

Dyslexia and Reading Instruction

Contrary to the commonly-held belief that learning to read is natural and easy, learning to read is a complex linguistic achievement. It is an acquired ability that requires effort and incremental skill development. Yet most children can learn to read if taught appropriately. In fact, scientists have estimated that 95 percent of all children can be taught to read at a level limited only by their reasoning and listening comprehension abilities.

All spoken words are made up of individual sounds called phonemes. Although a word like *mat* is made of the three sounds /m/ /ă/ /t/, the human ear hears only one sound when the word "mat" is spoken. The brain, however, can isolate the phonemes and combine them with others to make thousands of words. For the most part, this process is unconscious and automatic, and human beings are unaware of it as they engage in normal conversation.

If a child is to learn to read, she or he must first become aware that spoken words are made of these individual sounds. After they gain this knowledge (known as phonological awareness), they must be taught that letters or combinations of letters are the way in which we represent these sounds on paper. Most children grasp this concept easily, no matter what method is used to teach them.

Although many children learn to read regardless of the method used, and a few learn to read with little or no formal instruction, pupils with dyslexia have difficulty learning the letter-sound system unless they are taught in an organised, systematic, efficient way by a knowledgeable teacher using a well-designed instructional approach. Pupils with dyslexia need direct and explicit instruction to develop the knowledge and skills that underpin efficient word reading. These include an understanding of the alphabetic principle (the understanding that speech sounds are represented by letters of the alphabet) and phonological awareness (the ability to segment words into their constituent phonemes).

The challenge for teachers is to teach the language as it is to the pupils as they are. Multisensory approaches have always been recommended as effective teaching methods for the child with learning difficulties arising from dyslexia. Orton, Gillingham, Fernald and other educators all suggested methods and programmes of instruction which use as many channels of input to the learner as possible. These techniques offer effective teaching approaches for developing literacy skills.

Multisensory Instruction

- Pupils with dyslexia learn most effectively when information comes in through many sensory channels simultaneously. This is often referred to as multisensory instruction.
- Multisensory teaching links listening, speaking, reading and writing through the simultaneous

and alternative deployment of visual, auditory, kinaesthetic and tactile sensory modalities. Teachers should ensure that their pupils with dyslexia are seeing, saying, hearing and manipulating materials during learning time.

- Pupils with dyslexia seem to learn more effectively if multisensory approaches are used for mastering and assimilating letter-sound correspondences and sight words. They need systematic multi-sensory teaching that combines encoding (spelling) and decoding (reading), as these processes are inter-linked.
- Multisensory instruction reinforces learning by:
 - helping the learner access the information
 - helping the learner process the information
 - helping the learner retrieve information already learned
- Multisensory instruction allows pupils to use their own approach to the tasks through utilising their strong learning channels and at the same time exercising their weak ones.
- Multisensory instruction should be supported with other principles of good instruction including enhancing pupil attention and motivation, providing feedback and modelling, avoiding overloading the pupil, giving sufficient practice and providing effective reinforcement.
- There are numerous commercially produced multisensory teaching programmes to guide teachers working with pupils with dyslexia (see the section 'Teaching Materials' in The Library).
- Information and Communication Technology (ICT) can support multisensory learning and provide flexible learning tools for both the teacher and pupil (see the section 'ICT in Schools' in The Library).

Principles of Effective Multisensory Instruction

In teaching pupils with dyslexia, the combination of the following five principles will facilitate their ability to learn and recall information.

- (1) simultaneous employment of visual, auditory, kinaesthetic and tactile linkages,
- (2) systematic and cumulative organisation of content,
- (3) direct, teacher-led instruction,
- (4) diagnostic teaching to mastery,
- (5) synthetic and analytic presentation.

These five principles can be used as criteria to evaluate commercially produced teaching programmes.

(see the section 'Teaching Materials' in The Library).

Programme Content for Direct Teaching of Reading Skills

Word Attack / Word Identification

1. Phonological Awareness
2. Letter Recognition
3. Sound / Letter Correspondence
4. Orthographic Awareness

Continuous Text Reading Skills

5. Fluency
6. Comprehension

Each of these topics is explored below.

