

A LITERATURE REVIEW ON GEOGRAPHY TEACHERS' KNOWLEDGE OF AND ATTITUDES TOWARDS DYSLEXIA

Passadelli Anthoula Styliani and Klonari Aikaterini

Department of Geography, University of the Aegean, Mytilene, Greece

ABSTRACT

This article is a literature review on geography teachers' knowledge and perceptions of dyslexia, as well as the teaching methods they decide to use in order to differentiate their teaching in mixed ability classes, including dyslexic students. The aim of the systematic literature review was to identify: a) Geography teachers' knowledge and perceptions of dyslexia; and b) the teaching strategies that they use to help dyslexic students overcome their difficulties. The research was carried out from October to November 2020. Initially, 1346 articles on dyslexia and teaching methods, generally that were published during the last 20 years (2000-2020) were identified in 5 databases. Findings showed that, despite the very large number of publications on the subject, only a few studies (3) were found to meet our research criteria (dyslexia + geography + teaching methods + teachers' attitudes/knowledge). It is suggested that future studies focused on teaching geography and its impact on dyslexia would contribute to drawing clearer conclusions on the topic.

KEYWORDS

Geography teachers, dyslexia, teaching methods, knowledge, attitudes

1. INTRODUCTION

A developmental learning disorder can be a very serious handicap for a child, especially if the skills affected are critical in modern societies [1, 2]. Dyslexia is a specific learning difficulty which is more prevalent amongst students than any other disability [3]. Furthermore, this common learning disability involves about 80 percent of the learning-disabled population, although the prevalence rate may differ from country to country [4]. Dyslexia is a language-based disability and results from poor decoding ability [3]. Poor decoding ability is usually associated with deficits of various kinds, such as: phonological [5], grammar [6], memory [7, 8, 9], visual processing [10, 11, 12] and spatial thinking [13, 14, 15].

Spatial thinking is defined as “a collection of cognitive skills comprised of knowing concepts of space, using tools of representation, and reasoning processes” [16]. Lee and Bednarz [17] argue that the educational value of spatial thinking is enormous and must be taught and learned. What should be noted here is that spatial thinking and spatial skills associated with Geography education, since spatial skills can be developed through teaching Geography. Geography, as a science, enables us to understand the Earth in which we live from a spatial perspective [18]. Undoubtedly, many things in people's daily life are interwoven with geography and, of course, geographic knowledge enables people to understand things they do and how their everyday actions affect the world around them [18].

Nevertheless, within the context of teaching Geography, it has been observed that dyslexic students have difficulties and weak performance in Geography subject [18] in primary and secondary schools, and in-class teaching experience has shown that dyslexic students will have better outcomes with appropriate teaching methods. Thus, in order for any educational intervention to be successful, teachers should be trained to become aware of, sensitive towards and knowledgeable about dyslexia [15]. Furthermore, teachers should be deeply familiar with their teaching subject (i.e. Geography) in order to be able to properly apply their knowledge to teaching and to adapt teaching practices to their students' needs [19].

Taking into consideration the aforementioned statement that students with dyslexia have poor spatial abilities [18] and that teachers are the ones who with their guidelines and appropriate teaching methods could help those students improve their spatial abilities [19], this review focused on a literature review concerned with geography teachers' knowledge of, views on and attitudes towards dyslexia as well as the teaching methods they decide to use in order to differentiate their teaching in mixed ability classes that include dyslexic students. However, we narrowed down the scope of our research since we wanted to include in this review articles that should be related to geography teachers' views on dyslexic students in the secondary education or to methods that geography teachers used to help dyslexic students deal with their difficulties.

2. METHOD

Systematic reviews are common in healthcare professions - such as psychology, nursing, public health, occupational therapy, speech therapy, and physiotherapy - but are also increasing in other academic fields such as sociology, business management and education [20]. Systematic reviews can be broadly defined as a type of research synthesis which set out to identify and retrieve international evidence that is relevant to a particular question or questions [21, 22]. Apart from their usefulness in documenting what existing literature claims, they also identify gaps pointing to future research directions [23]. In the last decade, several systematic reviews in the discipline of geography education have been undertaken; for example, reviews on techniques and strategies in geography teaching [24], assessment in geography education [25], sustainable development in geography education [25], geographical literacy in students with dyslexia [26] etc. However, when we started our research, we wanted to see whether geography teachers were aware of dyslexia, and if so, how they deal with dyslexic students and whether they contribute to the latter's progress.

