hands and wrist provides the brain with information on how to grasp the pencil, apply pressure and perform writing movements

Visual-motor integration is the coordination of our eyes and our hands to successfully perform a task. In the classroom, students who are experiencing difficulties with visual-motor integration may appear to be clumsy and uncoordinated. They may also have difficulties copying simple shapes, letters and numbers, which will directly impact literacy and numeracy development

For our first activity I want you to try holding your pencil in your non-dominant hand. Now, on a piece of a paper try copying 'The quick brown fox jumps over the lazy dog'.

The second section of this module will investigate perceptual skills. The perceptual domain includes the awareness of our body in space and memory of what is seen. It also includes visual and auditory processing, or the brain's ability to make sense of information of what is seen and

heard as well as the of time. Students with difficulties in this area may be confused with information they see such as shapes, numbers and words, or confused with information they hear such as sounds, words and instructions. Their problems occur when processing the information not receiving it. They may also have a poor concept of time such as when things happen and for how long. This section of the module will explore some of the different perceptual skills students need for handwriting tasks in the classroom.

To learn about the different areas of the perceptual domain influencing handwriting, click on the sections below.

Visual scanning describes the skill of using our eyes to search in a systematic manner, such as scanning pages from top to bottom and left to right. Visual tracking, however, is the ability to focus on an object or item as it moves. Visual scanning and visual tracking skills are necessary for handwriting as they assist students in reading text, identifying consistency between letters or words and identifying letter orientation.

Form Constancy is the ability to recognise that an object remains the same - even when there has been a change in some of its characteristics, such as: position, size and colour. This means, no matter how an object is presented, a student is consistently able to identify it. Difficulties with form constancy can significantly impact a student's ability to correctly form and orient letters.

Visual closure is the ability to recognise an object as a whole when part of it is missing or hidden. It enables students to make a quick mental image once they have enough information. As a student's knowledge and recognition of written words increases, visual closure enables them to read fluently without needing to sound out individual words.

Visual discrimination is the ability to recognise the similarities and differences between objects and written symbols. It allows students to match and sort objects by size, shape, colour, position, number and detail. Difficulties in this area may impact students' ability to recognise numbers and letters, thereby affecting reading and writing.

Figure-ground discrimination refers to the ability to distinguish an object from a busy background. Figure-ground discrimination skills are used in a variety of tasks, such as finding specific items in a room, detecting words on a busy page and identifying details in pictures. Developing figure-ground skills enables students to concentrate on relevant materials and 'block out' irrelevant information. This leads to increased focus and attention to a task and more organised behaviour.

Visual memory is the ability to store visual details of what has been seen in short-term memory. These details include characteristics of objects or shapes. Visual memory difficulties may impact a student in different ways, including learning letters and numbers and copying from the board.

Sequential memory requires items to be recalled in a specific order, such as the alphabet or when counting. As every word consists of letters in a specific sequence, a student must be mindful of learning this sequence when reading to then recall it later. For example, if a student reads "was", but does not recall the sequence of the word, they may then later write this word as "saw".

The following activity simulates the experience of students with visual perceptual difficulties. Decode the symbols by using the key to uncover the hidden words. Type your answer in capital words, then click submit.

The final section of this module will explore functional writing skills. As you can see, on the foundations for learning model there is no domain labelled "writing skills". This is because many of the domains are integrated into writing. To bring together the underlying motor and perceptual skills we've learned about so far, we also need to understand how cognition, language ability and the Australian curriculum influence a student's handwriting.

To learn about the different areas of the functional writing skills, click on the sections below.

Letter recognition is one of the first literacy skills students learn at school and it lays the pathway for learning to read and write. When learning to recognise letters, a student draws upon their language skills (learning the name of the letter and storing it in their language system), cognition (in the area of memory) and perceptual skills (recognising the shape of the letter). When transitioning letter recognition to writing, understanding the link between shape-name-sound is important as to help students remember letters when writing. To be able to write, students need to recall letters from memory and then use their motor skills to correctly to write letters or words (Cahill, 2009).

For handwriting to be considered legible, there are expectations guiding the position of words on page, the placement of letters within lines, and the spacing between words. These need to be explicitly taught in the classroom and practiced to increase legibility.

The concept of writing across a page, starting on the left and moving to the right, can be taught when practicing letter formation. As students begin to write words and sentences, more detailed skills of spacing between letters and words can then be taught.

Automaticity of letter and number formation means that students can write letters or numbers without thinking about how to position the pencil or make the movement. This is important as it frees up student's memory to think about what to write. Automaticity can be developed by practicing the skills needed to write in many different activities.

There are many factors to consider when identifying why a student may not have the speed in writing to keep up with the rest of the class. The first reason to look at is whether students have learned letter patterns adequately. Speed should not be addressed until letter formations have been learned, as students need the automaticity of writing before they can work on other aspects of writing. Other common reasons for slow writing can be difficulties with attention, memory, language, motor skills and cognition.

Copying is needed in many classroom activities; either copying from the board, or copying from a worksheet/textbook on a desk. While sometimes perceived as poor behaviour in the classroom, laziness or tiredness, some signs displayed by students during copying activities may hint that they have not mastered all the necessary skills for copying. Copying in general requires a broad range of visual, perceptual, fine motor and handwriting skills and can present many difficulties for a child if they are unable to complete copying tasks.

At this stage of the training, I invite you to take a minute to reflect. Consider the content covered so far.

Do you feel like you have an increased knowledge of handwriting development?

Take a minute to think about the student's in your class that may have handwriting difficulties. Based on your learning, what might be the contributing factors to these difficulties? How might you support these students?

When you are ready to move on, click the next button.

We hope you have a greater understanding of handwriting development, the causes of handwriting difficulties and some strategies to support your students in the classroom. I encourage you to use your new knowledge to help make the appropriate adjustments for your students to support them within the classroom.

For more information on content covered in the module, please view the following handouts.

Visual Motor Integration

Posture

Hand dominance

Pre-writing skills

Bilateral integration

Fine motor skills

Development pencil skills & grasp

Visual perception

Visual discrimination

Visual scanning

Visual closure

Visual memory

Figure ground

Spatial relations

Positions on line & Page

Handwriting development – red flags