Word Attack / Word Identification

1. Phonological Awareness

- A lack of phonological awareness and a difficulty with phonological processing are seen by many as being the primary causal factor of dyslexia. The symptoms include a poor internal representation of language sounds, problems with storage and retrieval of words in the vocabulary and a poor acquisition of the grammatical structures of language. This will cause a pupil to have difficulty with the alphabetic stage of literacy and the indirect route to literacy (i.e. the development of phonic-based word attack skills).
- Children can differ significantly in the phonological component of their natural capacity for language. For some children this is due to differences in their pre-school linguistic experience but for others it is genetic endowment. Phonological ability exists independent of general intelligence. Explicit training in phonological awareness should be a vital part of all developmental and remedial reading programmes
- The concept of phonological awareness implies that spoken words are made up of sequences of individual sounds and syllables that can be separated, blended together and manipulated. Phonological awareness is considered essential to understanding the function of the alphabet in its representation of speech sounds (i.e. understanding the alphabetic principle).
- One aspect of phonological awareness, phonemic awareness, concerns the segmenting of words into their component sounds. A useful multisensory activity is to ask the pupil to repeat the sounds heard in the chosen word while looking at their mouth in a mirror and using their hands on their face to feel the shape the sound makes in their mouth.
- Awareness progresses hierarchically through five levels of difficulty and pupils with dyslexia will require direct and explicit teaching to develop:
 - 1) an ear for rhymes

- 2) an ability to match words by rhyme and alliteration
- 3) an ability to segment onsets (e.g., the initial sounds in a syllable as sh in shout)
- 4) an ability to fully segment all phonemes in words
- 5) an ability to manipulate phonemes (e.g., substituting the phoneme at the beginning of a word with a different one)

There are numerous commercially produced phonological awareness training programmes to guide teachers (see the section 'Teaching Materials' in The Library).

Teachers should be aware that while training in phonological awareness is essential for pupils with dyslexia, some will continue to have difficulty with phonological processing due to a deficit in rapid naming, a deficit in auditory short term memory and a deficit in articulation speed.

2. Letter Recognition

- When pupils can recognise and name the letters of the alphabet, they have a foundation for learning the alphabetic principle. Letters are the data that make reading possible and are visually processed individually, but unconsciously, by every reader. Beginning readers who readily recognise individual letters can begin recognising familiar letter sequences, an important ability in early reading. Letter knowledge will help pupils learn sound-letter relationships. Eventually, a reader's speed of letter recognition will determine reading speed.
- Pupils with dyslexia often experience difficulty and rapidly and accurately recognising and naming letters. Problems arise when the task requires associating, encoding, storing and retrieving linguistic material particularly in conjunction with symbols such as letters.
- Some pupils experience difficulty in differentiating between certain letters especially those that look somewhat alike or are the reverse or inverse of each other. These are often referred to as reversals (e.g. b & d, p & q) or inversals (e.g. u & n, b & p). Recent research suggests that such errors are most likely due to a problem in the phonological coding of these letters rather than deficiencies in the visual-perceptual system.
- Mutually confusing letters (e.g. b and d) should always be taught separately. If pupils have experienced this confusion over a significant amount of time, then correction will require substantial conceptual and perceptual-motor reorganisation. To do this, teachers must provide extensive multisensory drill and support to help the pupil develop automaticity. Frequent and brief teaching sessions are usually more effective.
- Knowledge of the alphabetic sequence gives access to an organisational system used widely in our culture from the telephone directory to the Internet. Although many pupils with dyslexia have significant problems in storing and retaining this sequence in memory, they can still learn to read and write.

3. Sound / Letter Correspondence

- When pupils have acquired sufficient phonological and letter recognition skills, knowledge of sound-letter correspondence must be developed. They must learn how the phonemes of language map onto the letters that represent them. This is a major learning problem for those pupils with dyslexia. They experience a significant difficulty in mastering the skill of associating spoken language with written language.

- English is an alphabetic language. The 26 letters (graphemes), alone or in combination, correspond to and represent the 44 sounds (phonemes). The letter or combination of letters used to represent a sound is referred to as a phonogram. Examples of phonograms are the individual letters as well as combinations such as 'll', 'ch', 'ue', and 'dge'. Each phonogram must be introduced and drilled until automaticity is achieved.

- As there is more than one way to spell some of these 44 phonemes and more than one way to pronounce some of the 26 graphemes, there are in fact 98 different phoneme-grapheme associations that must be learned.

- The aim of teaching should be for a pupil to acquire, for permanent automatic response, the names-sounds-shapes of phonograms and an ability to put them in the correct sequential order. The pupil's visual, auditory, tactile-kinaesthetic and oral-kinaesthetic perceptual systems must interact sufficiently to make learning so fixed that she or he can produce any aspect of the phonograms when needed whether for reading or spelling.

- When the pupil is given the name(s) of the letter(s), she/he must be able to recall a clue word, the sound, the appearance of the symbol for reading and the feel of the shape for the writing.

- When the pupil is given the sound, he/she must be able to recall the clue word, the appearance of the symbol for reading, the name of the spelling and the shape for writing.

- When the pupil is given the writing shape, he/she must be able to recall the name, the clue word, the sound and relate them to the printed shape for reading.

- When the pupil is given the clue word, she/he must be able to recall the sound, the name and the shape of the letter(s) for reading, writing and spelling.

