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EFFECTIVENESS OF ORTON–GILLINGHAM APPROACH TO A STUDENT WITH LEARNING DISABILITY: A CASE STUDY REPORT

Shameem Banu Showkath Hussain[1] & Laurie D. Leason[2]

[1]*Associate/AOGPE, Orton-Gillingham Educator, Dubai, United Arab Emirates.*

[2]*Fellow/AOGPE, Orton–Gillingham Language Therapist, OG instruction Learning Centre, Amenia, New York.*

Abstract

Individuals with learning disabilities are those who, despite traditional classroom teaching, have failed to demonstrate mastery in spelling and reading. This case study examined the effectiveness of Orton–Gillingham (OG)-based literacy approach to enhance reading and spelling skills. The participant, a fifth-grade student, presented with significant difficulties in decoding and encoding skills. The preliminary diagnostic tests were conducted to obtain the knowledge of phonics in reading and spelling. These test scores indicated the intensity of reading and spelling difficulty. A single participant, intervened with one-on-one OG approach for 1 year 5 months, supported with multi-sensory instruction. Data were collected through Barnell Loft diagnostic spelling test(Wittenberg, 1980), Gallistel-Ellis test of decoding, encoding skills (Gallistel, 1973) and parental feedback. Results demonstrated that the participant showed a significant increase in reading and spelling scores.

***Keywords**: Orton–Gillingham, decoding, encoding, multi-sensory.*

Referral concerns

The participant MA (pseudonym) was an eleven-year-old boy with mild mental retardation, congenital microcephaly, speech and developmental delay, hyper activity and attentions deficit and learning disability. He had been to special education service in a regional center, but his academic concerns, lingering despite intensive tutoring and previous therapies motivated the participant's mother to seek professional help. The participant was failed in summative assessment and retained in the same grade. MA was referred by his class teacher due to his learning difficulties to the OG tutor (author) to address his individual differences and needs. He faced challenges with reading, spelling, computing and writing skills. His mother primarily wanted to improve his reading skill. The author designed Orton–Gillingham

(OG) lesson plans and demystified reading and spelling by teaching phonograms, rules and generalization in alignment with OG principles (Gillingham and Stillman, 1960).

Background information

Participant's description and interests

MA was a curious, kind and social child. He liked dancing and took part in school cultural programs. His attitude towards school was variable. He loved religious and geographic studies. Mathematics, English and Science were more challenging for him, resulting in negative attitude towards those subjects. But he loved to go to school and enjoyed peer interaction.

Participant's family

MA lived in a nuclear family with his parents. His mother showed interest and concern in his academics. However, his father denied his disability, and he believed MA would overcome his intellectual disability. There was a family history of global developmental delay in his paternal side. MA's paternal uncle had developmental delay and dropped out of school at early years due to poor educational performance.

Relevant prenatal history and medical issues

MA was born to non-consanguineous parents with the history of Intra Uterine Growth Restriction (IUGR) and low birth weight. He was infected with congenital cytomegalovirus and suffered from seizures initially. He had undergone Computed Tomography (CT) scan of the brain and Electroencephalogram (EEG) immediately after the birth and later Magnetic Resonance Imaging (MRI). Repeated EEGs were done which were reported as unremarkable. He had had no further seizures and was not under any medication. He was diagnosed with Bilateral Retinochoroidal Coloboma of the eyes. He uses refractive glasses as prescribed by ophthalmologist.

Psychological assessment and Cognitive functioning

A comprehensive psychological assessment was carried out in December 2016. Wechsler Primary Scale of Intelligence (WPSI-R) indicated MA's mental age as 7.8 and Social Quotient (SQ) from Vineland's Social Maturity Scale indicated social age as 7.6, whereas his chorological age was 10.

Peabody Picture Vocabulary Test (PPVT-3) measured MA's vocabulary recognition age. The standard score he achieved was age appropriate. MA's receptive knowledge of various vocabulary items along with morphological constructions, grammatical categories, and syntactic structures were measured with Test for Auditory Comprehension of Language

(TACL-4). He presented the below average output of the story and some random flight which was pragmatically and semantically correct (level output 65%). In Language Development and Oral Expressive Communication Scale, he attained a level mildly below average. MA was not penalized for the use of total communication or for mis-articulations. A passage was read to MA to evaluate listening and comprehension skills. Understanding complex language and drawing inferences from the story presented with confusion and irrelevance. Dyslexia Screening Test- Junior (DST-J) was administered and the test results not only reflected difficulties but also provided data on areas of strength and weakness. The sub-scales score of the DST-J are considerably below, the risk index shows MA has great difficulty in rapid naming, one-minute reading, phonemic segmentation/rhyme, two-minute spelling, backwards digit span, non-sense reading, one-minute writing and vocabulary. Eventually, large-print materials were presented for testing due to his visual acuity issue and he wore spectacles during testing time.

