

Dyslexia in adolescents in the context of Technical High School: a critical review^{1,2}

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ABSTRACT

This study systematically reviewed the literature on dyslexia in adolescents in technical-integrated high school, seeking to identify signs and promote their development. Using the Design Science Research methodology, 30 articles from the Scopus, Scielo, and Web of Science databases, published between 2013 and 2023, were analyzed, aiming to develop a critique and an educational product to address the involved theme. The research revealed a gap in the literature on vocational and technological education for adolescents with dyslexia. It highlighted the need to adapt educational policies to meet their needs, ensuring access to adequate resources and support. Emerging research areas include the development of specific interventions, the analysis of the impact of dyslexia on educational and professional trajectories, and the investigation of young people's experiences. Based on the results, an educational product was developed to assist in the identification and teaching practices for these individuals.

KEYWORDS: Dyslexia; Vocational high school; Adolescent.

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Dislexia em adolescentes no contexto do Ensino Médio Profissionalizante: uma revisão crítica

RESUMO

Este estudo revisou sistematicamente a literatura sobre dislexia em adolescentes do ensino médio integrado ao técnico, buscando identificar sinais e promover seu desenvolvimento. Utilizando a metodologia *Design Science Research*, foram analisados 30 artigos das bases *Scopus*, *Scielo* e *Web of Science*, publicados entre 2013 e 2023 objetivando a elaboração de uma crítica e de um produto educacional para tratativa da temática envolvida. A pesquisa revelou uma lacuna na literatura sobre a formação na educação profissional e tecnológica para adolescentes com dislexia. Destacou-se a necessidade de adaptar políticas educacionais para atender às suas necessidades, garantindo acesso a recursos e apoio adequados. As áreas emergentes de pesquisa incluem o desenvolvimento de intervenções específicas, a análise do impacto da dislexia na trajetória educacional e profissional, e a investigação das experiências dos jovens. Com base nos resultados, foi elaborado um produto educacional para auxiliar na identificação e práticas de ensino para esses indivíduos.

PALAVRAS-CHAVE: Dislexia; Ensino Médio Profissionalizante; Adolescente.

Dislexia em adolescentes en el contexto de la Educación Secundaria Profesional: una revisión crítica

RESUMEN

Este estudio revisó sistemáticamente la literatura sobre la dislexia en adolescentes de la educación secundaria integrada a la técnica, buscando identificar señales y promover su desarrollo. Utilizando la metodología *Design Science Research*, se analizaron 30 artículos de las bases de datos *Scopus*, *Scielo* y *Web of Science*, publicados entre 2013 y 2023, con el objetivo de elaborar una crítica y un producto educativo para abordar la temática involucrada. La investigación reveló una laguna en la literatura sobre la formación en educación profesional y tecnológica para adolescentes con dislexia. Se destacó la necesidad de adaptar las políticas educativas para satisfacer sus necesidades, garantizando el acceso a recursos y apoyo adecuados. Las áreas de investigación emergentes

incluyen el desarrollo de intervenciones específicas, el análisis del impacto de la dislexia en la trayectoria educativa y profesional, y la investigación de las experiencias de los jóvenes. Con base en los resultados, se elaboró un producto educativo para ayudar en la identificación y las prácticas de enseñanza para estos individuos.

PALABRAS CLAVE: Dislexia; Educación Secundaria Professional; Adolescente.

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*Know all the theories, master all the techniques,
but by touching a human soul,
be just another human soul.*
Carl Jung

Introduction

Dyslexia is a neurobiological learning disorder with genetic characteristics. It is marked by specific disturbances in reading, which interfere with accuracy, fluency, comprehension and rhythm (APA, 2014; Bravo, 2020; Mangas, 2021; Guerrero-Vaca *et al.*, 2022; Rodríguez-Cano; Delgado-Benito; Ausin-Villaverde, 2022). This difficulty arises, mainly, from a lower performance in decoding and understanding the phonemes that make up spoken and written language. As a result, reading comprehension and the formation of a rich and flexible vocabulary can be compromised, altering the production of knowledge in general.

It is important to note that dyslexic students do not show signs of global intelligence or sensory deficits, so they are able to learn satisfactorily in the classroom (OMS, 1992; APA, 2014; Rodrigues; Ciasca, 2016; ABD, 2023). In fact, they usually have normal or even above-average intellectual abilities (ABD, 2023; Shaywitz; Shaywitz, 2023).

