Developing a Written Productivity Profile: Comparing handwriting to keyboarding

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Introduction

Gathering data on handwriting and keyboarding is useful when making decisions about a student's written productivity. To gather data, students complete 4 similar tasks using handwriting and keyboarding. The following pages provide a full narrative description of the assessment process, but overall, it's a simple process that takes less than a half hour to complete.

I. Handwriting Profile Assessment

To develop a written productivity profile, it is important to document the student's handwriting across a variety of tasks. In this part of the assessment, handwriting is first evaluated using a task that typically requires little working memory, and no spelling or composing. The second task adds near point copying as a variable. The third task adds spelling, and the fourth task requires more working memory to compose and spell.

A. Take Timed Writing Samples

Materials needed:

- a pencil similar to one the student typically uses (preferably without an eraser)
- lined paper appropriate to the student's grade level
- a timer or watch with a second hand
- a written sample of a sentence to be copied (see section 2 below)

In a quiet area, in a one-to-one situation, data should be collected on the following:

1. Writing the full alphabet
2. Sentence copying: "The quick brown fox jumped over the lazy dogs."
3. Writing a sentence from dictation
4. Writing an independently composed sentence

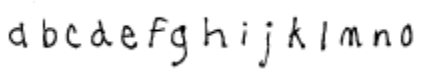
1. Writing the full alphabet:

- Ask the student to write the alphabet until you say stop. Allow the student to use manuscript or cursive, upper or lower case. Begin timing the process once the student begins to write the first letter.

- Observe the student writing the alphabet for one full minute and then instruct the student to stop. If the student writes quickly, ask him to continue writing the alphabet until he writes for one minute. If the student hesitates and seems unsure of what letter comes next, quickly tell the student the next letter as this is not a test of his alphabetic knowledge.

- Indicate on your data collection form the number of letters written in one full minute. Do not count spaces or penalize the student for omitted or incorrect letters. Then divide the letters per minute by 5 to obtain a gross word per minute rate (WPM).

Example



= 15 letters per minute or 3 WPM

2. Sentence Copying:

Clearly print or type the following sentence, which incorporates all of the letters of the alphabet, at the top of a piece of lined paper.
(See Appendix D).

The quick brown fox jumped over the lazy dogs.

If the student is familiar with this sentence such that he or she is able to write it from memory (instead of copying), substitute a less familiar sentence that contains all the letters of the alphabet.

The queen and king wore fuzzy slippers when jumping over the cardboard box.

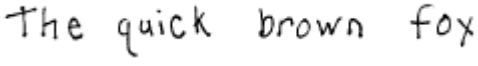
It was not until daylight that the very dizzy farmer spied the jumpy old fox by the square chicken coop.

- Ask the student to copy the sentence until you say stop.

- Observe the student writing the sentence for one full minute. Repeat the sentence if needed and then instruct the student to stop.

- Indicate on your data collection form the number of letters written in one full minute. Do not count spaces or penalize the student for omitted or incorrect letters. Divide the letters per minute by 5 to obtain a gross word per minute rate (WPM).

Example:



= 16 letters per minute or 3.2 WPM

3. Writing a Sentence from Dictation:

- Tell the student you want her to write a sentence that you will read to her.

- First, read to the student one of the sentences listed below.

- Ask the student to try her best to write each word in the sentence. Then speak each word of the sentence slowly one word at a time. Do not provide a visual model of the sentence. Do not stretch or over articulate words such that the word is phonetically disassembled. Begin timing the process once the student begins to write the first letter of the first word. When she has completed that word, quickly supply the next word in the sentence.

  Select a dictation sentence that would be typical for the age and grade of the student. The sentence should not be too difficult for the student, but should also include some words that provide a reasonable spelling challenge.

  Possible dictation sentences:

  Emergent level sentences:

  Look at that little girl play the drum.
  Can I play with that big red ball?
  Today I made a funny picture at school.
  I will eat all five hot dogs.
  We will ride on the blue boat.

  Fluent level sentences:

  Most of the time I sleep better at home.
  Before I start to read I turn on the light.
  I washed my hands because they were dirty.
  I found a green pen to write a letter.
  We can laugh about those eight clowns.
  I have seven books about forest animals.

  Secondary level sentences:

  There was confusion when the train suddenly stopped on the mountain.

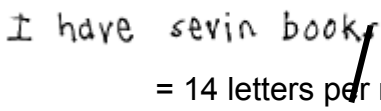
  His composition needed many corrections. His editing skills were lacking.

  Today I will go to the planetarium to see constellations of stars. We will study astronomy.