Early intervention and Educational history

MA attended play school and enrolled in kindergarten, when he was 4. But the school management recommended his mother to take him to special educational service because he was not focused and showed interest like his peers. Then his mom admitted him in a regional special education center when he was 7. He had been to educational and therapeutic services from October 2013 to March 2018. He attended the centre every day evening (Sunday to Thursday) for 2 hours for the period of 4.5 years. Mother was not aware of the educational plan followed at the centre, and no records were shared by the special education team. As reported by his mother, he attended speech therapy sessions due to articulation difficulty, at present his speech has clarity and intelligibility. He was enrolled in Grade 1 at the age of 7 in a regular school. The mother reported that she has not found any changes in his academic skills after attending 4.5 years of educational intervention in the regional special education centre. It has been recommended by his class teacher to find the appropriate educational intervention to intervene his specific learning needs and challenges.

Observation and data collection

MA was accompanied by his mother for initial screening and informal data collection sessions (total sessions: 5) in April 2018. His mother shared previous clinical assessment reports, test results, pedagogy records, class works, etc. He was attentive, social and maintained good eye contact during the sessions. He had no difficulty in maintaining sitting position when required. He got distracted easily and his attention tended to shift from one

task to another. The following tests and screening tools were administered to ascertain his baseline.

Letter Naming Fluency (LNF) test

This test showed MA has difficulty in recognizing 'I' and 'L' due to its visual similarity (Roland et al. 2011). His processing speed (fluency) is below than his chronological age. He was able to complete the test at 2 min 07 seconds. The test result was an indicator that MA lacked in basic early literacy skills. It was found out that MA required intensive structured literacy support.

Barnell Loft Diagnostic Spelling test

This test was conducted to examine MA's spelling ability. Also, it helped to diagnose the spelling deficiencies, because the words in the tests were clustered by spelling principles (Table 1) **(**Wittenberg, 1980). The test results indicated that his concepts on Vowel-Consonant-e rule, vowel diphthongs, vowel +r, -le words, two syllable phonograms were not established. He made errors in 18 items consecutively; hence, the test was stopped. His raw score was 6. The Barnell Loft diagnostic spelling test conversation table indicated his spelling age was less than 2 years which alarmed MA has significant difficulty in spelling (Wittenberg, 1980).

Principles	**Score**
Short vowels	4/5
Final e	0/3
Vowel digraphs	1/4
Adding Endings	1/4
More endings	0
Vowels+ r	0

Table 1 Barnell Loft Diagnostic Spelling test score

Gallistel-Ellis Test of Coding Skills

This test measured whether MA could give the sounds for the various letters and units or clusters (Gallistel, 1973). More importantly, it measured whether MA could recognize and spell words of these sounds. This test covered all categories of phonic structures. The author identified MA's knowledge of phonics in reading and spelling. The following procedure is followed in conducting GE test. MA was asked to attempt at least the first two words of every section, if he read correctly he was allowed to read continuously and testing carried out until he missed five out of six consecutive words attempted. If he missed both of the first two words in any section, testing was discontinued in that section and he was asked to read the

first two words in the next session.The same procedure was followed to extract the spelling score from the test (Table 2).