Learning disorders can be seen by their prevalence in the student population. According to Lin *et al.* (2020) and Chávez Fonseca, Atafullas Macías and Ortiz Miranda (2021), statistics published by the Brazilian Dyslexia Association (ABD) between 2013 and 2021 indicate that about 3 to

17% of the world's student population has dyslexia, with more frequency in males (Bodea; Talas; Mosneag, 2015) and in individuals with an above-average IQ. It is common for these individuals to have comorbidities (Pereira; Silva, 2023) and significant genetic factors for dyslexia (Cruz, 2020) in both alphabetic and ideographic languages (Chung *et al.*, 2014), and in the adult population it is estimated that the prevalence reaches 4% (APA, 2014), without, however, presenting the scores of the adolescent population separately.

Early diagnosis and appropriate support, such as specialized reading classes, can help people with dyslexia develop strategies to overcome their problems. The importance of a Specialized Education Service (SES) for students with dyslexia is undeniable. This type of approach allows educators to adapt to the specific needs of each student, taking into account their abilities, strengths, and areas of need. It is particularly relevant in the context of dyslexia, in which students may face unique challenges in reading, writing, and comprehension (Brasil, 2011; 2021).

It is possible to encompass the adoption of varied pedagogical approaches, the use of assistive technologies and the creation of an inclusive educational environment, which allows students to succeed in reading and writing – essential skills, for example within the scope of Professional and Technological Education (EPT). In this context, students constantly deal with the reading of technical documents, such as handouts, manuals and equipment sheets. This practice is fundamental in the integral formation of young people, preparing them for their human development in all its dimensions, emphasizing this skill as fundamental.

Therefore, the Federal Network of Professional, Scientific and Technological Education (RFEPCT), by integrating high school and technical education, serves individuals within the life cycle of adolescence with the mission of preparing them with specific skills for a certain sector in the world of work, while at the same time forming critical and active citizens in their social environment (Saviani, 2007; Ramos, 2008). To this

end, the acquisition of reading is a fundamental tool for the development of the individual. However, it is reinforced that difficulties or deficiencies in decoding and linguistic comprehension can result in significant losses for the student's personal life project and their fulfillment as a human being.

Exploring and analyzing these issues within the scope of EFA, especially in the modality of technical education integrated with secondary education, is preeminent. Solis, Kulesz, and Willians (2022) report the impact of an intensive, multicomponent two-year reading and word comprehension intervention on high school students with reading difficulties. Although in recent years this number has increased, they have not yet been sufficient for conclusions that can be generalized to this life cycle. However, it is possible to say that interventions, even if late, cause positive effects.

Having made this preamble, the central question that is proposed in this article is: based on the researched literature, how to identify signs that point to dyslexia in adolescents and take advantage of the findings of the researched literature instruments to assist teachers in teaching practices? The general objective of this work is to carry out a systematic review of the literature on the learning disorder called dyslexia and to point out the signs present in adolescents who study in high school integrated with technical education, in order to develop an educational product that contributes to the identification and adoption of measures that promote their school development.

The presentation of this study is systematized as follows: a) it reports the methodology followed to meet the declared objective, and was carried out following the precepts of *Design Science Research* (DSR); b) it presents the theoretical foundation that cites the theories of Ausubel and Vygotsky; c) presents the results and discussions with the data produced with the systematic review; d) shows the Educational Product, as the artifact built in the DSR technique; e) synthesizes the results achieved from the objective of the study.

Methodology

This study is developed in the format of a systematic and critical review, allowing an in-depth and comprehensive analysis of teaching practices and ways of identifying young people with dyslexia in high school. The approach adopted is qualitative, focusing on the phenomena that involve individuals (learning), in the context of their relationships and in the environment in which they find themselves.

To this end, it is based on the methodology of *Design Science Research* (DSR), or Research Based on Scientific Design (Dresch; Antunes; Lacerda, 2021), which is an approach that starts from the scientific review of the literature and also from the state of the art to produce artifacts that mitigate or even solve problems. This technique is widely applied in various areas, including education and teaching.

In DSR, an artifact is conceptualized as "something built by man" with the intention of solving or mitigating an issue. The proposed solution is sufficiently adequate, considering the context, the cost/benefit ratio, the application environment and the real needs of those involved with the problem analyzed (Simon, 1996).

Consequently, the following steps were followed in the methodology:

1. **Identification of relevant studies:** a search was carried out with a systematized methodology in databases, journals, books and other research sources. For the query, the *Scopus* (Elsevier),² *Web of Science* (WoS)³ and *Scielo*⁴ databases were used after defining the search terms. To identify relevant studies on the subject with the use of the Boolean operators "AND" and "OR" ("OR"), the keywords used were: "dyslexia", "dyslexia", "ensino médio", "high school", "adolescentes" e

² Available at: <https://www.elsevier.com/products/scopus>.