2.1. Research Question

The basic questions of this review paper attempt to answer: (1) how many studies have been done about Secondary Education Geography teachers' knowledge of the interrelation between dyslexia and spatial skills; and (2) whether Geography teachers use appropriate methods that help students with dyslexia improve their school performance. However, the main objective of this paper was to review the literature of the last 20 years (2000-2020) with intention to identify and record:

- Researches on secondary geography teachers' knowledge of and views on dyslexia; and
- Researches on the methods that the Secondary Education geography teachers use in order to enhance spatial and geography skills of students with dyslexia.

2.2. Data Collection

Databases searched

In order to answer our research questions, we reviewed the literature of published studies and grey literature that has been published for the last 20 years; that is, from 2000 to 2020. We collected the data on scientific publications by applying the systematic literature review models presented by Badger, et al. [27], Cooper [28], Evans & Benefield [2001], Torgerson [30]. Thus, the data collection consisted of the following phases:

- (1) Defining the research question;
- (2) Defining inclusion and exclusion criteria;
- (3) Defining databases; and
- (4) Defining the search terms.

We undertook literature search in November 2020 in the following international online bibliographic databases: A) Hellenic Academic Libraries Link(<https://search.heal-link.gr/>) and University of the Aegean Main Catalogue (<https://www.lib.aegean.gr/en/main-catalogue-opac>); B) Oxford University Press (Journals); C) ERIC (Education Resources Information Center); D) SAGE; E) Taylor Francis and F) Springer. The search included articles written only in English and published in scientific journals.

2.3. Search Terms

We carried out the research using the following keywords: teacher's perceptions on dyslexia; geography teachers' views on dyslexia or geography teachers' knowledge of and attitudes towards dyslexia; educators' thinking about dyslexia; teaching methods to teach geography to dyslexic students; educational material for dyslexic students for Geography subject.

Selection of papers for inclusion in the review

We specified a number of the further criteria in order to select appropriate articles for inclusion in our review. The predefined inclusion criteria were as follows. An article should: (1) discuss geography teachers' view on dyslexic students; (2) have been published during the period 2000-2020; and (3) discuss teaching methods for dyslexic students in geography or generally in geoscience. So, from this review we excluded: (1) review books, chapters and conference papers; (2) papers that investigated other learning disabilities; and (3) papers that referred to teaching methods for dyslexic students in theoretical courses.

2.4. Limitations of Research

Two primary limitations can be considered in this study. The first one is that the results are based on research written only in English. The second limitation is that this research excluded papers that were published in English and appeared in conference proceedings.

3. RESULTS

The database search revealed 1,346 articles, among which there were duplicates that had resulted from overlapping searches. By having analyzed the information provided by the title and abstracts, we ended up selecting 59 articles, of which only 3 met our inclusion criteria (Table 1). One of them referred both to Geography teacher's views on dyslexia and the teaching methods they use, whereas the other 2 articles referred only to teaching methods teachers used. More specifically, only 6.7% of all articles that we found we concluded in our research (Table 2), because 35.4% of the articles referred to reading, writing, and spelling, and 21.6% referred to learning a foreign language. Moreover, 13.2% of the articles, although they referred to dyslexic

students' spatial and geographic skills, did not discuss about teacher's views or the strategies they use, and 23.1% of the articles referred to dyslexia in general terms.

Table 1. Articles which met review's inclusion criteria

Author (year)	Geography teacher's views	Spatial abilities	Teaching methods for dyslexic students on Geography
Feeney (2003)	-	✓	✓
Allegri (2015)	-	✓	✓
Passadelli et al. (2020)	✓	✓	✓

Table 2. Total number of reviewed papers identified from each database and number of papers included in the review

Database	Number of papers identified in the search	Number of papers meeting inclusions criteria
ERIC	33	1
Google scholar	442	1
Taylor Francis	161	0
Research gate	100	1
Sage	132	0
Wiley Online Library	438	0
Springer Link	10	0
Science direct	30	0
Total	1346	3

After the research in databases and the study of the papers were completed, the researchers' views were categorized as follows.

A. Secondary Education geography teachers' views on dyslexia

From the research in databases we found 1 article [19] that was published in 2020. This article presented Geography teachers' knowledge of and perceptions on dyslexia. This research investigates: (a) teachers' perceptions on and knowledge of dyslexia; (b) teaching methods used for dyslexic students; and (c) the obstacles the teachers face when implementing appropriate methods and techniques. To achieve the research objectives, the researchers employed a quantitative approach complemented by a small qualitative part. They used a structured questionnaire consisting of five parts with 34 closed-ended questions and two open-ended ones, and targeted all junior high school geography teachers in Greece. The selection of the participants was based on stratified random sampling. The respondents were 61 Greek teachers teaching Geography in the 7th and 8th grade in Greek public junior high schools. The results were categorized into: (1) Geography teachers' knowledge of and perceptions on dyslexia; (2) The use of ICT; and (3) The use of maps.