Principles	**Reading Score**	**%**	**Spelling score**	**%**
Closed syllable single consonant CVC	17/25	68	6/10	60
closed syllable consonant blend—CCVCC	6/20	30	2/10	20
silent e & open syllable	5/15	33	1/5	20
soft c, g, s; tch, dge	0/15	0	0/5	0
vowel team syllables	2/25	8	0/15	0
Words with Easy Endings	3/25	12	0/5	0
Vowel R Syllables	-	-	-	-
-cle Syllable & Common Suffixes	-	-	-	-
Multi-syllable Words,	-	-	-	-
Phonetically Irregular Words	5/20	25	1/10	10

Table 2 Pre-data: Gallistel-Ellis Test of coding skills (administered on April 2018)

Informal writing

MA was given three sentences to write by coping. His tripod grasp was dysfunctional. His writing strokes were superficial. The writing was illegible to read. His letter sizes were too big, and length and width of the letters were not proportionate. He was not exhibiting any reversal of letters. He was aware of lower and upper case letters. However, while writing upper (h, l, b, d, etc.) and lower (g, j, y, f, etc.) extensions, letters were not written with appropriate strokes which helped reader to differentiate letters (h with long left upper extension vs. n with short left upper extension). Writing was a tedious activity for MA. He had never been to any occupational therapy program, as his parents could not afford for it.

Interpretation of testing data

MA has difficulty in remembering units of sounds, fluent recognition of letters, decoding regular and irregular words. He showed greater difficulty in encoding three-letter regular and irregular words and exhibited working memory deficits. He lacked in pre-requisite of learning and he was not exposed to literacy program that would be beneficial to him. The author concluded that an intensive, explicit, sequential and systematic instruction would considerably help MA to bridge the literacy gap.

Summary of Orton–Gillingham work

The baseline information was collected and analyzed by the main author. His mother was briefed about Orton–Gillingham approach and how the approach would be implemented

during one-on-one tutoring session. Informed parental consent was obtained to conduct and publish the research paper. The main author worked with MA from June 2018 to November 2019. MA appeared for the session twice a week, one session for 60mins and another for 90 mins. Cumulatively, he received 150mins/week OG instruction.

Orton–Gillingham Lessons

Orton–Gillingham approach is a direct, explicit, multisensory, structured, sequential, diagnostic, and prescriptive way to teach literacy. Each lesson plan is tailored with OG elements that include phonogram review, visual drill, auditory drill, blending drill, reading (words, short phrases, sentences, red words drill, spelling (words, short phrases, sentences), introduction of new phonogram/rule, oral reading connected to text, comments, over all errors and next lesson plan objective. Perhaps, each element comprises comments, reflection and next step. Lesson plans for MA were supervised by co-author, the Fellow, accredited by the Academy of Orton Gillingham General Practioners and Educators (AOGPE). Ongoing feedbacks and inputs given by fellow were implemented during the course of the sessions. The total number of OG lessons completed was 117. MA was provided with the opportunities to read and write using variety of multisensory techniques which is the key to activate visual, auditory and kinesthetic systems. Each phonogram was introduced in slower pace. He became accurate and fluent in decoding and encoding the learning materials.

The sequence of phonogram or rule presented to MA during OG lessons were as follows:

- Consonants, Vowels
- Digraph (-sh,-ch,-th (hard), -th(soft), -ck,-wh); Tri-graph (-tch, -dge))
- Floss rule –ff,-ll,-ss,-zz; Vce rule (a_e, e_ei_e. o_e, u_e)
- Hard and soft c
- Vowel team (ai, ay, ee, ea, oa, ie); Y as a vowel in single syllable words (fly, cry)
- Open syllable V,CV (i/tem, re/play); Closed syllable (CVC, VC) with digraphs and short vowel
- Diphthong(oy, oi, ou)
- Rabbit words (VC/CV); Compound words (combine two closed syllable words)
- One-syllable short-vowel words with consonant combinations(splat, stop)
- Punctuation: Period, Capitalization, Question mark
- Instruction on noun, verb, adjective (simple adjective big, tall, etc.)
- Suffix –-s, -es, -ies, -ves
- Red words: you, is, some, etc.
- Script writing (lower case)

Visual drill

In the visual drill, author showed MA the cards one at a time on which the letter/letters known were written. MA vocalized the sound the letter/letters make. He was a visual learner and provided with keyword pictures on the bottom of the card to recall the sound of a presented letter/letters. He looked for visual cues when we began the OG session. This visual strategy helped him to associate sound-symbol correspondence. At the beginning we used manipulators, tiles with color (red for vowels, green for consonants) for the representation and as a mnemonic.

Auditory drill

The author asked MA to spell the sound he hears. The sounds chosen should only be the sounds previously introduced. MA wrote the grapheme representing the sound that was just heard on the sand paper, sand, foam board, note book, etc. (multi-sensory modality). He then said the letter name(s) and underlined from left to right while saying the sound.