³ Available at: <https://www.webofscience.com/wos>.

⁴ Available at: <https://scielo.br>.

“*teen**”, the latter term being truncated, that is, it considers terms with such a stem;

2. **Description and synthesis of the data:** relevant information was identified within the time frame (from 2013 to 2023), being articles from original or review papers, with a population aged 12 to 20 years and the filters of step 1. The inclusion and exclusion criteria were clearly defined to ensure the relevance of the selected studies;
3. **Discussion and presentation of results:** it was interpreted in the light of existing theories and presented in a clear and concise way. This approach made it possible to identify the relevant problems and the interpretative hypotheses suggested by the researchers whose works were consulted.

Once the steps were listed, the search resulted in a total of 202 works, considering the three platforms, as shown in Figure 1:

FIGURE 1: Number of articles found in the searched databases

Academic portals	SciELO	Scopus	WEB OF SCIENCE
Initial search with the term "difficulty of learning"	63	673	538
Narrowing with the term "dyslexia"	4	132	66
Restricting publication years between 2013 to 2023	2	26	16

Source: Authors, 2025.

When starting the search, the term “*dificuldade de aprendizagem*” or “*learning disability*” And the result is described in Figure 1, in line with each platform consulted. The next step was to restrict the data with the

filter “dislexia” or “*dyslexia*”, which resulted in a much smaller number of articles. And, finally, the last filter used in the decade established at the beginning of the work from 2013 to 2023.

With the application of the filter of the year of publication, 44 articles remained for the next phase. Thus, basic reading (of the abstracts) was carried out and the pre-established criteria continued to be applied.

After reading the identified studies, 30 articles met the previously established inclusion criteria. Table 1 presents the list of articles and their authors, as well as the year of publication:

TABLE 1: List of articles, authors and years of publication

Nº	AUTOR	TÍTULO	ANO
1	ALVES, R. J. R. <i>et al.</i>	Testes para Identificação de Sinais de Dislexia; processo de construção	2021
2	BODEA, C.A.; TALAS, D. A.; MOSNEAG, F.	Screening Program in Dyslexia for Highschool Students	2015
3	BRAVO, A. Z.	Dislexia desde el enfoque históricocultural: una propuesta de intervención integral em el sistema cubano	2020
4	CASTAMAN, A.S.; DE BORTOLI, L. A.	METODOLOGIAS ATIVAS NA EDUCAÇÃO PROFISSIONAL E TECNOLÓGICA	2021
5	CASTAMAN, A.S.; RODRIGUES, R. A.	Práticas pedagógicas: experiências inovadoras na Educação Profissional e Tecnológica	2021
6	CHUNG, K. K. H. <i>et al.</i>	Syntactic and discourse skills in Chinese adolescent readers with dyslexia: a profiling study	2014
7	CONDE, E. P.; SOARES, M. V.	O PROFESSOR E AS POTENCIALIDADES DO ALUNO COM DISLEXIA	2021
8	CRUZ, T.	DISLEXIA E A DIFICULDADE NA APRENDIZAGEM: identificação e possibilidades de intervenção	2020
9	DANSÍLIO, S.	CEREBRO Y DISLEXIA: UNA REVISIÓN	2015
10	DILÁSCIO, M. G. <i>et al.</i>	Abordagens cognitivo-comportamentais: um diálogo com a aprendizagem	2018
11	FONSECA, L. G. C.; MACÍAS, S. C. A.; MIRANDA, J. A. O.	ESTRATEGIAS DIDÁCTICAS PARA DISMINUIR TRASTORNOS DE DISLEXIA Y DISORTOGRAFÍA	2021
12	FRISK, M. <i>et al.</i>	The Problem of Dyslexia in Teenage	1967
13	FRITSCH, M. L.	Early screening of reading and writing difficulties in the first grade - a pilot study	2021
14	IBÁÑEZ-AZORÍN, A. <i>et al.</i>	Profile and neuropsychological differences in adolescent students with and without dyslexia	2019
15	GUERRERO-VACA, D. J. <i>et al.</i>	Comunicación y herramientas digitales para la dislexia¿ Un problema en la Educación? Una revisión	2022
16	KOLOSKI, P. E. B.; RODRIGUES, M. B.	ANALISE DE MATERIAL INFORMATIVO SOBRE DISLEXIANO CONTEXTO DA EDUCAÇÃO INCLUSIVA	2020
17	LIN, Y. <i>et al.</i>	The Prevalence of Dyslexia in Primary School Children and Their Chinese Literacy Assessment in Shantou, China	2020
18	MANGAS, C. <i>et al.</i>	Será a dislexia uma vantagem? Um olhar diferente sobre a diferença	2021
19	MONTOVANI, S. <i>et al.</i>	Ocorrência dos processos cognitivos de leitura e escrita e habilidades perceptivo-visuais em escolares com Dislexia Visual	2021
20	MOURA, A.	O olhar e a prática do professor do ensino médio sobre a dislexia	2022
21	PEREIRA, M. D.; SILVA, J. P.	Aspectos psicológicos em crianças e adolescentes com dislexia: uma revisão sistemática	2023

