

## **Evidence Base for Handwritingbot**

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# Helping spelling, reading and writing

The new phonetics feature of HandwritingBot can be a valuable tool for students in improving their reading, writing, and spelling skills in several ways:

## 1. Enhancing Reading Skills

- **Phonetic Awareness:** By breaking down words into their phonetic components, students can learn to recognise the individual sounds that make up words. This can help in decoding unfamiliar words and improving reading fluency.
- **Pronunciation Practice:** The phonetics feature can guide students on how to pronounce words using a 'spelling voice', reinforcing their understanding of letter-sound relationships and improving their overall reading fluency and comprehension.

## 2. Improving Writing Skills

- **Sound-to-Letter Mapping:** Understanding phonetics helps students grasp how sounds correspond to letters and letter combinations. This can aid in more accurate and confident writing.
- **Phonetic Spelling:** When students are unsure of how to spell a word, they can use their knowledge of phonetics to spell it out as it sounds, which is a critical step in learning to write correctly.

## 3. Boosting Spelling Skills

- **Spelling Patterns:** Exposure to phonetic representations helps students notice and remember common spelling patterns and rules in the English language.
- **Word Segmentation:** Breaking words into phonetic chunks can make spelling more manageable. Students can tackle one sound at a time, which simplifies complex words.

## Examples and Scenarios

- **Blending Sounds:** A student learning to read the word "cat" would see it broken down into its phonetic components /k/ /æ/ /t/. Practicing this helps them understand how the sounds blend to form the word.
- **Segmenting Words:** For writing, a student might be unsure how to spell "elephant." They can break it down phonetically as /ɛ/ /l/ /ə/ /f/ /æ/ /n/ /t/, guiding them through the spelling process.

## Benefits for Different Learning Styles

- **Visual Learners:** Seeing words broken down into phonetic components can help visual learners grasp the structure and spelling of words.
- **Auditory Learners:** Hearing the phonetic sounds and practicing pronunciation can reinforce learning for auditory learners.
- **Kinaesthetic Learners:** Writing words phonetically and spelling them out can help kinaesthetic learners through active engagement.

By integrating phonetic features into its functionality, HandwritingBot can provide a comprehensive tool for students to enhance their reading, writing, and spelling abilities, making the learning process more interactive, effective, and enjoyable.

## Best practise handwriting strategies

Even though some students seem to handwrite effortlessly, most students require explicit teaching. Recent research suggests consistent practice which provides students with opportunities to develop emerging skills is most beneficial for developing handwriting fluency (Cahill, 2009; Schlagal, 2014). **Handwritingbot can be integrated into any lesson and easily broadcast to students from a TV on individual devices for daily tasks. It includes explicit teaching of how to form each letter in both audio and video form.**

Handwriting instruction should include:

1. Teacher modelling of the correct formation, sizing and placement of letters. For early learners, writing letters in the air or copying a letter from a correct model is helpful (Graham, 2010). **Handwritingbot's animation speed and pause between letters can be adjusted so students can form the letters in the air, then write them afterwards. It includes explicit teaching of how to form each letter in both audio and video form.**
2. Teacher explanations on how to form letters and words must accompany the modelling. **As above. The audio of how to form each letter is consistent every time students hear it.**
3. Short daily practice sessions which prove to be more effective (and perhaps more interesting) than longer weekly lessons. **Handwritingbot can be integrated into any lesson and easily broadcast to students from a TV or individual devices for daily tasks.**
4. The introduction of letters of the alphabet in formation groups rather than in ABC order. This method removes the chance for the visual confusion of letters that are closely positioned within the alphabet (b/d and p/q). For the Victorian modern cursive handwriting script, this means letters can be taught in the following groups:
  - anticlockwise letters (a, c, d, g, q, e, o, f, s)
  - clockwise letters (m, n, r, x, z, h, k, p)
  - the i family letters (i, t, l, j)
  - the u family letters (u, y, v, w, b)

**Teachers program their own exercises, so teaching in these letter groups is simple.**

Regardless of what order letters are chosen to be taught, it is important that students know the names of individual letters and the sounds that can represent each one. Letter names and their sounds serve as a memory cue and assist the retrieval of the motor-program required to successfully write a given letter (Graham, 2010).

**Handwritingbot audio includes naming the letter before describing how to form it. Alternative audio includes just naming the letter without the formation instructions. The letter sounds instead of names will be an option in 2024!**

Other considerations in the teaching of writing include:

- Using mnemonics to prompt student letter formation (for example, begin at the top, tail letters go under the line, 't' is a teenager not fully grown or 'w' is like a wiggly worm). **Handwritingbot audio includes mnemonics for each letter.**

- Teachers capitalising on the opportunities to teach handwriting through the writing practices of modelled, shared, interactive, guided and independent writing. Teachers could *model* a recount using Handwritingbot; create a *shared* story with students; students can *interactively* create texts together; teachers can *guide* them on what to write before; students can *independently* type/dictate on their device, then copy what has been produced using best practise handwriting.
- Linking handwriting to other curriculum areas so that it is meaningful rather than just skill and drill. Examples include modelling of writing prompts on a TV; sending exercises to students' devices such as spelling lists; students can dictate the answer to a maths problem such as 'what might you be doing at 8am?' then copy the animation.
- Ensuring handwriting does not take the place of writing. Students should also have an opportunity to write regularly for meaning and purpose. Handwritingbot simplifies the writing process by bypassing the step of translating thoughts into individual letters. Students can express their ideas verbally, have Handwritingbot read their words aloud, then proceed to write with accurate spelling and handwriting. This approach is particularly beneficial for novice and reluctant writers, enabling them to experience success, boost their confidence and employ best-practices in their writing.