- Indicate on your data collection form the number of letters written in one full minute. Do not count spaces or penalize the student for omitted or incorrect

letters. Divide the letters per minute by 5 to obtain a gross word per minute rate (WPM).

Example: The slash indicates the end of the one minute time period.



= 14 letters per minute or 2.8 WPM

4. Writing an Independently Composed Sentence

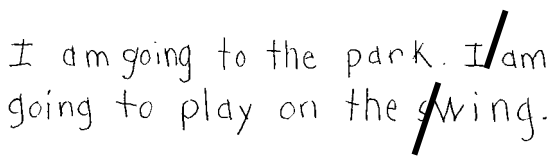
- Casually engage the student in a conversation that is of interest to the student.

- After a minute or two of conversation, ask the student to write one or two sentences about what was discussed. For example, if the student likes a particular movie or television show, ask the student about his favorite part. After the student describes one or two events, ask the student to write two sentences about the movie or show. *Do not visually or verbally model a sentence for the student.* This task is looking at the ability of the student to convert oral language into written language.

  Kindergarten or first grade level students may only be able to compose one sentence. Older elementary age students may be able to compose one to two sentences. Secondary students should be encouraged to compose at least two to three sentences. Students with severe writing problems should be encouraged to produce as much as they can. Begin timing the process once the student begins to write the first letter of the first word. Indicate in your notes at what point in his writing the student was at the one minute mark. Continue doing this at each additional one minute mark until the student has finished his task. The writing task should not be longer than 5 minutes.

- Indicate on your data collection form the number of letters written at the one minute mark, at the two minute mark, etc., until the student has finished the task. Do not count spaces or penalize the student for omitted or incorrect letters. Report the number of letters per minute or average the letters per minute for each completed minute of time. Divide the letters per minute by 5 to obtain a gross word per minute rate (WPM).

  Example:



First minute: 18 LPM or 3.6 WPM
Second minute: 19 LPM or 3.8 WPM

B. Obtain Handwriting Samples

You may also want to obtain unedited work samples that have been completed in class. Student notebooks often provide samples that will provide evidence of the student's typical handwriting.

To gauge legibility, it is helpful to ask an unfamiliar adult to read the writing sample and note the percentage of words that are read correctly. The student can also be asked to reread past assignments out loud to note the percentage of words that are read correctly.

II. Keyboarding Profile Assessment

To develop a written productivity profile to aid in the consideration of assistive technology, it is important to document the student's keyboarding, as well as handwriting, across a variety of tasks. To assess keyboarding skill, you will use strategies similar to those listed in the handwriting section. As with handwriting, in this part of the assessment keyboarding is first evaluated using a task that typically requires little working memory, and no spelling or composing. The second task adds near point copying as a variable. The third task adds spelling, and the fourth task requires more working memory to compose and spell.

Keyboarding Style

Observe the student using the keyboard to write his name and the date. Note the style of fingering the student uses. Fingering styles can include:

- Optimal: ten finger touch typing
- 2 fingers; 2 thumbs for space bar
- 2 index fingers
- one finger and thumb
- one finger hunt and peck

A. Take Timed Keyboarding Samples

Materials needed:

- a standard keyboard and computer. Turn off auto correction features that affect spelling and capitalization.
- a timer or watch with a second hand

In a quiet area, in a one-to-one situation, data should again be collected on the following:

1. Typing the full alphabet
2. Sentence copying using keyboarding
3. Typing a sentence from dictation
4. Typing an independently composed sentence

1. Typing the full alphabet:

- Ask the student to type the alphabet until you say stop. Allow the student the keyboarding style most comfortable for that student. Begin timing the process once the student begins to type.

- Observe the student typing the alphabet for one full minute and then instruct the student to stop. If the student types quickly, ask him to continue typing the alphabet until he types for one minute. If the student hesitates and seems unsure of what letter comes next, quickly tell the student the next letter, as this is not a test of his alphabetic knowledge.

- Indicate on your data collection form the number of letters typed in one full minute. Do not count spaces or penalize the student for omitted or incorrect letters. Divide the letters per minute by 5 to obtain a gross word per minute rate (WPM).

  Example:

  abcdfghjklmnoprstvwy = 20 letters per minute
  Or 4 WPM

2. Sentence Copying Using Keyboarding:

- Have the student copy the same sentence used in the handwriting section above: The quick brown fox jumped over the lazy dogs. Place the paper on a typing stand or on a clipboard positioned to the side of the computer where the student can see it with ease.

  If the student is familiar with this sentence such that he or she is able to write it from memory (instead of copying), substitute a less familiar sentence that contains all the letters of the alphabet.

  The queen and king wore fuzzy slippers when jumping over the cardboard box.