22	RODRIGUES, S.; CIASCA, S. M.	Dislexia na escola: identificação e possibilidades de intervenção	2016
23	RODRIGUES-CANO, S.; DELGADO-BENITO, V.; AUSÍN- VILLASVERDE, V.	Áreas de desarrollo para intervención en dislexia: Una propuesta de realidad virtual	2022
24	SANTOS, D. V. G. dos; FERRETE, A. A. S. S.; SANTOS, L. A. M.	ANÁLISE DA PRODUÇÃO CIENTÍFICA ACERCA DA FORMAÇÃO CONTINUADA DE DOCENTES DOS INSTITUTOS FEDERAIS	2020
25	SHAYWITZ, S. <i>et al.</i>	Persistence of Dyslexia: The Connecticut Longitudinal Study at Adolescence	1999
26	SILVA, D. R.	Dyslexia: Assessment of Neuropsychological Contributions	2018
27	SILVEIRA, F.; CASTAMAN, A. S.	Formação continuada de profissionais da educação: problematizações na educação profissional e tecnológica	2020
28	SOLIS, M.; KULESZ, P.; WILLIAMS, K.	Response to intervention for high school students: examining baseline word Reading skills and reading comprehension outcomes	2022
29	VAN DER JAGT, J.; CHRISTENSEN, D.	Modelo de equilíbrio de Bakker de aprendizagem da leitura investigado com alunos de 16 a 18 anos: um estudo piloto	2022
30	ZUPPARDO, F.	Modelo piloto de estudio del tratamiento rehabilitador de autoestima y comportamiento en adolescentes con dislexia y disortografía mediante su mejora lectoescritora	2017

Source: Prepared by the Authors, 2025.

It should be noted that, in addition to these bibliographies, the scope of references in the books consulted was expanded, such as Nico and Gonçalves (2020), Alves *et al.* (2021) and Shaywitz and Shaywitz (2023), which present practical guidelines and suggestions for activities with dyslexics. The search for practical suggestions that could meet the theme addressed led to indications of activities that were included in the NP. Topics found in the works of Nico and Gonçalves (2020) and Shaywitz and Shaywitz (2023).

This procedure resulted in a total of 49 references to be analyzed, all meeting the previously established criteria. The selection and screening process has ensured that the studies included in the systematic review are of high quality and relevant to the research topic. The inclusion of studies that meet strict criteria for this purpose ensured the reliability and validity of the results of the critical and systematic review.

However, the findings are presented in two moments. The first is based on the theoretical foundation, through the books consulted, and the second, with the analysis and discussion of the results, based on the 30 articles evidenced.

Theoretical Background

According to Ausubel (1982), in his Theory of Meaningful Learning, the learner's interest influences how and where this new concept can be anchored. His theory translates the importance of verbal language, as a facilitator of the learning process, but it can also occur mechanically, such as syllables formed by pairs of letters, being called learning by discovery or receptive. These forms of learning are not contrasting, being presented in different ways so that they can be assimilated (Moreira, 1999).

Vygotsky (2008) argues that learning occurs within a historical-social context, in which the learner modifies his environment to meet his needs. The child's thinking is influenced by the history of the society in which he lives and by his own trajectory of personal development. Vygotsky (2008) emphasizes the influence of emotions in the educational process and highlights the relevance of mediation, language and internalization for the cognitive development of the individual.

Vygotsky (2008) also introduces the concept of Zone of Proximal Development (ZPD), which indicates the real cognitive level of the individual added to the potential that he can achieve with the support of an adult or more experienced colleague. It differentiates the actual ability, which is the independent lower level of orientation and the potential to be achieved with adequate support. In short, the cognitive development of the subject occurs through the interaction between mediation, internalization and language, within the context of the learner (Moreira, 1999).

