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The ReadingPen:

A Powerful tool for dyslexic persons

Dyslexics often benefit from using a computer as a support in their learning, but that a computer can be the size of a pen is an innovation featured by the ReadingPen. This 'reading pen' is a technical tour de force, which can help dyslexics cope with learning disabilities.

New tool

Communication in today's world is becoming increasingly more intensive and varied. We use e-mail, Internet and SMS to send messages to each other. In addition, we still use letters, memos, books, articles and written texts to transfer messages and information. These new technical communication means have not decreased the need for reading. On the contrary, reading has become even more essential. For dyslexics, who have difficulties with reading, today's reality has not become easier in any way. Fortunately there are also technical developments that benefit dyslexic people. One of the latest tools is a small and handy piece of equipment that is used like a pen and is called the ReadingPen. As its name indicates, the ReadingPen can read. The user scans the words and the pen reads them out aloud. In addition, the ReadingPen offers other options such as a digital dictionary showing the definition of the scanned word at a press of a button. The ReadingPen is not only a clever, technical tour de force; it provides support for dyslexic students beyond the reading process.

Dyslexic students

Students suffering from dyslexia have difficulties automating the identity of words and developing skills in the technique of reading (Van der Leij, 1998). A page of words for a dyslexic student is a maze through which he can barely manage. Decoding the words takes so much time that the concentration required for the content decreases, although the student is intelligent enough to understand the text and to start working on the text. If not discerned, dyslexia can lead to tremendous frustrations.

Although a dyslexic student may have sufficient verbal competence to read texts that meet his cognitive level, his problems in reading also slow down his learning process. After all, this is the purpose for which he needs to study textbooks, yet he does not reach the point of learning because the text is inaccessible to him. This can have negative effects on his learning motivation, while the problem is covered up by difficult or recalcitrant behavior. The student's learning problems are then interpreted by the teacher as related to lack of motivation and concentration, and the chances of acquiring proper help decrease. In addition to discerning a reading problem early, the approach in confronting the issue is very important. If students diagnosed as dyslexics do not receive the best type of help appropriate for their reading problems, they could still suffer from consequences affecting their motivation and attitude towards learning.

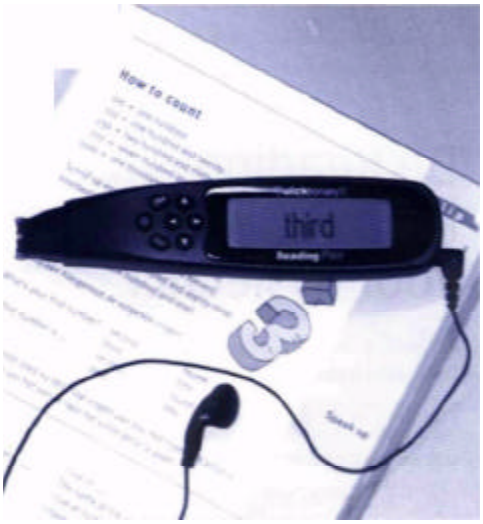
The approach towards reading problems

As soon as it is clear that a student suffers from a severe learning disability, which may or may not be confirmed as dyslexia, assistance should be extended to confront this problem. Van der Leij discerns five approaches for this type of learning disability. The main approaches are 'remedial' and 'compensative'. But there are other options as well, such as 'corrective', 'stimulative' and 'dispensive'. If a 'remedial' method is selected, the approach is to alleviate problems by further developing the learning aspects that the student masters poorly or average. This could mean teaching and practicing partial skills, such as linking signs and sounds or teaching phonological skills. 'Compensative' seems

to be the opposite of ‘remedial’. Remedial teaching emphasizes the weakest skills; the compensative approach tries to improve the student's reading skills by further developing the stronger aspects of existing reading skills. In order to help students cope better with dyslexia, compensation software is often used (see: Callebaut, 2002). These resources are method-independent and are connected to all subjects. In addition, these resources enable students to do their homework promptly, which means valuable time saving for students who are already overburdened by their dyslexia.
The ‘corrective’ approach does not target the reading process itself but rather deals with the basic psychic and physical functions that are required for reading - for example training in the area of pronunciation or improving learning capacities by means of medication. ‘Stimulating’ and ‘dispensing’ are not approaches that deal with the reading process itself, but rather with limiting the side effects of the reading problem. The most common explanation for ‘stimulating’ is reading stimulation. Students with reading problems tend to gain less pleasure from reading in the long run. In addition, reading problems could also influence the student's self-esteem, his task perception and the evaluation of his own competence. The approach of a reading problem based on ‘stimulation’ is not only aimed at developing reading motivation but also at increasing the motivation for learning by concentrating on the student's learning behavior and his attitude towards work and study. Finally, ‘dispensing’ means dealing with students' reading problems by taking measures that provide an alternative form for activities – in which reading plays a role - by means of reduction and/or simplifying. For example, a teacher can conduct an oral test or a school can adjust test regulations for dyslexic students by providing more time for taking the test. One can also invest in resources such as study books on cassettes, computers for word-processing and enlarging texts, or special reading programs.