Blending drill

The author presented MA with the combination of vowel and consonant on a blending board. The patterns presented make-up words that only include a combination of previously taught sounds and skills. After prompted by the author, MA either segmented the sounds he sees then read the whole word, or read the entire word out. During the blending drill, the words presented were both real and pseudo (non-sense) words, which granted MA to practice with reading unfamiliar words and work on his word-attacking skills to build the independence and automaticity in reading.

Reading

A list of real words was given to MA to read; all these targeted words for reading would be combination of previously learned phonograms/rules. Initially, MA was given 4 to 5 words to read and he progressed to read 10 words, 3 short phrases and 2 sentences in June 2019. He became automatic and fluent in reading CVC, CVVC, open syllable, plurals and compound words.

Spelling and writing

Author dictated words of review concepts. MA repeated the word, segmented it into sounds using finger spelling, tapping out, or segmenting with colored blocks, magnets on a tactile surface (embedded multi-sensory in our instruction). He stated the letters of the word, then stated the letters again as they were writing the word (SOS-Simultaneous Oral Spelling). M.A struggled on working memory at the beginning, so the author dictated one word at a time

while writing short phrases. We used to write 2 words and 1 short phrase during our writing drill initially. He got tired and writing was tedious (even writing single graphemes during auditory drill). Later, he wrote 8 words, 4 short phrases and 3sentenses legibly with appropriate punctuation marks. We focused on the letter size for 5 months when we started to work on. The number of words/phrases/sentences that were dictated was increased, indicating that MA's handwriting fluency and legibility have improved. He used adaptive tripod pencil grip for writing

Red words

Orton–Gillingham red words are those words, that cannot be sounded out phonetically and do not follow any particular phonemic rule. They are red because MA needs to stop (like a stop sign) and think about them. M.A was introduced with red word(s) and reviewed each red word before presenting the new one (e.g. you, your, etc.). Each red word was learnt with multi-sensory techniques, writing on bumpy board, sand paper, wet writing, etc.

New Phonogram/Concept

Upon reviewing the learned phonograms/rules, if MA was ready, author introduced a new phonogram with the same OG principles and elements (Gillingham and Stillman, 1960). He repeated the sound while tracing on tactile surface or writing phonogram 3 times. The author explained the generalization of rule if applicable (e.g. c is soft or hard depending on the vowel that follows, when c meets i and e it sound /s/ as in city, cent and when c meets a, o, u it sounds /k/ as in cat, cot, cut). MA reads aloud a list of new words with new phonogram. The author dictated words that reflect new concept or phonogram; repeated word and segmented into sounds and/or syllables. MA repeated the word, segmented it into sounds using finger spelling, tapping out, or segmenting with colored blocks, magnets on a tactile surface. Author dictated phrases or sentences that reflect new concept or phonogram. MA repeated the sentence, segmented into each word, using finger spelling, tapping out, or segmenting with colored blocks, magnets on a tactile surface.

Oral Reading of Connected Text

The author tailored a passage with learned phonograms. MA read text aloud. Emphasis was given on accuracy, fluency and comprehension. MA used finger, pencil or card for tracking issues. The author requested MA to re-read for fluency, word attack skills, prosody and comprehension. Open and close-ended questions were asked at the end to monitor the comprehension. New vocabulary was introduced and reviewed in next lesson drills. Vocabulary knowledge was expanded and learned vocabularies were used in other

components of lesson to enrich his reading and comprehension skill. His semantic association in the given oral reading context was improved and he inferred the main theme of the given passage.

Error correction and next lesson objective

Errors were analyzed as deletion, substitution, insertion, confusion, transposition, etc., and error correction procedure was done immediately as it occurred in each element. The OG instruction was diagnostic and prescriptive in nature. The author consolidated the error(s) of the practicing lesson, and based on those error(s) the next lesson plan was designed with objectives. The author used to embed multi-sensory modality while introducing new phonograms that include pictures, bumpy board, air writing, water writing, tiles, magnets, sand paper, color codes, manipulators, etc. Gradually, the visual cues (pictographs), kinesthetic movements (motions) were faded as MA showed progress in lessons..

Comparative analysis of test scores

The author re-administered the GE test of decoding skills to identify areas of growth in reading and spelling. The reading and spelling scores denoted mastery in phonic principles (Table 3).

