(REVIEW ARTICLE)

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Teaching a foreign language through ICT to students with dyslexia and attention deficit hyperactivity disorder (ADHD) and the role of ICTs

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Abstract

Students with learning disabilities are a heterogeneous group and exhibit particularities in the areas of perception, language, memory, attention and concentration, metacognition, self-regulation, motivation, behavior, social skills and emotional development. It is therefore important to identify these difficulties as early as possible, so that students can be helped in time by adapting teaching to their own needs. New technologies, already promising in a variety of fields, seem to be able to be used for the necessary differentiation of teaching, materials and assessment of students with learning difficulties such as dyslexia and ADHD.

Keywords: Dyslexia; Foreign language; ICT; Learning disabilities

1. Introduction

Students with dyslexia also have difficulties in learning a foreign language. Students who fail in the foreign language tend to show deficient discrimination skills and difficulty in learning sounds and symbols, characteristics that are responsible for learning differences in the foreign language that cannot be attributed to a lack of motivation or low intelligence (Nijakowka, 2010). Also, Dicklage identified cases of students at Harvard University who failed in the foreign language, while having a positive attitude towards the course and making efforts. Dicklage was the first to suggest that the difficulties experienced by these students were similar to the problems of dyslexia, i.e. reading and spelling difficulties, letter/symbol reversals, sound confusion, incomplete discrimination of foreign language sounds, and deficits in verbal memory (Sparks, 1995, in Nijakowka, 2010).

More specifically, Dicklage divided these students into three categories:

- "strephosymbolics", i.e. students with a history of learning difficulties related to reading and spelling, left-right confusion and mirroring/inversion of letters/symbols, as well as a family history of similar learning difficulties,
- to students with deficits in auditory perception (audiolingual deficits), i.e. students with difficulties in the auditory discrimination of sounds, syllables, and words in the foreign language and
- to students with problems in auditory memory, which according to Dicklage coincide with problems in auditory perception (Sparks et al., 1989).

However, in the 1970s and 1980s researchers had not particularly focused on examining the phonological characteristics of students who had difficulties in learning a foreign language. Instead, Gardner and his colleagues hypothesized that students' motivation as well as their attitudes towards language learning play an important role in the success or failure of language learning (Gardner 1985; Gardner & Lambert, 1972 in Sparks, 1995). Also, Horwitz et al. (1986) considered that there is some form of anxiety specifically in learning a foreign language, which hindered

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language acquisition, while Krashen (1988) believed in the existence of an "affective filter" which prevented individuals from responding adequately to their contact with the language, and therefore made learning the foreign language difficult (Sparks, 1995). Rebecca Oxford (1990, in Sparks, 1995), focuses on students' inability to use effective learning strategies and the role of cognitive profiles in learning a foreign language. Nevertheless, while researchers have shown some connections between these variables and successful foreign language learning, no single variable or set of variables is solely responsible for successful or unsuccessful language learning (Ho, 1987).

In the 1980s, a possible link between learning difficulties in the foreign language and learning difficulties in the mother tongue was formulated. According to Sparks et al. (1989), students with special learning disabilities have certain characteristics regarding language functioning, which may negatively affect their ability to learn a foreign language. Skehan also believes in the correspondence between the first language and the foreign language. According to his words, children who learn their first language faster, have corresponding results in the foreign language as well (Sparks et al., 1995). Conversely, if some students have difficulties in learning their mother tongue, they will also have difficulties in learning the second or foreign language. Sparks and Ganschow's "linguistic coding deficits hypothesis" is based on this argument. In the "phonological deficit hypothesis" the two researchers hypothesize that learning a foreign language relies on native language skills. Therefore, a person's skills in the linguistic parts of the native language – phonology, syntax and semantics – act as a foundation for successful foreign language learning (Sparks, 1995).

The first research on the difficulty of learning a foreign language by students with Special Learning Disabilities was conducted by Anna Gajar at Pennsylvania State University on two groups of students who were measured with the Modern Language Aptitude Test (MLAT) (Sparks et al., 1989). The MLAT measures five aspects of spoken or written language: listening comprehension in auditory memory exercises, phoneme-graph association ability, vocabulary knowledge, sensitivity to grammatical structures, and visual mechanical memory for words (Sparks et al., 1989). In all five tests, students with learning disabilities had significantly lower results compared to control students, which proves that most students with learning disabilities will have problems learning a foreign language (Gajar, 1987). In conclusion, students with learning difficulties in their mother tongue are very likely to have difficulties when learning a foreign language. Since the linguistic parts of the mother tongue are the basis for learning a foreign language, it follows that the particularities that the specific students have in their mother tongue should also be preserved in the learning of a foreign language.