After a few seconds the scanned word appears and is automatically vocalized

ReadingPen
Amidst the range of resources available for helping students with reading problems, the ReadingPen is a unique apparatus due to its form and suitability. The ReadingPen, true to its name, is a pen that reads. It can read words aloud as soon as a dyslexic person does not identify a word. It is amazing that a pen with the size of a large felt-tip contains a computer that enables us to scan text and then read it aloud.



The manufacturers of the ReadingPen, Wizcom Technologies, call the apparatus a ‘study buddy’, from which it emerges that the ReadingPen is primarily intended for high school students and pupils in the upper grades of elementary school. Using the ReadingPen students can tackle their tasks with more ease because the ReadingPen reads aloud those words that they cannot pronounce. The ReadingPen is simple to use. The student needs to hold the pen only a few millimeters in front of the printed word and ‘run’ the pen over the word. After a few seconds the scanned word appears in the pen and is automatically vocalized. The automatic vocalization is just one of the options available in the pen, but it can be switched off so the student hears the word only after pressing one of the buttons on the pen. The student can hear the word through a

headphone, but in quiet places the volume is adequate enough for the pen to be heard without headphones. The pen not only reads individual words, it can also read complete phrases and a full line.

Options

The pen has additional functions besides its pronunciation option. A scanned word can also be spelled. The individual letters are not pronounced like in the word itself; the individual letters are pronounced aloud. For example, the ReadingPen will spell the word ‘pad’ as (pee), (ay), (dee).
The pen can also explain a word. For that purpose the pen contains the current American Heritage College Edition dictionary. The dictionary can also be read aloud so the student can easily read the text on the pen. Moreover, it is possible to carry on in-depth searches in the pen's dictionary. A normal dictionary explains terms using words unfamiliar to the student, making it difficult to understand the meaning. In such cases the ReadingPen can also look up words that appear in the definitions. This provides the student with the possibility to independently search for definitions while hardly losing time reading since he is spared the chore of leafing through a dictionary.
By using the ReadingPen students do not lose time because they can decode words by a simple stroke of a pen. This also enables weak readers to concentrate on the texts. Yet, this does not mean that the student is not required to read along or to put in any efforts. The student only reads a few words with the pen as soon as his reading stagnates. The need to develop reading skills and to use reading strategies is definitely not eliminated. Even when using the ReadingPen the student still needs to read most of the text himself and to use strategies for understanding the text and to know which definitions provided by the ReadingPen are best suited for the context in his reading material.

Remedial teaching

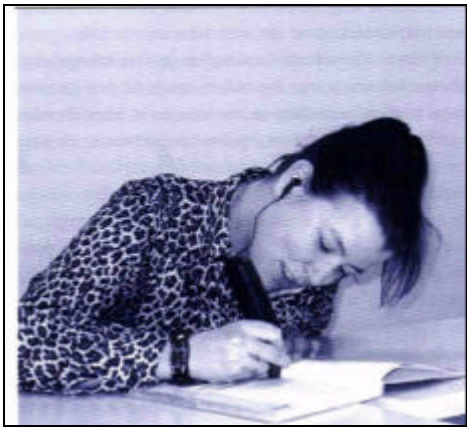
The ReadingPen has a built-in computer that stores words scanned by the student in its memory. This way the pen creates a list of the 80 most recently scanned words. This function not only serves the student but also the remedial teacher who coaches the student. The student can re-read all the words he scanned, and if he uses the ReadingPen he can listen once more to the words. The teacher can refer to the list created by the student and attain an insight to the type of words that present the student with difficulties. Remedial help can then be given based on specific words without the need for extra testing.
Dyslexic persons often have problems with foreign languages, in particularly English because so many different phonetic sounds derive from the same letters. The ReadingPen pronounces the English words correctly. The remedial teacher who wants the student to practice certain letter-sound combinations in English can scan a few words that contain these combinations and ask the student to practice these. The student listens to the vocalized words that were scanned into the ReadingPen and he then repeats the words while he listens and reads. Of course, a computer equipped with text-to-speech software can deliver the same results, but the advantage of the ReadingPen is that it can be used anywhere. The pen is very practical, making it easy to take along. By using headphones, the student can concentrate on the vocalized word while shutting out external noises. In addition, the student can test himself by scanning the words he needs to learn, listening to them, and subsequently writing them down without looking at the display. By listening to the words once again after writing them, the student can check the written words himself. In case of doubt he can play the word once again on the ReadingPen, making it easier to check.

