

DYSLEXIA AND CONCEPT MAPS: AN INDISPENSABLE TOOL FOR LEARNING

Giovanna Lami

Associazione Italiana Dislessia - Sezione di Modena, Italy

Marina Locatelli, Associazione Italiana Dislessia - Sezione Perugia, Italy

Abstract This paper describes the experience of the Modena Section of the Associazione Italiana Dislessia in using concept maps with dyslexic students. An evaluation is made of the characteristics of concept maps that highlight the strengths and minimize the weaknesses of young dyslexics while promoting their success at school at all ages. The fundamental difference between normal student readers and dyslexic students lies in the difficulty dyslexics have in reading a text and then create a map autonomously. The help of a tutor or supporter is necessary. The map represents a substitute for the text and allows access to knowledge, favours learning and memorization, and encourages autonomy in study and revision so much that it becomes an indispensable tool for learning at school.

1 Introduction

Dyslexia is defined as a specific learning disability that is neurological in origin. (Lyon, Shaywitz & Shaywitz, 2003). It is characterized by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction. Secondary consequences may include problems in reading comprehension and reduced reading experience that can impede growth of vocabulary and background knowledge.

It tends to be resistant to conventional teaching methods, but its effects can be mitigated by appropriately specific intervention, including the application of information technology and supportive counselling. Those involved with dyslexic learners (teachers, parents, associations) have a great interest in identifying study methods that are compatible with the typical learning difficulties that dyslexia causes, thus facilitating learning for many intelligent students who would often otherwise be forced to abandon school and allowing them to achieve academic success.

2 The relationship between concept maps and the learning styles of dyslexic students

People with dyslexia

1. Have normal I.Q.
2. Read slowly
3. Easily get tired
4. Comprehension difficulties in reading texts

In most cases the last three points limit the dyslexic student's ability to acquire methods that allows him or her to study autonomously and to effectively complete a normal school career (Stella, 2004). Indeed, while in most cases dyslexia improves with age due to its developmental nature, the reading effectiveness of the dyslexic student at high school decreases because of the greatly increased demands of the school and the number of pages to be read, which in Italian high schools average more than 20 pages per day.

Learning using auditory input by means of a human reader or speech technology is often insufficient because it lacks the supporting visual text that every normal reader makes use of. It should also be taken into account that people with dyslexia usually have a "visual" intelligence and think in "images" so that it seems logical to utilise this learning style. This does not happen with teaching strategies which use only aural means as when you listen to the voice of someone reading, with e-books and with school books in digital format. It should also be remembered that the aural memory is weaker than the visual memory and that speech synthesis is not particularly pleasant.

Concept maps are also an important tool because their characteristics complement the learning difficulties caused by dyslexia and can enhance the dyslexic's particular points of strength as listed below (Abi James, 2003)

- They provide non-linear information in the visual domain.
- Concepts are emphasized by "nodes" together with the labelled relationships in a meaningful net.

- Concepts are represented by key words and relationships by verbs or essential linkers.
- The organization of a map is independent of the rigorous grammatical and syntactical structure of sentences.
- Images and colour can trigger ideas, categories or subjects to facilitate memorisation.
- The maps allow large amounts of information to be stored graphically.

Compared to a normal reader, the problem that the dyslexic learner meets when constructing concept maps on his/her own consists in the difficulty of identifying key words and the relationships connecting them because their reading problem. This process is greatly limited by a slow reading speed, by frequent spelling errors and by comprehension difficulties especially when the text is long and complex.

3 Case report and methods

Since 2001 the Modena section of the Associazione Italiana Dislessia (Italian Dyslexia Association – A.I.D.) promotes the use of graphic organizers by tutors and parents when helping dyslexic students during their homework, especially during high school years. Both mind maps and concept maps have been used and are chosen according to the kind of homework and the student’s preference. Concept maps were made both by hand and by using different software such as: CmapTools, Inspiration, Knowledge Master.

Compared to other kinds of graphic organizers (Hall & Strangman, 2003), concept maps have been shown to be the most useful way of representing knowledge, especially when dealing with complex subjects. The representation of the relationships that connect the concepts is a particularly important tool (Novak & Gowin, 1995), and is useful in the learning process and in facilitating the recovery of information during revision. Compared to studies of the creation of maps by normal readers, concept maps prove to be particularly difficult for dyslexic students to build on their own.

The experience acquired in the Modena A.I.D. Section suggests some possible ways of using concept maps with dyslexic students which vary depending on the individual characteristics of the student and on the quantity and complexity of the subject to be studied:

- The making of a map can be guided by an expert tutor who supplies “the skeleton” of the map and who then reads the text in such a way that the student can trace the missing concepts and add therefore “the pulp” to the skeleton.
- The tutor reads the text, underlines the key words and writes them on the “nodes” if the student prefers to see all ideas on the screen at once before connecting them up manually to form a conceptual network.
- The tutor makes the map: this constitutes the textual support and is a substitute for the book, one that has a strong visual impact, and which the student uses as a guide while listening to the reading.

The finished map can then be used by the student for revision or as a guide during oral presentation. If the map is made using software it can easily be personalized by the student, with consequent advantages for learning. The text can be read by a tutor or by speech synthesis software.

It is important to remember that dyslexia often goes along with dysorthography and dysgraphia. In this case, as well as being slow reader, a student will also be dysorthographic and have problems in dealing with space. This further complicates autonomous creation of concept maps and makes them less usable in the study of foreign languages due to frequent spelling errors. In resolving this problem, a tool contained in the “Knowledge Master” software has proved to be very useful. It allows you to import text in .txt or .rtf format, copy the key words and include them in nodes by simply clicking on them without having to type them in. This tool is extremely easy to use and rapid even for normal readers.

4 Discussion

Dyslexic learners often do not make full use of the potential offered by the construction of maps because of the difficulty they have in working autonomously with the written text. However, concept maps offer these learners the great advantage of a textual support that can represent knowledge in a way that is more suited to them and to visual thinking compared to the traditional linear type of text which is generally not sufficiently accessible. The advantage of a concept map is that it is the equivalent of a simplified text that, because it represents knowledge by using short phrases, does not require good literacy skills. It appears to be a very effective tool for improving vocabulary knowledge and allows for greater comprehension, stimulates memorisation, and facilitates recall of acquired information. It also favours autonomy in at least some of the stages of learning and by means of the

visual approach develops the reader's auditory understanding of the text, which is not the case with e-books and digital texts.

The use of mapping software, such as Cmap, which can be read by speech synthesis, allows access to unknown or foreign words which represent the equivalent of the "non-words" that are particularly difficult for dyslexics to read as they require phonological processing, which is usually lacking.

5 Conclusion

From several years' experience of working with dyslexic learners, it has become clear that concept maps are an advantageous learning strategy at the upper elementary and upper level grades. They develop the strong points of dyslexic students while minimising their weak points. One drawback is that they cannot generally be created autonomously and they need the aid of a supporter. While the autonomous creation of maps adds to their worth, it might be useful to make ready-made maps on different school subjects available as a study tool for those who do not have the aid of a supporter or individual tutor.

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