- For reading revision, the learner learns to look at a phonogram, to use spatial ability to note position and direction, to listen to the sound in the clue word, to repeat and relate the clue word to the sound and to feel the position of the teeth, tongue and lips during reproduction of the sound.

- For spelling revision, the learner listens to a sound, repeats it and links to the corresponding letter name(s), and writes the spelling alternatives for the sound and finally looks at what has been written.

- Here is a useful sequence for pupils learning the phonograms: ĭ, t, p, n, s, ă, d, h, ě, c, k, ck, ǒ, b, y, m, r, y, j, ŭ, g, ng, f, ff, l, ll, ss, w, v, qu, x, z, oo, th, sh, ch, tch, ar, er, ed, i-e, a-e, o-e, or, u-e, ee, ay, ce, ge, dge, ow, ue, e-e, y-e, oi, oy, wh, ou, au, aw, ea, oa, oe, igh, ai, ir, ur, eu, ew, ear, ey, tion, ie, ei, ph, our, eigh, sion, cian, us, ui, ure

4. Orthographic Awareness

Orthographic awareness involves sensitivity to the structure of the writing system (spelling patterns, orthographic rules, inflectional and derivational morphology, and etymology)

a. Morphology

- Pupils with dyslexia who continue to experience specific difficulties in sound-letter correspondence will benefit from direct instruction in the structure of language. The development of word reading skills and reading comprehension skills can be facilitated by morphological awareness.
- By definition a morpheme is the smallest, single unit of meaningful language. All words are morphemes. Some words like compound words have more than one morpheme. Bound morphemes (e.g. affixes) are meaningful units which are not actual words, e.g. -s in *cats*, -ly in *quickly*. Unbound morphemes have lexical meaning and can stand alone. All meaningful, single-syllable words are unbound morphemes, e.g. and, run, in. Morphology is the study of how morphemes form words. Grammatical morphemes are function words, e.g. prepositions, articles, conjunctions, auxiliary verbs e.g. the, and, will.
- Research has highlighted the importance of morphology.
- Morphology plays a strong role in orthography (i.e. spelling patterns).
- Morpheme analysis as a reading strategy provides a direct route to the lexicon of the spoken word.
- Morphological awareness is a strong indicator of reading comprehension and training has a positive effect on comprehension.

b. Syllable Awareness

- Knowledge of the basic types of syllables is an important aid to word attack.
- The basic principles of syllabification will facilitate word attack and word identification.

c. Syntax

- Syntax refers to the system of rules that directs the comprehension and production of sentences.
 - Syntax specifies the order of words and the organisation of words into meaningful sentences types.
 - Syntactic rules allow the user to combine words into meaningful sentences and to alter the form of a sentence.
 - Syntax plays an important role in identifying words, and in understanding written language.
- Pupils need to learn:
 - about the underlying structure of simple sentences and how it can be manipulated

- to analyse and construct common paragraph forms
- to map and outline the logical flow of text of various kinds
- to recognise a well written ("reader friendly") text

d. Semantics

- Semantics refers to the meaning component of language and the relationships between and among words.
- A learner's personal lexicon is stored in the semantic memory.
- Reading comprehension depends on semantic and syntactic information as well as general knowledge.
- Syntactic and semantic information can aid decoding.
- Semantic deficits can be caused by prolonged decoding difficulties.

Therefore, pupils with dyslexia may have difficulties in vocabulary, word categorisation and word retrieval.

- Pupils must learn to identify antonyms, synonyms, analogies, associative linkages; classes, properties, and examples of concepts; connotative and denotative meanings.
- Word meanings should be learned in relation to other word meanings.
- New words can be learned through repeated exposure in context and more formal study.

Continuous Prose Reading Skills

Continuous prose reading is a far more complex task than is often appreciated. In monitoring continuous reading, we expect the pupil to read with fluency, with reasonable speed, with accuracy and with full comprehension. However, all four of these aspects of continuous reading are interdependent and a problem with any one can negatively affect the act of continuous reading. Reading accuracy will increase with word identification skills and practice in reading in context. Most pupils with dyslexia will require specific help in developing ability in fluency and comprehension. Reading speed will increase with the improvement of reading accuracy, speed and comprehension. Developmental reading activities such as Paired and Shared Reading provide opportunities for the pupil to practice reading skills in context and to develop accuracy and fluency on materials that are at an appropriate level of difficulty

5. Fluency

- Repeated reading of prose text is the most frequently cited and most researched method for developing fluency. Repeated reading methods are based on the information processing model which suggests that fluent readers are those who decode text automatically, leaving attention free for

comprehension. Pupils should practice reading text that can be read accurately (i.e. no more than 5 – 10% error rate). Material should be carefully selected so that reading text that is too difficult does not frustrate the pupil.