Dyslexic adults

The options described below are not the applications intended primarily for the ReadingPen. The ReadingPen is first and foremost a tool for students who have reading difficulties. However, dyslexic adults can also use the pen at work or to read a book. The latter - reading for pleasure - is something that many dyslexic people simply have stopped doing. The ReadingPen can help dyslexics regain their

reading pleasure. However, dyslexic adults are very skeptical about the pen. They have experienced so many ups and downs to get to where they are today and they are not immediately convinced of the added value of the pen. Most of them have already developed methods for coping with their work without all too much hindrance from their reading problems. Korine Wit, acting fire chief officer in Utrecht, relates that in the past she has already gone through all the necessary obstacles to have her reading problems recognized. The pen does seem like an interesting tool, but to be useful on a practical level the ReadingPen would have to be able to read larger text segments. In addition, the pen vocalizes text rather quickly. When she tried the pen without reading along, she could not get a grip on the entire text. However, it later emerged that the vocal speed could also be manipulated. Furthermore, Korine indicated that even when using the ReadingPen it is important first to orient herself and to forecast the contents prior to reading the text. This knowledge is necessary in order to understand the text as well as follow the vocalized text in the ReadingPen with more ease.
In typical work practice where fonts and margins are smaller (to save paper) dyslexic persons cannot fathom the text. Font size 10 in Times New Roman is also difficult to read with the ReadingPen, certainly when complete sentences and phrases are required for reading. Nevertheless, Korine would acquire the pen if it were less expensive.

Use in Remedial Teaching (RT)
Remedial teachers who have seen and tried the pen indicate that the pen has more options than they actually use. Especially for teachers working at school with several students, it is difficult to use the pen for a number of purposes other than as a reading tool for individual students. Roos Wierts, a remedial teacher in the Eindhoven City College, finds that the pen is a good tool, but notes that it takes time to integrate it in the RT lessons. According to her, the pen has more options than she requires. According to Roos, the fact that the pen stores the words scanned by the student and reproduces these as a list of words, gives the Dutch language teacher - for example - the possibility to have an insight to the language command of the student. During Dutch language lessons, one can work with the words that are explained by the remedial teacher, and the Dutch language teacher can practice the skills learned in the RT lessons for the purpose of reading and understanding the words. This collaboration between RT and Dutch language teachers is extremely desirable, but its realization will still take some time. Roos also noticed that students need to get used to the pen. Mastering scanning skills demands some practice. At the beginning the pen does not ‘catch’ the scanned word immediately, while the student expects to hear it promptly. The pen needs time to read the scanned word. Although this time span is sometimes perceived as too long, it actually never takes longer than 10 seconds for the text to appear in the display. One particular student who tried the pen had little difficulties with the ‘reading time’, but noted that it was too bad that no other voice was used for the ReadingPen. She felt that in the long run the voice of the pen could play on one's nerves.



Immigrant students
One particular group, which is not a target audience for the ReadingPen but which can very well benefit from it, is immigrant children. These students have a limited vocabulary and reading Dutch as a second language often creates problems. The automatism in reading as mastered by their Dutch peers is something they have long stopped taking for granted and therefore

the ReadingPen could serve as a nice support.
Many immigrant students also have problems with the subject of English in school. On one hand this is caused by the fact that they have to learn English - a third language for them - through their second language, Dutch. Furthermore, it appears that these students have problems learning to spell and pronounce in English. At times the Dutch spelling interferes with the English spelling because the students have difficulties keeping the two apart. The English TTS (text-to-speech) module in the pen is good and offers these students the possibility to practice English pronunciation and spelling. After all, the student can test himself and practice pronunciation by himself.
However, for immigrant students the most important function in the ReadingPen is the dictionary. Immigrant students who enroll in secondary education, especially if they follow academic studies - HAVO or VWO - use dictionaries very often during their studies. Certainly if they begin their studies in the Netherlands only in high school, their Dutch vocabulary is limited while they have to take courses that entail reading books full of professional terms, school jargon, instructions and infrequently used vocabulary. Moreover, the speed required when reading the study material is fast, and students cannot permit themselves to leaf through dictionaries during lectures. The ReadingPen gives them the possibility to rapidly search for a definition of a word. In addition, the student can listen to the pronunciation of the word and thereby be able to read it faster.