Principles	**Reading Score**	%	**Spelling score**	%
Closed syllable single consonant CVC	25/25	100	10/10	100
closed syllable consonant blend—CCVCC	20/20	100	10/10	100
silent e & open sylllable	15/15	100	5/5	100
soft c, g, s; tch, dge	14/15	93	4/5	80
vowel team syllables	24/25	96	14/15	93
Words with Easy Endings	23/25	92	4/5	80
Vowel R Syllables	-	-	-	-
-cle Syllable & Common Suffixes	-	-	-	-
Multi-syllable Words,	-	-	-	-
Phonetically Irregular Words	18/20	90	10/10	100

Table 3 Progress Monitoring: Gallistel-Ellis Test of coding skills (administered on November 2019)

MA demonstrated 100% mastery in CVC words, closed syllable consonant blend and silent e and open syllable. GE section on soft c,g,s,tch, dge, vowel team syllables, words with easy ending and phonetically irregular words scored between 90% and 100%, based on the GE analyze results guidelines a score of 90% to 100% of the words in specific section indicates

that MA can read and spell any word that contains those phonemic elements in that particular word structure. MA's reading scores in soft c,g,s,tch, dge and words with easy ending were relatively higher than the spelling score (Figure 1 and Figure 2).

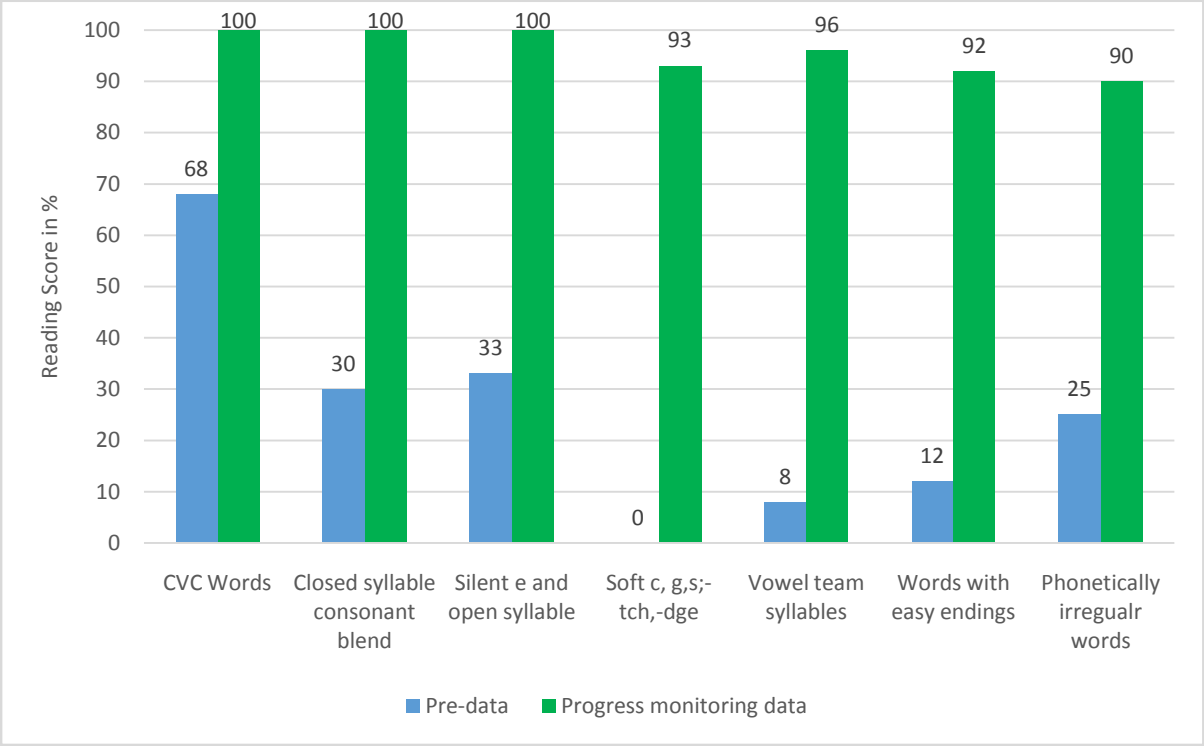

Figure 1 Gallistel-Ellis test of coding skill (reading score in percent) (Gallistel, 1973)