  It was not until daylight that the very dizzy farmer spied the jumpy old fox by the square chicken coop.

- Ask the student to type the sentence until you say stop. Observe the student typing the sentence for one full minute. Repeat the sentence if needed to reach one full minute and then instruct the student to stop.

- Indicate on your data collection form the number of letters typed in one full minute. Do not count spaces or penalize the student for omitted or incorrect

letters. Divide the letters per minute by 5 to obtain a gross word per minute rate (WPM).

Example:

The quick brown fox jumps ov = 23 letters per minute
or 4.6 WPM

3. Typing a Sentence from Dictation:

- Tell the student that you want her to type the sentence that you will read to her.
- Read the same sentence as used in the handwriting section above. Then, providing one word at a time, ask the student to type that word in the sentence. *Do not provide a visual model of the sentence. Do not stretch or over articulate words such that the word is phonetically disassembled*. Begin timing the process once the student begins to type the first letter of the first word. When she has completed that word, quickly supply the next word in the sentence.
- Indicate on your data collection form the number of letters typed in one full minute. Do not count spaces or penalize the student for omitted or incorrect letters. Divide the letters per minute by 5 to obtain a gross word per minute rate (WPM).

  Example:

  Dictation sentence: Before I start to read I turn on the light.

  Befur I stort to reed I trn = 21 letters per minute, or 4.2 words per minute

4. Typing an Independently Composed Sentence

- Casually engage the student in a new conversation that is of interest to the student.
- After a minute or two of conversation, ask the student to type one or two sentences about what was discussed. For example, if the student recently went on a fun vacation, ask the student about his favorite part of the trip. After the student describes one or two events, ask the student to type two sentences about this. *Do not visually or verbally model a sentence for the student.* This task is looking at the ability of the student to convert oral language into written language, and thereby, to compose meaningfully using the keyboard.

  Kindergarten or first grade level students may only be able to compose one sentence. Older elementary age students may be able to compose one to two

sentences. Secondary students should be encouraged to compose at least two to three sentences. Students with severe writing problems should be encouraged to produce as much as they can. Begin timing the process once the student begins to type the first letter of the first word. Indicate in your notes at what point in his typing the student was at the one minute mark. Continue doing this at each additional one minute mark until the student has finished his task. The writing task should not be longer than 5 minutes.

- Indicate on your data collection form the number of letters typed at the one minute mark, at the two minute mark, etc., until the student has finished the task. Do not count spaces, punctuation or penalize the student for omitted or incorrect letters. Report the number of letters per minute or average the letters per minute for each completed minute of time. Divide the letters per minute by 5 to obtain a gross word per minute rate (WPM).

Example:

I wnt on a trp with my dad and brothr. We

[1 minute]

wnt campng.

[2nd minute]

First minute= 18 LPM or 3.8 WPM
Second minute= 21 LPM or 4.2 WPM
Average= 19.5 LPM or 3.9 WPM

B. Obtain Background Information

It is useful to obtain background information that documents previous experience with keyboarding. Occupational therapists and teaching staff who address computer skills can be consulted to determine if keyboarding opportunities have been made available to the student. Occupational therapists can make observations of a student's fine motor dexterity, to help make decisions whether traditional 10 finger keyboarding is a possibility or whether based on the student's age or disability, less traditional fingering patterns will be more functional, e.g., 2 index fingers plus 2 thumbs on the space bar.

Keyboarding Effectiveness

To be effective, keyboarding should at least be commensurate with age appropriate handwriting speed. A student should, at least, be able to type the alphabet and type a copied sentence at a rate similar to handwriting rates expected at his grade or age level. When keyboarding rates are slower than handwriting rates, then the student may experience frustration by the comparative slowness of keyboarding. By the 5th grade, students typically achieve handwriting speeds of 10 WPM using a copying task. In order for keyboarding to be effective for that student,

keyboarding rates for the alphabet and a copied sentence should be at or above this WPM rate. *If keyboarding rates lag behind handwriting rates, but keyboarding is needed as an accommodation for illegible handwriting, then keyboarding training which builds familiarity with the layout of the keys or keyboarding training that teaches 10 finger typing may be necessary.*

Again, at early literacy levels, it is not unusual for the word per minute rate to be slightly reduced when a student is required to spell or independently compose a sentence. Spelling and/or the composition of written language are significant factors when the WPM rates show a greater discrepancy as compared to keyboarding tasks that do not require these skills. A student with overall developmental delays should be expected to keyboard at a rate commensurate with his or her development level of ability; age and grade levels would not determine keyboard rate.

For complete information on developing a written productivity profile related to spelling and written expression, contact Denise DeCoste or Carol Hightower at HIAT by email.