Information about the importance of handwriting versus keyboarding can be found [here](#)

# Students with dyslexia and dysgraphia

Handwritingbot can specifically address the needs of students with dysgraphia in the following ways:

- 1. Illegible Handwriting:**  
Handwritingbot offers structured and consistent practice in letter formation, helping students produce more legible handwriting.
- 2. Inconsistent Spacing and Poor Letter Formation:**  
Handwritingbot provides exercises designed to improve letter spacing with the two finger space animation between words and consistent letter formation, guiding students to develop better handwriting habits.
- 3. Slow Writing Speed:**  
Handwritingbot allows students to practice at their own pace, with the adjustable animation speed and pause between letters, and gradually improving their writing speed through repetitive and structured activities.
- 4. Poor Pencil Grip and Fatigue:**  
While Handwritingbot doesn't directly address pencil grip, the reduced pressure and more enjoyable practice environment can lessen fatigue and encourage more frequent practice.
- 5. Frequent Erasures and Cross-Outs:**  
Handwritingbot's immediate feedback helps students correct mistakes in real-time, reducing the need for erasures and cross-outs.
- 6. Avoidance of Writing Tasks:**  
The interactive and engaging nature of Handwritingbot makes handwriting practice more appealing, reducing frustration and avoidance.
- 7. Omission of Words and Letters:**  
Handwritingbot can help students focus on forming each letter and word correctly, reducing the likelihood of omissions.
- 8. Difficulty with Copying:**  
Handwritingbot's structured exercises can improve the skills needed for copying text accurately, promoting better attention to detail.
- 9. Poor Spatial Planning on Paper:**  
Handwritingbot includes features that guide students in organizing their writing spatially, helping them maintain consistent margins and alignment.
- 10. Spelling Difficulties:**  
Handwritingbot integrates spelling practice into handwriting exercises, helping students improve their spelling alongside their handwriting skills.

By addressing these specific needs, Handwritingbot supports the development of handwriting skills in a structured, engaging, and effective manner for students with dysgraphia.

# Students with learning difficulties

HandwritingBot is especially beneficial for children with learning difficulties. The benefits of video modeling are well-researched and known to reduce stress, include multi-sensory teaching, increase enjoyment, keep a consistent and familiar format, and is self-paced.

## **Expanded Benefits of HandwritingBot for Special Needs Students**

1. **Reduces Stress and Anxiety:**
  - **Consistent Format:** The predictable and repetitive nature of video modeling helps create a stable learning environment, which is particularly beneficial for children with autism spectrum disorder (ASD) and anxiety. Consistency helps reduce stress and makes the learning process feel safer and more manageable.
  - **Self-Paced Learning:** Students can replay the animations as many times as needed, which eliminates the pressure of keeping up with peers or the instructor. This flexibility is crucial for children with learning difficulties who may require more time to master each step.
2. **Multi-Sensory Teaching:**
  - **Visual and Auditory Cues:** By incorporating both visual animations and auditory instructions, HandwritingBot caters to different learning styles and strengthens the retention of information. This approach is particularly effective for children with dyslexia and other learning disabilities.
  - **Tactile Feedback:** When paired with writing practice, the tactile experience of forming letters can reinforce learning. Special needs students often benefit from this multi-sensory approach, as it engages multiple parts of the brain, enhancing understanding and memory.
3. **Increases Enjoyment and Engagement:**
  - **Interactive Elements:** The interactive nature of Handwritingbot can make the learning process more enjoyable and engaging. This is particularly important for maintaining the attention of students with ADHD and other attention disorders.
  - **Motivation:** Positive reinforcement of such improved handwriting and spelling can boost motivation and self-esteem. Seeing their progress can encourage students to keep practicing and improving their skills.
4. **Customizable and Adaptive Learning:**
  - **Tailored Content and student agency:** HandwritingBot's ability for students to type or dictate their own text as well as modifying the pause between letters and animation speed ensures that each child receives the appropriate level of challenge and support, which is crucial for students with varying degrees of learning difficulties.
  - **Feedback and Correction:** Immediate feedback on letter formation and writing can help students correct errors in real-time, promoting better learning outcomes. This feature is beneficial for students with dysgraphia and other writing disorders who need constant guidance.
5. **Facilitates Independent Learning:**
  - **Empowers Students:** By providing tools that students can use independently, HandwritingBot empowers children to take control of their learning. This

independence can foster a sense of achievement and confidence, which is particularly valuable for students with special needs.

- **Parental and Teacher Support:** The ability for parents and teachers to monitor progress by observing students write rather than using their time to demonstrate how to write ensures that children receive consistent support both at home and in the classroom.

#### 6. **Evidence-Based Practices:**

- **Research-Backed Benefits:** Studies have shown that video modeling can significantly improve skill acquisition in children with autism and other developmental disorders. The visual and step-by-step nature of video modeling aligns with the learning preferences of many special needs students, making it an effective teaching tool.
- **Proven Techniques:** Incorporating proven educational techniques such as scaffolding, where complex tasks are broken down into manageable steps, helps students gradually build their skills without becoming overwhelmed.

#### 7. **Support for Diverse Needs:**

- **Wide Range of Fonts:** The inclusion of all Australian print and precursive fonts ensures that HandwritingBot meets various curriculum requirements and caters to the specific needs of different educational systems. This versatility makes it a valuable resource for schools and parents across different regions.
- **Inclusivity:** By providing resources that cater to the needs of all students, including those with special needs, HandwritingBot promotes an inclusive learning environment where every child has the opportunity to succeed.

In summary, HandwritingBot enhances learning for special needs students by providing a structured, multi-sensory, and engaging approach to writing instruction. Its ability to reduce stress, adapt to individual needs, and support independent learning makes it a powerful tool for improving educational outcomes for children with learning difficulties.