Regarding the first category, the result of this research showed that younger geography teachers and those who had attended courses on dyslexia at the university have better perceptions on dyslexic students. Moreover, teachers believed that dyslexic students do not have at all or have limited difficulties in orientation, a fact that is debatable in several studies [31, 32, 33]. The great majority of teachers believe that dyslexic students have difficulties only in writing (80.3%), in learning a foreign language (59%), and in theoretical courses (93.4%), something that is a false assumption, as dyslexia affects not only reading, writing and theoretical courses [34, 35, 36, 37, 38, 39, 40, 41] but also science courses [42]. The research also revealed that the majority of

teachers have poor knowledge of and misunderstandings about dyslexia [42, 43, 44], although they showed some accurate understandings when they were asked about reading, writing, and learning a foreign language. So, this article showed us what situation prevails in Greece as far as teachers' knowledge of and attitudes towards students with dyslexia are concerned. This article also analyzes the participants' profile and the possible reasons why geography teachers do not have any knowledge of and are not willing to acquire any about dyslexia.

B. We found 3 articles (one is the same as the above because this research investigated two fields) that discussed about which methods are better for dyslexic students in Geography subject.

- The first article (Feeney, 2003) [45] presented multimedia as an educational tool for presenting geographic material. Using a geography subject that was developed in two formats (traditional text and interactive multimedia). Both formats included graphics such as maps, pictures, and diagrams with sound and animation included in the multimedia format. The difference between two formats was that in the second format there were animated maps and audio sound bites. Each section was designed to take 15-20 minutes. The results of this research indicated that interactive multimedia was helpful for dyslexic and non-dyslexic students alike to enhance their school performance, because of multimedia's ability to incorporate materials that stimulate multisensory learning pathways [45].
- The second article (Allegri, 2015) [14] presented dyslexic students' cognitive styles, and discussed methods which can help these students have better outcomes in Geography lessons. This research also proposes the use of multimedia like Power Point, Prezi, smartboards etc. as very helpful. Another potential of this research is processing auditory information; that is, it ensures that the overall discourse allows reiteration, clarification of new terms and regular pauses to reflect and catch up, temper the overall speed of delivery, provide clear examples and explanations, supply handouts and explanatory lists of new concepts and unfamiliar terms [14]. Allegri states that dyslexic students have their own cognitive style, such as nonverbal and visual style and global style, which follow the divergent way of thinking. On the one hand, visual style works through mental images, diagrams and graphic representations, whereas, on the other hand, analytical style focuses on a visual support to understand graphics and maps. Finally, geography global style focuses on reading maps that requires an immediate global approach. The main tools of geography are graphs and thematic maps of different types that analyze the various issues considered from a global point of view. Systematic style sees the student proceeding at stages through the analysis of the different variables, whereas the intuitive style starts from a hypothesis and tries to confirm it.
- The third article is Passadelli et al. [19] and refers both to Geography teachers' views on dyslexia and the teaching methods they use. The methodology of this research presented in A, above. Regarding the results about teaching methods, Passadelli et al. [19] found that 65.6% of teachers do not use appropriate methods due to the fact that the teachers believe that the presence of a dyslexic student does not affect at all or only slightly their teaching. The majority of them use a few or not at all representations, memory aids, mental maps, teamwork teaching, new technologies, diagrams, 3D images or explanatory notes. However, international literature has shown that dyslexic students have memory deficits [35]. In addition, too much cognitive load reduces the working memory capacity that is available for reading comprehension [46]. However, the usage of memory aids would help dyslexic students have better learning outcomes. Dyslexic students are able to memorize

images [47] so the visual approach to the geography subject would help dyslexic students develop better understanding and achieve better performance. Unfortunately, teachers either do not know about this ability or do not take into account this ability of dyslexic students. Research has shown that students with dyslexia are gifted in 3D models [48, 49]. If it is so, then if teachers use 3D images, 3D maps, and 3D simulations, dyslexic students may develop better understanding of the subject and improve geographical skills, such as orientation, decoding map symbols, and so on, that are important for their life. In the third category about the use of maps, teachers usually use traditional maps (wall maps) (54.1%) and globes (42.6%) in geography classes, whereas the great majority of them used neither 3D maps (86.9%) nor digital maps (52.5%) at all. The researchers came up to the conclusion from teachers' responses that the main obstacle is teachers' unwillingness to use new strategies and techniques to help dyslexic students.

