

Dyslexia, ICT and Foreign Language: Integration Through Management

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Abstract– Based on the literature review, it has been identified the need to work in the articulation of different aspects related to education of people with dyslexia (understood to mean a learning difficulty). The foregoing mentioned, with the purpose of knowing progress to date in this area, as well as establishing alternatives to improve these learning processes, supported by tools aimed at this type of condition, which are closely linked with Information and Communication Technologies (ICT). This article presents the management studies guided to the addressing of actions in institutions of education, bearing in mind the strategies that have been developed in recent years and their relationship with respectively approached topics such as inclusive and bilingual education, and the use of best practices that enable quality on education based on the Project Management Body of Knowledge (PMBOK) guide.

Keywords-- dyslexia, education, management, foreign language, Information and Communication Technologies (ICT).

I. INTRODUCTION

In recent years, some research has aimed at achieving quality in education [1]. To accomplish part of this purpose, work has been carried out focused on inclusive education, the successful incorporation of ICT, and the management education that engender equity opportunities in the classroom.

A considerable number of studies show that there are various learning difficulties [2], among which is dyslexia. This condition broadly transcends the ways logos and graphemes are encoded or decoded, being a difficulty that affects a considerable population of children, teenagers and adults. In regard, strategies and tools have been incorporated to contribute and mitigate the impact it generates. Some of these strategies involve the use of ICT as a facilitator and equal conditions in terms of acquiring the necessary skills to function in different contexts, this requires a scope that outlines competitiveness in an integral way between the areas and that stress the learning of a foreign language[3].

This article is the result of a systematic review of references with a special emphasis on the traceability between dyslexia, Information and Communication Technologies (ICT), bilingual education and management in educational institutions. This review allowed visualizing project-based educational management as a guiding path to reach the proposed goals within the educational area, by describing various strategies and methods in management that permit organizing and directing internal processes to attain indicators.

Some research describes the way in which educational centers have chosen to include the PMBoK guidelines as an opportunity to improve practices and give a clear and achievable direction to the requirements of their community.

II. DYSLEXIA

Nowadays, dyslexia is defined as a neurological difference that can have a serious impact during the educational stage, in the workplace and in daily life (if it is not time oriented) [4]. According to distinct sources, it should be accompanied by a clinical examination and a psychopedagogical evaluation [5] [6]. Taking into account that dyslexia affects between 5% and 20% of population [7] [8], it is necessary to intervene in this learning process with oriented tools that support their needs [9].

A. Types of dyslexia

At the beginning of the century, dyslexia was classified into two large groups, such as developmental dyslexia and acquired dyslexia, the first being inherited by DNA and the second type referring to people who have had an accident, trauma, blow or brain involvement [7].

Other authors such as A.L. Latorre y J. Romero, categorize four types of dyslexia. One of them is defined as phonological dyslexia in which the person infers a word instead of reading it based mainly on a visual relationship rather than on what is actually being read. In the second instance they mention superficial dyslexia in which there is an auditory recognition making a disconnection between grapheme and sound. In a third place they refer to acquired dyslexia and, finally, mixed dyslexia as a junction between the difficulties of superficial dyslexia and phonological dyslexia in which the development and interpretation of reading, listening and writing is compromised [10].

B. Features of dyslexia

Some of the features found in dyslexia are the difficulties to acquire vocabulary, express oneself orally (reading), lack of structure in producing sentences related to grammar and syntax, issues at distinguishing similar sounds or words, confusion between two or more languages [11] and problems

with pace of reading causing barriers to understand and learn other languages [12]. It is important to consider that the existence of dyslexia does not imply evidence of all its characteristics.

III. LEARNING A FOREIGN LANGUAGE FOR STUDENTS WITH DYSLEXIA

One of the features of the population with dyslexia is the difficulty to acquire key skills oneself in a foreign language, so it is necessary to know strategies that bolster this area of knowledge. Among these proposals is the one of the Common European Framework of Reference (CEFR) which refers to the importance of flexibility in particular cases [13]; diversity of standards established in different countries, for example, in Spain, where important advances are conducted in the area, looking for guarantees in work and academic equity for this population [14]; or the attempts of the Colombian Ministry of National Education (MEN) to contribute with practice guides that integrate bilingual training [15].

With specific reference to the dyslexic population, there are proposals to contribute to their learning of a foreign language (English language). Strategies such as cards that promote vocabulary, grammar schemes, grouping of verbs by patterns, reading texts (stories) in that language or the use of technology such as applications or web sites [16].

IV. ICT IN BILINGUAL AND NON-BILINGUAL TEACHING AND LEARNING IN STUDENTS WITH DYSLEXIA

There are currently different approaches aimed at establishing a reciprocal relationship between bilingual and non-bilingual teaching-learning through the use of ICT. Some options are educational platforms, applications or multimedia tools, without neglecting the use of video games, social networks or the media, as shown in Fig. 1.