These concepts are fundamental to present the content to students with dyslexia, as this condition is genetic and permanent. This time, school progress is related to the presentation of the contents in the way the student can learn.

Dyslexia is a genetic condition and is related to certain regions of the brain. The anterior region is responsible for the articulation of phonemes and the analysis of words (broca's area), the dorsal region is

responsible for the grammatical structure and phonology of words (Wernick's area) and a third cerebral portion in the posterior region that visually processes words "expressway of reading" (Dansílio, 2015; Shaywitz; Shaywitz, 2023). As such, studies show that dyslexia is often associated with differences in the way the brain processes language and symbols in the areas affected by the disorder.

Silva (2017), in his work published in the journal 'Fragmentos de Cultura', points out three classifications for dyslexia: phonological, lexical and mixed. The distinguishing feature of phonological dyslexia is the embarrassment of operating the phonological route while the lexical route functions acceptably. However, the greatest difficulty is reading unfamiliar words, meaningless syllables or "pseudowords". Reading familiar words is easier. In addition, there are problems with tasks related to memory and phonological awareness, which impacts the understanding of what has been read (Silva, 2017).

The main problems with lexical dyslexia involve the lexical route and dyslexics of this type have a slow reading and several errors. The reading is in syllabic division and constant returns to the beginning of the word to review what has been read, and there may also be errors in the stress of syllables, changes of letters and lines (Silva, 2017; Mantovani *et al.*, 2021). In the third type of dyslexia classification, the mixed, the student will have difficulties in both reading routes, being the most severe type.

Difficulty in reading may simply be a formative deficiency, that is, a gap in the student's educational background (Moura, 2022). Therefore, it is crucial to identify whether the reading difficulty is due to a disorder such as dyslexia or to general learning difficulties. Correct identification allows the proper referrals to be made with the student. This may include specific educational interventions, classroom accommodations, or referral to health professionals if needed (Moura, 2022).

Detecting dyslexia in young people can be tricky, as this condition is often not noticed during childhood, due to the individual's ability to

overcome their difficulties. However, when intellectual demands intensify, as in adolescence, it becomes more difficult to deal with this problem and the symptoms become more apparent (Shaywitz; Shaywitz, 2023).

Signs of dyslexia in adolescents may include difficulties in managing and writing down tasks and deadlines, the need to read the text several times to understand it, problems understanding more complex math topics such as algebra, resistance to learning a new language, and notable differences between school performance and performance on written tests (Ibáñez-Azorín *et al.*, 2019; Rodríguez-Cano; Delgado-Benito; Ausin-Villaverde, 2022).

Emotional support is crucial for students with dyslexia. This can include building the student's self-esteem, encouraging effort, and celebrating progress. In addition, it may involve recognizing the student's effort, regardless of the result, and reinforcing the idea that error is a normal and valuable part of the learning process (Zuppardo; Rodriguez Fuentes; Serrano, 2017; Manga, 2021; Pear tree; Silva, 2023).

In Brazil, the legislation that regulates SEA meets the needs of students, but the challenge is to implement solutions that reduce the differences in the quality of learning acquired. Special education becomes the main focus of the school from the perspective of inclusive education, concentrating on students with disabilities, global developmental disorders and high abilities/giftedness (Brasil, 2011).

Therefore, it is essential that educators know how to identify the signs of dyslexia and implement effective teaching strategies to support these students. The identification of dyslexia in young people involves observation of various signs and symptoms, as well as the application of specific methods. In addition, some young people with dyslexia may have difficulties understanding mathematical concepts and oral language, so oral language assessment can be useful in diagnosing dyslexia (Cruz, 2020; Alves *et al.*, 2021; Count; Soares, 2021).

Finally, training teachers on dyslexia and effective teaching strategies can help ensure that students with dyslexia receive the support they need. This may involve training teachers on the characteristics of dyslexia, effective teaching strategies, and the importance of an inclusive and supportive learning environment (Castaman; De Bortoli, 2021; Kosloski; Rodrigues, 2020; Count; Soares, 2021; Moura, 2022).

Results and Discussion

Although this work considers a cut with results between the years 2013 and 2023, the concern with the theme dates back to the 1960s, which demonstrates the historical importance of the theme in the scientific community. To this end, this topic discusses the references listed in the survey, in order to identify the signs that point to dyslexia in adolescents.