4. CONCLUSIONS

Dyslexia and teaching dyslexic students are well-researched topics. The present article though has reviewed international literature in 2 sections. The first one was on Secondary Education Geography teachers' knowledge of and attitudes towards dyslexia, whereas the second was about teaching methods that Geography teachers used in order to help dyslexic students.

In the first section with the keywords that we used, we found only one article. Even though we found many articles on teachers' views on dyslexia, only one of them referred to Secondary Education geography teachers' views. Generally, the majority of articles about dyslexia referred to primary school and kindergarten teachers. Most of the articles were about reading, writing and learning foreign languages. Moreover, of these articles, there was only one that referred to Geography subject, despite the fact that it has been proven that dyslexic students do have orientation problems [15]. This is an evidence that there is a lacuna (: gap) in the field that needs to be investigated and be filled in with more research. Furthermore, because the research carried out by Passadelli et al. [19] is the only one that refers to Greek Geography teachers, it would be good if there is more research done in Geography teachers' views on and attitudes towards teaching Geography in other countries to see whether they have the same views and attitudes as their Greek counterparts. This would help draw more accurate conclusions and to take more systematic actions so that geography teachers learn how to deal with dyslexic students and help them overcome the obstacle of dyslexia.

As far as teaching methods that Geography teachers used, we found only 3 articles. One of them was the same as with that was referring to Geography teachers' views on dyslexia. One of them did not propose any appropriate strategies; it simply showed that Geography teachers do not use ICT. Both of these articles suggest that the use of technology is a suitable tool for teaching geography to dyslexic students. Multimedia technology is now widely used in secondary school classrooms, and has excellent potential for environmental and science education such as Geography [50]. Moreover, when traditional teaching methodologies are used in schools where there is a large number of students in a single class, it is difficult for a teacher to use assistive multimedia applications – such as activities, games and videos - to dyslexic students [51] or to repeat instructions. Furthermore, technology has so many aspects and possibilities now that if teachers used them they would help students with dyslexia. Comics, representations, audio videos and more have been used in other subjects but not in Geography. There is a need to apply various technology-based techniques in teaching Geography to dyslexic students so to find out which techniques are the most beneficial to them. These techniques should be based on the special skills that dyslexic students have with new technologies, since dyslexic students have been proven to be

charismatic in 3D representations [46]. So, if 3D geographic educational material may be created, dyslexic students could overcome some of the difficulties they face with Geography subject. Finally, and from an educational point of view, teachers are those who encounter students with dyslexia and are expected to identify students who struggle with literacy, differentiate their teaching approaches to accommodate them for each student's needs and make sure that students' emotional wellbeing is taken good care for. It is, therefore, imperative that teachers are adequately trained, particularly during their undergraduate studies, so to understand dyslexia and how to support their students' needs [52]. Some of these teachers will also be called to teach Geography subject to dyslectic and non-dyslectic students, a subject that all students face difficulties with. Unfortunately, there has not much research in teaching Geography to students and, especially, to students with dyslexia, a lacuna that the present research has highlighted. Furthermore, this research has made an effort to illustrate that there is a need for further research in teaching Geography and teaching methodologies and teaching materials that teachers actually use in their Geography lessons.