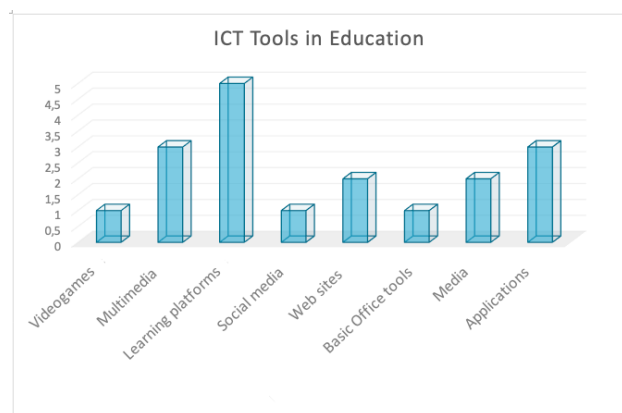


Fig. 1. Strategies identified as common within the literature review.

Significant efforts have been made to make this type of tools, strategies or methods a possibility to support not only students with regular education, but also for students with

differences in their learning process, thus supporting the inclusive education that is developed with the integration between education and ICT [17], for example, in certain studies in which is exposed a learning environment of writing competence in students with a mild cognitive impairment, this through the advantages of the use of ICT [18].

Authors recognize two types of approaches to ICT-mediated for learning difficulties, the first aimed at offering programming tools for pathologists to have the possibility of developing customized software applications for their patients. The second includes the participation of students with a specialization in educational sciences who, in turn, study computer science too, to develop applications, proposals that emphasize the teaching and learning of students [19] with basic software such as Microsoft Office package or even with Visual Basic Programming language; on the other hand, Artificial Intelligence (AI) has been incorporated with voice recognition through applications that facilitate both the implementation and the feedback of the thematic guide to work [20].

In addition, the Computer Based Learning Model has been approached [7] to propose an education based on Machine Learning that provides the possibility of feedback and support the concepts and dynamics of students with dyslexia with programming codes that identify the needs of the specific population. Likewise, it has been used to diagnose this learning difference and thus take action on it through own platforms [21].

Some other studies have been focused on the applications design that could contribute with the identification of children with dyslexia, that based on the associated features can express an integral solving [22] [23]. Likewise, emphasis has been placed on the reading-writing contribution with a view to applicable results to the learning process of students with dyslexia, bearing in mind an application that remedies the present difficulties and make direct emphasis on memory, auditory and visual perception, exercises of body scheme, laterality or exercises of spatial representation [24].

An example of the aforementioned is *EasyLexia*, this tool has been modified in different iterations to accommodate the explicit needs of population with dyslexia, thus making changes that improve the experience and results of the client (parents or educational institution) and, of course the end user (student with dyslexia) [25], as well as, making use of ICT from the generation of an application called *Lisdexia* to contribute to the reading-writing process taking into consideration aspects such as linguistic competences, performance (comprehension, recognition, spelling), memory (visual or auditory), and functions, being attention, discrimination and categorization, and laterality [9].

Another tool is *DysEggxia*, based on prediction software and writing correctors under the Computer-Based Model [26]. This solution has evolved over time by including Machine Learning, in order to give a pre-diagnosis of people with possible dyslexia [27].

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V. ICT MANAGEMENT IN THE IMPROVEMENT OF EDUCATION

In recent years, the role of ICT has taken on an increasingly important part within the education sector, generating the need to make changes in the organization and direction of educational institutions. These changes have to be made from planning based on a modification of the general structure that is coupled to the new requirements of the academic society [28].

According to the educational quality, it is sought an alignment between the approach of organizational strategic management that, for this analysis, articulates axes such as dimensions, standards, management, educational principles, the ICT relationship and the components of the center [29], as shown in Fig. 2.

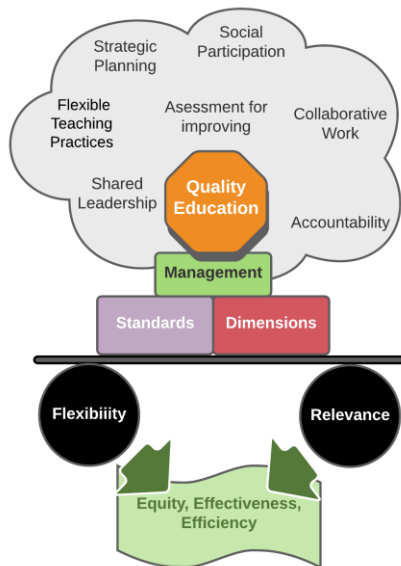


Fig. 2. Strategic Educational Management Model. This graph was taken and modified from [29].

Besides, there is a process of continuous improvement by educational institutions, through planning with emphasis on the organizational structure, which allows to achieve an improvement in student learning, as well as an increase in the ability to manage through change [30].