The first scientific journal article found about adolescents with specific difficulties in reading and writing was written by Frisk (1967). The author considers that 10 to 15% of these young people have the disorder and, in adults of normal intelligence, the prevalence varies from 2 to 15%, with a determining influence of heredity and certain differentiated neurological functions. Even though this article is part of the excerpt of the articles analyzed in this study, it demonstrates the historical relevance of the theme of dyslexia in adolescents.

National statistical information from the Brazilian Dyslexia Association (ABD) between the years 2013 and 2021 can help to understand the prevalence and impact of dyslexia in Brazil. Of the patients evaluated in the consultations provided by ABD in the aforementioned period, 47% were diagnosed with dyslexia and 53% with other problems.

Other indications are that there are not many publications for adolescents and, especially, for EFA, as found in the pilot study by Jagt (Van Der Jagt; Christensen, 2022). In addition, the literature pointed out that in the academic training of teachers there is also a deficiency of

training for this public (Silveira; Castaman, 2020). Therefore, it is understood that there is an urgency to expand the studies and promote discussion among teachers to work with these students with specific and differentiated characteristics. After all, they have legally acquired rights; they are considered a priority public in national legislation; the life cycle corresponds to that of the group served by basic education, which also has a legal guarantee in national legislation - Law No. 8,069 (Brazil, 1990), Opinion of the Chamber of Basic Education (CEB)/National Council of Education (CNE) No. 16 (Brazil, 1999a), Resolution CEB/CNE No. 04 (Brazil, 1999b), Resolution CEB/CNE No. 02 (Brazil 2001), Resolution CEB/CNE 04 (Brazil, 2009), Decree No. 7,611 (Brazil, 2011), Law No. 13,005 (Brazil, 2014).

The prevalence of the disorder being "high" percentage, 3 to 17%, which ends up influencing the rates of retention and school dropout, also influences self-esteem and the correlation with the emotional states of adolescents, in the case of comorbidities that generally accompany this disorder (Shaywitz; Shaywitz, 2023).

The degree of responsibility of professional practice in teaching is very significant and needs to be perceived by this professional so that they act within the fundamental principles and concepts of the EFA teaching modality, who perceive themselves as facilitators and mediators not only of technical knowledge, but also trainers of citizens with a specific training that brings personal satisfaction and professional fulfillment to their students. Silveira and Castaman (2020, p. 02) believe that such "[...] conscious, deliberate and organized posture" arises through the search for continuously knowing new techniques and methodologies that allow them to share their technical knowledge so that everyone can learn, despite their individual differences and specificities.

By enhancing individual characteristics and seeking to minimize the difficulties presented by students, with suggestions for approaches to the situations encountered, the teacher will intervene synergistically in the

construction of knowledge, promoting significant learning that will maintain their interest, motivation and satisfaction in overcoming their difficulties, generating greater interest in remaining in the school environment and continuing their technical and professional training (Dilascio *et al.*, 2018, Castaman and Rodrigues, 2021).

Another point, addressed by Silveira and Castaman (2020), relevant in this context, concerns the appreciation of the professional involved with education in the country. The practice of education is done by many hands and the entire school community gets involved. They are parents, technicians and teachers, as well as the school's territory. Therefore, when referring to training and continuing education, one should think about covering all those involved, as the inclusion of adolescents with dyslexia will be perceived in all environments and social circles they attend.

Santos, Ferrete and Santos (2020) mention that teachers at the Federal Institutes of Education, Science and Technology in technical areas are usually professionals with a bachelor's degree or technologists specialized in the relevant areas. These individuals go through a competitive selection process to join the RFEPCT. On the other hand, teachers of general disciplines have licenses in the respective disciplines, which provides specific knowledge of concepts and pedagogical performance, a better understanding of the learning process and theories that facilitate the mediation of content and the vision of the individuality of the learning process.

Initial and continuing teacher training should reflect these needs, providing them with the skills needed to navigate the ever-changing educational environment. In addition, experiencing teaching is a vital component that allows teachers to apply and refine their skills in a real and original environment on a daily basis, the classroom. In summary, contemporary teacher professionalization requires an open, flexible, and innovative mindset, capable of adapting and thriving in the midst of

continuous transformations in the educational landscape (Ibáñez-Azorín *et al.*, 2019; Nico; Gonçalves, 2020; Guerrero-Vaca *et al.*, 2022).