- Material should be read orally 3 – 4 times for optimal benefit.
- Measures of rate and accuracy are both important benchmarks of improvement in reading fluency.
- Activities such as choral reading or reading aloud with an audio tape recording of the text can also be useful.
- Multiple readings of single words and phrases may also improve fluency.

6. Comprehension

Reading comprehension can be difficult for the pupil with dyslexia because of the continuing demands of orthographic decoding in combination with limited working memory capacity.

- To enhance reading comprehension, teachers should model the cognitive processes involved.
- Pupils should be trained in the habit of looking carefully at the title of the reading and the picture clues, before they read. They should also be encouraged to think about what they already know.
- While they read they should try to:
 - predict and make hypotheses about what they think will happen,
 - visualise or picture things in their mind and
 - make analogies and link prior knowledge with new things they are reading about.
- These skills should first be demonstrated one at a time by the teacher and then practiced while listening to stories. Finally, they can be applied to reading. Always demonstrate and practice strategies one at a time and with reading material that is at the pupil's independent reading level.
- Pupils should also learn to stop reading at regular intervals to reflect on what they have read. They should learn to question what they read by asking themselves, "Does this make sense?" At first this can be practiced after each sentence, then after each paragraph and, later on, after each page or section of the book.
- Finally, pupils should be introduced to and given plenty of practice with the reading comprehension strategies that good readers use such as:
 - Reading on to look for and use context clues
 - Rereading silently or out loud
 - Verbalising a confusing point

- Asking someone who can help

Teachers can help by showing how they monitor their ongoing comprehension when they read. Teachers should show pupils how they help themselves when they don't understand.

The Role of Metacognition and Learning Styles

Pupils with dyslexia may have difficulty with the metacognitive aspects of learning. This implies that they need to be shown how to learn, for example through identifying connections and relationships between different learning tasks. This essentially means the emphasis should not only be on the content or the product of learning but also on the process - that is, **how** learning takes place.

Strategies for developing metacognition in reading include:

- 1) **Teacher-modelling**, in which the teacher demonstrates the application of a reading strategy such as self-questioning or summarising, explaining both the procedure for implementing the strategy, and the purpose and utility of the strategy.
- 2) **Think-alouds**, in which the pupil verbalises his/her processing as they read a text.
- 3) **Reciprocal teaching**, in which the teacher and pupil(s) take turns at (a) asking questions during reading, (b) summarising the text at appropriate points, (c) clarifying what has been read, noting any inconsistencies and (d) predicting the next part of the text.
- 4) **Semantic mapping**, in which the pupil uses a teacher-made graphic representation or mind map as a guide to the organisation of the material in the text and how the ideas of the content are related. Later, the pupil learns to mind map the text's content while they read.

Related to the concept of metacognition is the view that the learning process should also be consistent and conducive to the pupil's learning preferences. Therefore learning styles need to be considered alongside the need to develop metacognitive awareness.

The recent interest and research into learning styles is based on three concepts: (1) individuals prefer to learn in different ways and under different circumstances, (2) these preferences can be identified and (3) the manner of instruction affects student learning.

The research consistently reveals that when pupils are taught through their preferred learning style they demonstrate: 1) significant improvement in their attitudes towards instruction, 2) increased tolerance for cognitive diversity, 3) significant increased academic achievement, 4) better discipline/behaviour, and 5) greater self-discipline for homework completion.

· Learning styles pertain to rather consistent ways humans interact with new and difficult information including ways they select, take in, make sense of, remember, recall and use input from all that is available to them both internally and externally.

Three areas of behaviour have been suggested as being involved in learning style - cognitive, affective and physiological.

Cognitive behaviours include modality preference, attention, automatisisation, memory processes and concept development.

Affective behaviours include personality variables such as persistence and perseverance, frustration and tolerance, curiosity, locus of control, achievement motivation, risk taking, cautiousness, competition, co-operation, reaction to reinforcement and personal interests.

Physiological behaviours include sex-related behaviour, health-related behaviour, time of day rhythms, need for mobility and environmental elements.

Teachers can often identify learning style preference by careful observation of choices individuals make and behaviours they exhibit. This is important because identification of a pupil's style can prompt instruction that matches how a pupil prefers to learn. When preferences are honoured, pupils demonstrate greater academic achievement and stronger desires for learning.

These two aspects can be reciprocal and together they focus not on the symptoms of the dyslexic difficulty, but on the fundamental principles of learning and the learning process. This view is further highlighted if one considers the cognitive and processing aspects of dyslexia which implies that dyslexia is often a difficulty with information processing as well as being a reading difficulty. The cognitive and metacognitive aspects involved in the learning process are important and help to pinpoint the strategies needed to address the difficulties experienced by pupils with dyslexia.

Pupils need to learn strategies for themselves. Teachers should demonstrate and model appropriate learning strategies for all their pupils.

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