2. Dyslexia and difficulties in learning a foreign language

According to Margaret A. Crombie (1997), the degree of difficulty students have in their mother tongue is to some extent "predictive" of the degree of difficulty they will have in learning a foreign language. Dyslexia is more pronounced in languages that are less consistent with respect to graphemes and phonemes, such as English (Ziegler & Goswami, 2006; Kormos & Smith, 2012). The English language has 26 letters but 44 sounds, meaning many letters such as the vowels 27 and the letter c have more than one sound, and some sounds are represented by more than one letter (Linan-Thompson, 2014). This means that for a student to decode the 3000 most commonly used monosyllabic words, he needs to learn about 600 different spelling combinations and 400 phonological rhymes, much more than if he were to learn to combine 26 letters with 26 phonemes (Ziegler & Goswami, 2006). This fact makes the english language opaque and contrasts with the transparent greek language, which exhibits reliable grapheme-phoneme correspondences. The greek language varies orthographically, but is completely consistent in the pronunciation of its individual letters or in combination (Ziegler & Goswami, 2006). Consequently, students with dyslexia are required to cope with learning English as a foreign language, often without appropriate resources and without effective teaching.

Students with learning disabilities also have problems learning and applying grammar rules. Initially, students have difficulties, even in their mother tongue, in understanding certain grammatical concepts, such as for example what are nouns and what are verbs. This means that foreign language teachers cannot rely on dyslexic students' knowledge of grammatical concepts in order to explain them in the second language (Kormos & Smith, 2012). In an interview, students reported that they had a problem not only in understanding grammatical structures and rules, but also in applying them when they had to speak or write texts (Kormos & Mikó, 2010 in Kormos & Smith, 2012). Also, the difficulties these students face when learning a foreign language are related to their ability to remember the spoken material in the order it is presented to them, that is, with serial processing. For this reason, dyslexic students find it challenging to learn and apply the rules of word order in the foreign language (Kormos & Smith, 2012).

An additional problem for dyslexic students is the learning of rules through learning mechanisms. While most of the time the syntactic and morphological rules are clearly presented during foreign language teaching, students also elicit the rules by reading or listening to material both inside and outside the classroom. Therefore, dyslexic students have limited opportunities to learn grammatical rules in an indirect way, which hinders the correct use of the language in

real conversational situations (Kormos & Smith, 2012). The noun endings and verb conjugations of some languages such as German, Russian and Italian are specific. However, there are languages in which such specific grammatical structures do not exist and therefore students with learning disabilities have problems learning these languages. This is because the correct use of endings and conjugations requires placing the morphemes in the proper order, an operation that is hindered in dyslexic students due to the limitations they face in their phonological processing as well as their working memory (Kormos & Smith, 2012).

In research conducted by Kormos & Mikó (2010), the grammatical knowledge of Hungarian dyslexic students was studied in comparison with their non-dyslexic peers after four years of studying grammatical structures in elementary school. The researchers found that students with dyslexia were far behind in learning English compared to their peers, as none of the dyslexic students could make sentences in the passive voice. Also, these students had less difficulty with affirmative sentences, but could not form questions and negatives correctly. Therefore, as syntactic structures become more and more complex, dyslexic students experience more difficulties in learning them (in Kormos & Smith, 2012).

3. ICT and foreign language teaching

Introducing this paragraph, we emphasize the significance of all digital technologies in the field of education and in ADHD training, which is highly effective and productive and facilitates and improves assessment, intervention, and educational procedures via mobile devices that bring educational activities everywhere [55-58], various ICTs applications that are the main supporters of education [59-73], and AI, STEM, Games and ROBOTICS that raise educational procedures to new performance levers [74-82]. Additionally, the development and integration of ICTs with theories and models of metacognition, mindfulness, meditation, and the cultivation of emotional intelligence [83-110], accelerates and improves more the educational practices and results, especially in children with ADHD, treating domain and its practices. All the above-described activities should satisfy the teaching objectives and facilitate learning [17-20, 27-50].