In view of the review presented here, eight main points of attention were identified on the theme of dyslexia involving the context of professional and technological education (Rodrigues; Ciasca, 2016; Kosloski; Rodrigues, 2020; Cruz, 2020; Moura, 2022). The bibliography raised responded directly to the problem proposed in the introduction by offering a theoretical and empirical basis that identifies signs of dyslexia in adolescents of high school integrated with technical and subsidizes pedagogical practices. The studies analyzed addressed everything from neurobiological aspects and classifications of the disorder to intervention methodologies, in addition to discussing inclusive strategies, assistive technologies and educational policies. This synthesis allowed us to highlight gaps in the care of dyslexics in this context and to support the elaboration of the educational product, which guides teachers in the early identification and development of inclusive pedagogical practices. The following are the points of attention highlighted:

1. **Identifying students with dyslexia:** it is crucial to identify the most common signs and symptoms of dyslexia in adolescents to provide the necessary support as early as possible;
2. **Effective teaching strategies:** teaching strategies should be adapted to support students with dyslexia in vocational and technological education. This can include differentiated pedagogical approaches, use of assistive technology, among others;
3. **Teacher training:** teachers should be trained to identify and support students with dyslexia, which may involve workshops, continuing education courses, among others;
4. **Support resources:** resources should be made available to support students with dyslexia and their families, including adapted teaching materials, guidance services, among others;

5. **Early intervention:** early intervention can significantly impact the academic performance and quality of life of students with dyslexia;

6. **Best practices:** best practices for integrating students with dyslexia into vocational and technological education should be identified and implemented;

7. **Educational policies:** educational policies should be adapted to better meet the needs of students with dyslexia;

8. **Emerging Research Areas:** Emerging research areas in the field of dyslexia in professional and technological education should be explored to continue advancing the understanding and support of these students.

Educational Product

After the analyses undertaken, the Educational Product (PE) was elaborated, which aims to be a useful tool for teachers and technicians of the RFEPCT, with the objective of addressing the deficiencies identified in the teaching-learning process and improving the understanding of dyslexia disorder, regardless of whether a report is issued or not. By compiling a support material with quick and practical access, with concepts and suggestions, it was hoped to make the integrality sought by the philosophical and practical guidance of the professors of this institution more transparent and replicable, with the necessary property for the foundations of a public, free and quality institution.

The material consists of 47 pages, stored on the Sucupira Platform, under the registration of ISBN 978-65-83250-01-8 and its content describes the most recent concept used by the International Association, the signs that help educators, family members and the student himself to identify the characteristics of the disorder in the adolescent and encourage them to seek specialized help, obtain the report, and to proceed with the necessary adjustments that are legally guaranteed to the dyslexic (Ignácio; Fonseca, 2024).

Thus, it presents data such as: concept (p. 4), diagnosis (p. 7), guidance to the teacher (p. 10), evaluations (p. 16), important signs for identification (p. 26), guidance to students (p. 28), assistive technologies (p. 31) and suggestions for support materials (p. 40). The following is the cover of the Educational Product (PE):

FIGURE 2: Cover of the educational product (PE)

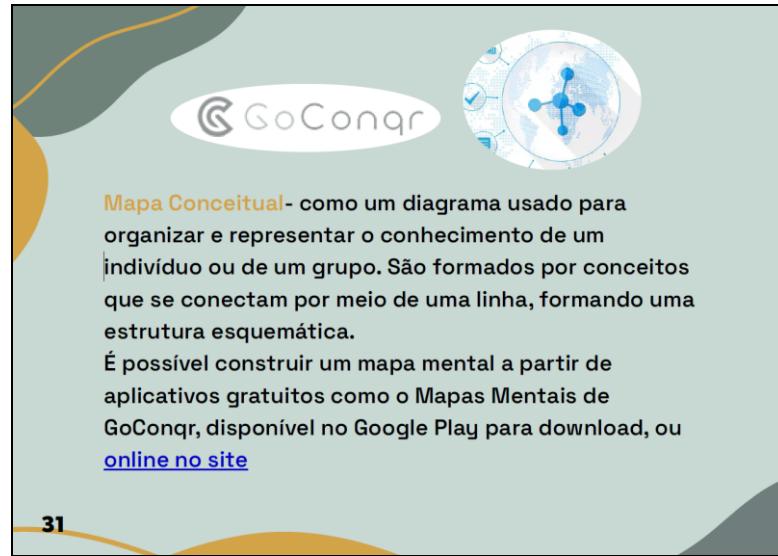


Source: Authors, 2024.

The colors in which the NP is presented are different from those not recognized by colorblind people (green and red). The PE features an eye-catching look, pastel colours, for greater visual comfort.