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"Now, listen to me..."

Expectations

What struck me mainly during the period in which I offered the pen to various target groups, such as remedial teachers, lecturers and students, is that the ReadingPen is viewed with considerable skepticism. Since the pen appears to be a cure-all, the expectations also tend to be quite high. The ReadingPen after all is a practical tool that actually contains an entire computer. People do not expect any faults and they expect the pen to read quickly.
It is a pity that due to these high expectations the initial enthusiasm is sometimes doused by unjust criticism. On one hand, the criticism that the pen sometimes takes too long to read a word is correct, if one expects the pen to read just as fast as a seasoned reader who has no reading problems. On the other hand, the time it takes the pen to provide a student with access to a word is much shorter in contrast to the time it takes a dyslexic student to read the text himself. In addition, the pen has other benefits that certainly justify its use. Students are no longer dependent upon teachers or remedial teachers if they want to read a text. They can also read anywhere because in contrast to a computer the pen is easy to take along in a coat pocket or school bag. This sense of independence is a tremendous benefit for students who until now have always had to ask for help. Furthermore, the resistance to reading prevalent in so many students decreases if they have an easier access to texts. In this manner the ReadingPen contributes to the ‘stimulating’ approach mentioned earlier. The independence acquired through using

the pen can also be an opening to work with the students on learning and using reading and studying strategies. If a student can read faster as a result of the pen, the other methods could be investigated to increase his reading level even further. A condition is that the student will always have the pen at his disposal and that the school permits him to use it during classes and during tests and exams.

Methodical motivation

Koos Henneman, an expert in dyslexia and a board member of the Dyslexia Foundation, indicates in an interview in Balans Belang (2002) that the pen can have a remedial effect. However, this is not a feature to be taken for granted. In order to ensure a remedial effect it is vital that the remedial teacher and the student jointly look for ways to utilize this pen for improving reading skills. Dyslexic problems do not simply melt away like snow in the sun as soon as one purchases the pen. The novelty of the pen and self-assuring feeling it elicits decrease the longer the student uses it. The student gets used to using the pen and it becomes an article that achieves new and higher levels in alleviating reading difficulties. It would be improper to assume that the student would no longer have any reading problems when using the pen. The pen is a powerful tool, but students also have to learn how to work with it. This means that remedial teaching is approached differently, but it does not become redundant. The remedial teacher also needs the time to adapt the pen's options to the individual needs of the student, for example repeating words that are taught, using options that enable the student to spell words, to divide words into syllables, or to construct a list of difficult words.
The first function of the pen appears to be ‘compensating’ and ‘stimulating’. The ‘remedial’ aspect is certainly among the options, but this differentiates from one student to another. The extent to which the ReadingPen can be integrated into RT lessons depends on the creativity of the remedial teacher, who then should have a ReadingPen at his/her disposal at all times.

Dyslexia certificate

The price of a ReadingPen raises eyebrows in many circles. The ReadingPen costs about €300. This is a considerable sum of money, but the pen is more than worth this amount. In addition, there are frequent sale pitches that offer a reduction on the price. This makes its acquisition worthwhile, certainly when it emerges that not only compensating and stimulating methods are the motives, but that the pen also raises the remedial benefits to higher levels. The means of receiving reimbursement of costs should also be investigated. In that case it must be demonstrated that using the ReadingPen increases the reading skills of dyslexic students. Even if such a reimbursement option existed (for example by including the ReadingPen in the Health Fund package), orthopedagogs should still emphasize the importance of the reading pen's availability when they study the facts concerned with a dyslexia medical certificate. If it emerges that the student benefits from using the ReadingPen, an orthopedagog could prescribe its use and subsequently, reimbursement would be possible.
It is very important that those who will be using the ReadingPen maintain realistic expectations from the pen. The pen is a technological wonder but not a miracle cure for dyslexia. The ReadingPen should also not be treated as the only proper solution for dyslexia, making all other assistance unnecessary. However, the ReadingPen does open a range of possibilities for supplementing RT to students who - thanks to the ReadingPen - could become more autonomous readers and who could discover that reading is fun.

Author
Dr. Corinne Sebregts studied language and literature at the Nijmegen Catholic University and specialized in teaching Dutch as a second language. She works at the Eindhoven City College as the ISK department chairman (ISK: Dutch acronym for the International Bridging Class for 12-18 year old immigrants in the Netherlands) and her functions include the development and implementation of language policies of the ISK. As a remedial teacher she is involved in developing a support system for students who have problems mastering Dutch as a second language.

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