Compared to the rest of the courses in the syllabus, foreign languages as a teaching subject had from early on the particularity of the use of new technologies (Economou, 2004). In Greece, foreign language textbooks have been accompanied since the 1980s by audio cassettes, with the help of which learners can listen to native speakers of the language speak, with the aim of trying to imitate their pronunciation. Later, the sound is enriched with image, thus producing the first videos with visualized dialogues and/or songs, which enhance the learner's contact with the foreign language. This is how the CALL - Computer Assisted Language Learning method was born. Since the 1960s and after passing through various stages of development (behavioural, communicative and combination stage - Lee, 2000), the CALL method uses and combines hypermedia, multimedia and the internet. It emphasizes authentic environments for learning and using the foreign language. Today, a wide variety of computer applications (software, text editors, tools for teaching grammar, vocabulary, pronunciation, writing) are available not only for the English language, but also for many others.

The inclusion of ICT in the teaching of foreign languages enables the introduction of information in a non-linear order, direct response of the learner, free navigation and learning of the language at their own pace, so that the needs of each learner are met, depending on the interests , his special educational needs and preferences. The combination of sound, image, video and graphic representations make learning a fun and interesting process, and facilitate the learning of vocabulary and expressions, grammar and syntax. Moreover, the internet seems to multiply the benefits of computer use during the teaching of a foreign language (Economou, 2004). The possibilities seem endless: e-mails and chat rooms that offer both asynchronous and synchronous communication, information search and retrieval, educational applications and online educational games for practicing the target language, interaction with native speakers or other learners, etc.

The use of ICT in teaching English as a Second Language (ESL) is one of the most widely discussed topics in the field of education. Research shows that the use of ICT improves education and provides more opportunities for learning (Yunus et al., 2012).

One of the most popular tools used for teaching English is blogs. These offer a multidimensional medium, in the sense that they are not simply a writing platform, but offer the possibility of interaction. Kelly & Safford's 2009 research on the effectiveness of using online writing when teaching exposition investigated whether students used complex sentences when blogging about football. The results of the research were encouraging and showed a linguistic empowerment of the students, so the students started using higher language to write or comment on the blog. In addition, it appeared that students received feedback from more than one person, and this type of feedback can be more effective, according to Holder (2006). The researchers also concluded that the dialogic nature of the blog and the

communicative comment network were the factors that led children to defend and justify their opinions, using higher-level language and sentences of increased complexity. In addition, blogs are popular ways for teenagers to express themselves, and it appears that teens who blog tend to be more prolific writers in and out of school (Lenhart et al., 2008). The very audience of the writing is changing; it is not just the teacher who will read the writing, but a larger social group. This fact alone can change the dynamic of writing, from a product to be graded by the teacher, to a product with a social content, where style, form and understanding of the readership gain increased weight (Sweeny, 2010).

Another advantage is found in the use of distance education. By distance education we define the teaching and learning approach that uses technology to communicate and collaborate in an educational environment (Piezon & Donaldson, 2005). The feature of electronic communication facilitates learners to engage in an active, authentic and collaborative learning process, a building block of constructivist theories of teaching and learning (Aksal, 2009). Thus, ICT seems to offer the platform for the emergence of active and meaningful learning. The study by Blachowicz et al. (2009) also demonstrated the benefits of using an electronic program, both in mobilizing students regarding learning activities and their autonomy, and in changing teachers' beliefs about the benefits of ICT, and classroom management. Students' attention and concentration seemed to increase, as well as class performance. According to another study by Yuksel & Tanriverdi (2009), watching movie clips helped learners retain and study vocabulary more easily, thus improving their reading comprehension. Similar benefits are reported by Considine et al. (2009), on using different digital media, including songs, animations, music videos and other online resources, to maximize learner engagement.

The emergence of ICT seems to intensify the impact of media on culture and education. Linking reading, writing and technological literacy provides students with opportunities to interact with wider audiences and produce authentic texts. (Lawrence et al., 2009). A primary feature of many contemporary learning theories, personalization, interaction and student motivation are also key features of ICT-mediated learning (Yunus et al., 2013).

4. Conclusions

Students with dyslexia need practices and approaches, which will facilitate and strengthen their foreign language learning. The ICT that will be used by the teacher to teach English should be able to accommodate educational activities of different types and with varying levels of action on the part of the student, so as to respond to the level of knowledge of each student and benefit both beginners and advanced users. These activities should satisfy the teaching objectives and facilitate learning.

Compliance with ethical standards

Disclosure of conflict of interest

The Authors proclaim no conflict of interest.

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