It is also found in the PE, the assistive technologies made available for student use and the link to various support materials that can be of great help to students and educators. An example is about the use of the Concept Map teaching tool, as illustrated in Figure 3:

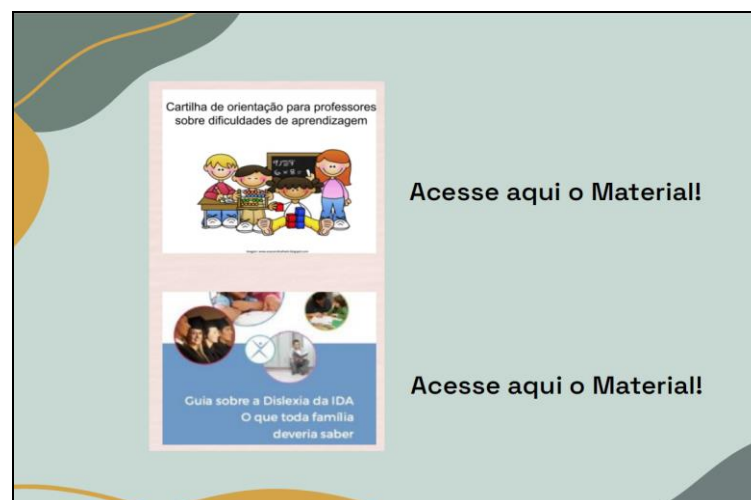
FIGURE 3: Example of materials that make up the PE: Concept Map



Source: Authors, 2024.

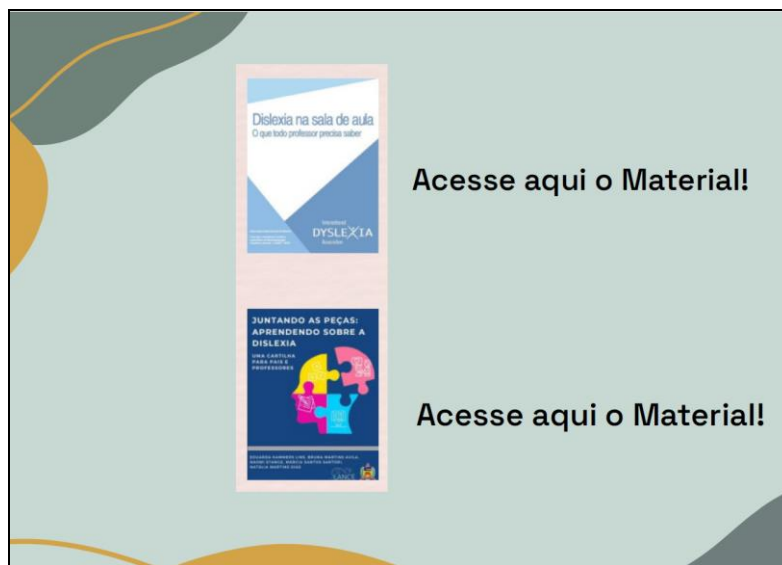
The EP contains interactive links that lead directly to the publications when clicked on the observations in blue, as in Figure 3. As well as places where the observation "Access the Material here" appears, and the reader will have access to the original publication with all the information. As illustrated by some pages of the booklet in the images of Figure 4 and 5 below, they exemplify.

FIGURE 4: Some links to the booklet prepared (PE)



Source: Authors, 2024.

FIGURE 5: Other links to the booklet prepared (PE)



Source: Authors, 2024.

Conclusion

RFEPCT, by integrating technical and vocational education, aims to prepare individuals with specific skills for a particular sector in the world of work, while forming critical and active citizens in their social environment. In this context, the acquisition of reading is a tool of paramount importance for the development of the individual. However, difficulties or deficiencies in decoding and linguistic comprehension, such as dyslexia, can result in significant losses to the student's personal life project and their fulfillment as an individual.

While this study provides a valuable overview of dyslexia-related issues in EPT, there are some limitations that should be considered. For example, the effectiveness of teaching strategies and support resources can vary depending on the specific context and individual characteristics of students. In addition, identifying students with dyslexia can be challenging due to the lack of consensus on diagnostic criteria and overlapping symptoms with other learning disorders.

Thus, the selected bibliography not only clarified the signs and impacts of dyslexia, but also supported intervention proposals and pedagogical strategies, contributing to respond to the research problem and to the construction of solutions applicable in the school context.

Future research could focus on developing and validating standardized assessment tools for the identification of students with dyslexia in EFA. In addition, longitudinal studies could be conducted to examine the long-term impact of teaching interventions and strategies. Finally, additional research is needed to explore the effectiveness of different types of teacher support and training resources.

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