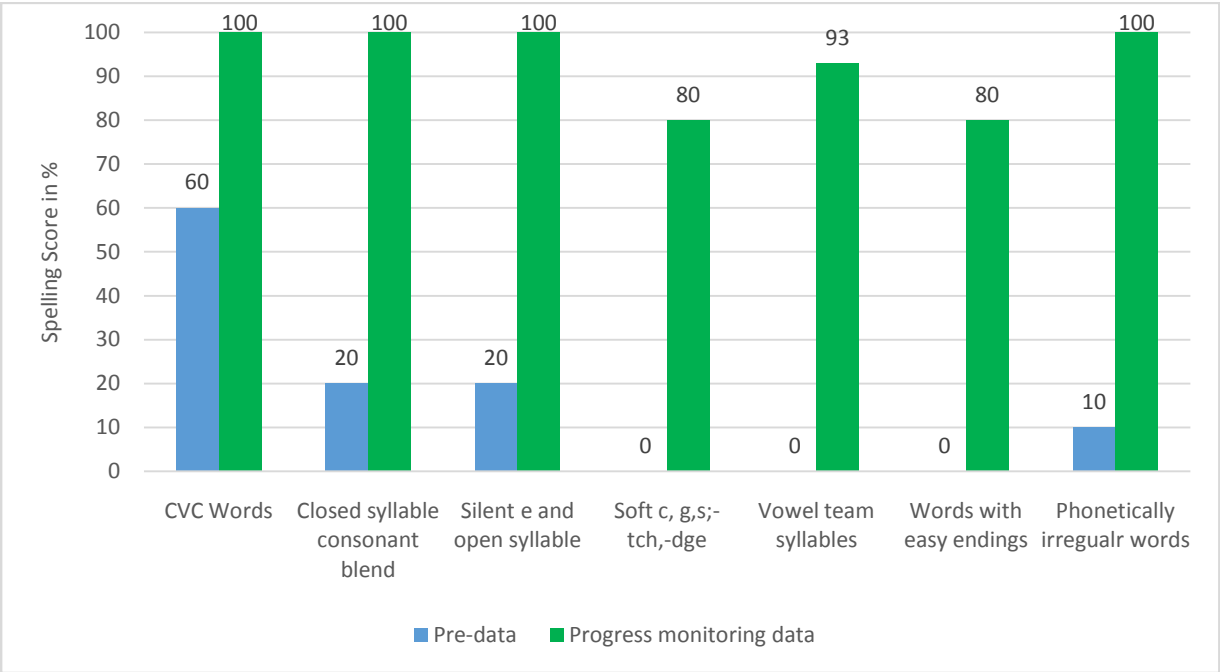

Figure 2 Gallistel-Ellis test of coding skill (spelling score in percent) (Gallistel, 1973)

Conclusion

MA's response to OG approach was encouraging and positive. The author emphasized that MA to master each skill/phonogram/rule before move on to the next. The goal was for MA to use the skills he has learned to decode words independently. MA demonstrated mastery in spelling and reading of learned concepts. Learning to spell and learning to read rely on much of the same knowledge, such as relationship between letters and sounds. Thus, structure literacy approach enhanced MA's literacy skills and accelerated his reading and spelling fluency. Further, the author planned to structure the lesson plan with the next level of scope and sequence that is built on reviewing the learned concepts. The systematic, sequential, multi-sensory and explicit instruction helped MA to enhance reading and spelling ability, which was evident from the progress that he made since its inception. The author observed MA's profile as a successful one, who had not responded to conventional learning and special education service.

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Authors Biography

Shameem Showkath Hussain holds a Master degree in Rehabilitation Science and certification to teach English language learners and learning disabled/dyslexia. She is an Associate member of the Academy of Orton-Gillingham General Practitioners and Educators (AOGPE) and also a proud recipient of Orton National Scholarship. She is passionate to work with students' with diversified language and learning needs.

Laurie Leason holds a Master of Science in Education and a Reading Specialist PreK-12 in New York State and is a Member of the Ontario Teachers College, as well as a Fellow of the Academy of Orton-Gillingham Practitioners and Educators (AOGPE). Her Orton-Gillingham training began after two of her children were diagnosed as dyslexic. Dyslexia runs in her family, so she has personal as well as professional knowledge.

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