Another important element in this process of search for educational quality refers to techno-pedagogical management, which includes knowledge management accompanied by information management (discrimination of the information), learning management (skills development) and administrative management (access and specification) [31]. The above, accompanying the generation of projects with special emphasis on quality and document management [32]. In this way, with the interaction of fundamental elements will be possible to achieve the objectives of the educational organization, among which is the management of inclusive education.

Some educational projects in countries like Colombia, have been directed to the process of teaching and learning of a foreign language. Dividing in this way, the phases of the project into three main sections such as the resolution of the problem, an alternative-solution and a budget or schedule, as shown in Fig. 3 [33].

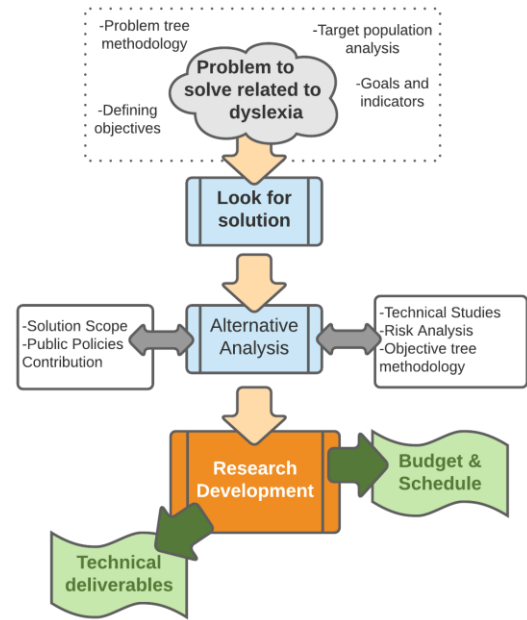


Fig. 3. Structure of the project to strengthen English in Colombia. This graph was taken and modified from [33].

Other authors elaborate a more complex plan with the possibility of including projects based on the foundations of the Project Management Body of Knowledge (PMBok) guide. This guide, in its sixth edition, presents guidelines related to key concepts, adaptation of processes, tools and project management techniques [34]. Based on this, it is possible to include management and planning in institutions, ICT in development, professional development for teachers, digital culture in the schools, resources, ICT infrastructure and, involve the stakeholders on it [35].

VI. RESULT ANALYSIS

The review of these areas of knowledge shows that there are still different limitations in the education sector that have circumscribed more organized and directed companies, assuming that management is severely related to other sectors. Therefore, it can be identified that the information related to education and management is emerging, but that there is still a fairly gap about application or research in this topic.

On the other hand, taking into account the collected information, it can be inferred that some policies and guidelines have been drawn up regarding research and

attention to inclusive education, nevertheless, there is still missing the classification of concepts, despite that not all the learning difficulties have the same characteristics; it is said a global concept of equity, making difficult to accomplish objectives in a more emphasized way and on specific needs.

Finally, it is possible to consider that according to the found studies, there is still a disjointed line between dyslexia, ICT mediated education and foreign languages, since it was evidenced that most of the finding has a clear relationship between a maximum of two of these items.

VII. CONCLUSIONS

The objective of this literature review was to frame the investigations that have revolved around the educational field in terms of inclusion, bilingualism and management. In this way, it was evidenced that an aspect that stands out in these studies is the common goal of achieving quality in education arising multiple factors, but that it is not possible to reach if there is no evidence of an approach towards inclusion as a pillar.

Inclusion therefore makes possible to consider an equitable coverage towards the reach of achievements regardless of their length and magnitude. A learning difficulty that has been considered in different studies is dyslexia, due to the degree of affection in the life cycle of a person, bearing in mind that it is a condition that defines the way to encode information through reading (which is extrapolated to different complications in other areas). However, there are authors who have directed their research practices to search for tools that include Information and Communication Technologies (ICT) for the development of a transversal and integral curriculum that appropriates the concepts regardless of whether they are working in content linked to foreign languages or mother tongue.

In addition, this paper also involves the management concept approaches from different points of view and the existing relationship that has been generated in recent years about planning and organizing in educational centers in order to guide the objectives of each of them, but also guide it to the achievement of local and global goals. This shows that management is not necessarily linked to a certain specific circle of companies, but can be part of educational institutions and, in this way, they can have the opportunity to extrapolate those results in terms of profits. It was therefore found that it is possible to strengthen links between the educational management (which allows managing knowledge), information and resources in search of an enhanced environment in terms of aimed structures at inclusive education.

VIII. FUTURE RESEARCH

After collecting the information and the findings in the systematic literature review, it is possible to consider that future research addresses:

- Topics related to the use of ICT in different learning difficulties (aside from dyslexia) to find out if it is possible to gather some of these opportunities and involve them in the main studied factor. If there is evidence of a lack of connection between the aforementioned aspects, involve proposals that contribute to the interested parties.
- To offer a specific solution that considers education institutions as a company that requires guidance and standards based on the strategic management.
- To carry out a strategic solution that brings together factors such as dyslexia, bilingualism and management as an opportunity of changing and supporting educational institutions and users.

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