REFERENCES

- [1] Duncan, G. J., Dowsett, C. J., Claessens, A., Magnuson, K., Huston, A. C., Klebanov, P., Pagani, L. S., Feinstein, L., Engel, M., Brooks-Gunn, J., et al. (2007). School readiness and later achievement. *Developmental Psychology*, 43, 1428–1446. <https://doi.org/10.1037/0012-1649.43.6.1428>
- [2] Ritchie, S. J., & Bates, T. C. (2013). Enduring links from childhood mathematics and reading achievement to adult socioeconomic status. *Psychological science*, 24(7), 1301-1308.
- [3] Adubasim, I. C. J., & Nganji, J. (2017). Dyslexia-a learning difference. *Autism Open Access*, 7(1), 1-4.
- [4] Snowling, M. J., Muter, V., & Carroll, J. (2007). Children at family risk of dyslexia: a follow-up in early adolescence. *Journal of child psychology and psychiatry*, 48(6), 609-618.
- [5] Snowling, M. J., Hayiou-Thomas, M. E., Nash, H. M., & Hulme, C. (2020). Dyslexia and Developmental Language Disorder: comorbid disorders with distinct effects on reading comprehension. *Journal of Child Psychology and Psychiatry*, 61(6), 672-680.
- [6] Snowling, M.J., & Hulme, C. (2012). Annual research review: the nature and classification of reading disorders—a commentary on proposals for DSM-5. *Journal of Child Psychology and Psychiatry*, 53, 593– 607. <https://doi.org/10.1111/j.1469-7610.2011.02495.x>.
- [7] Majerus, S., & Cowan, N. (2016). The nature of verbal short-term impairment in dyslexia: The importance of serial order. *Frontiers in Psychology*, 7, 1522. doi: 10.3389/fpsyg.2016.01522
- [8] Cowan, N., Hogan, T. P., Alt, M., Green, S., Cabbage, K. L., Brinkley, S., & Gray, S. (2017). Short-term memory in childhood dyslexia: Deficient serial order in multiple modalities. *Dyslexia*, 23(3), 209-233.
- [9] Gray, S., Fox, A. B., Green, S., Alt, M., Hogan, T. P., Petscher, Y., & Cowan, N. (2019). Working memory profiles of children with dyslexia, developmental language disorder, or both. *Journal of Speech, Language, and Hearing Research*, 62(6), 1839-1858.
- [10] Araújo, S., Faísca, L., Reis, A., Marques, J. F., & Petersson, K. M. (2016). Visual naming deficits in dyslexia: An ERP investigation of different processing domains. *Neuropsychologia*, 91, 61-76.
- [11] Law, J. M., Veisapak, A., Vanderauwera, J., & Ghesquière, P. (2018). Morphological awareness and visual processing of derivational morphology in high-functioning adults with dyslexia: An avenue to compensation?. *Applied Psycholinguistics*, 39(3), 483-506.
- [12] Ronconi, L., Melcher, D., & Franchin, L. (2020). Investigating the role of temporal processing in developmental dyslexia: Evidence for a specific deficit in rapid visual segmentation. *Psychonomic Bulletin & Review*, 27, 724–734 (2020). <https://doi.org/10.3758/s13423-020-01752-5>
- [13] Aleci, C., Piana, G., Piccoli, M., & Bertolini, M. (2012). Developmental dyslexia and spatial relationship perception. *Cortex*, 48(4), 466-476.
- [14] Allegri, R. (2015). Geography and disability: a reflection on opportunities offered by teaching geography to dyslexic students. *J-Reading-Journal of Research and Didactics in Geography*, 2(2015), 85-93. DOI:10.4458/6063-08

- [15] Klonari, A., & Passadelli, A. S. (2019). How Evident is Differentiation of Spatial and Geospatial Skills between Dyslexic and Non-Dyslexic Students?. In Chiou, V., Holz, O., Ertürk, N.O. & Shelton, F. (Eds.), *International Insights: Equality in Education*. Münster, Germany: WAXMAN/Verlag, 155-165. ISBN 978-3-8309-4022-7
- [16] National Research Council. (2006). *Learning to think spatially: GIS as a support system in the K-12 curriculum*. Washington, DC: National Academies Press.
- [17] Lee, J., & Bednarz, R. (2012). Components of spatial thinking: Evidence from a spatial thinking ability test. *Journal of Geography*, 111(1), 15-26.
- [18] Klonari, A., & Passadelli, A. S. (2019). Differences between Dyslexic and Non-Dyslexic Students in the Performance of Spatial and Geographical Thinking. *Review of International Geographical Education Online*, 9(2), 284-303.
- [19] Passadelli, A. S., Klonari, A., Michalakis, V. I., & Vaitis, M. (2020). Geography Teachers' Knowledge of and Perceptions on Dyslexia. *Education Sciences*, 10(10), 278. <https://doi.org/10.3390/educsci10100278>
- [20] Lane, R., & Bourke, T. (2019). Assessment in geography education: a systematic review. *International Research in Geographical and Environmental Education*, 28(1), 22-36.
- [21] Pearson A. (2004). Balancing the evidence: incorporating the synthesis of qualitative data into systematic reviews. *JBIC Reports*. 2(2), 45–64. <https://doi.org/10.1111/j.1479-6988.2004.00008.x>
- [22] Munn, Z., Peters, M. D., Stern, C., Tufanaru, C., McArthur, A., & Aromataris, E. (2018). Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. *BMC medical research methodology*, 18(1), 143. <https://doi.org/10.1186/s12874-018-0611-x>
- [23] Petticrew, M., & Roberts, H. (2006). *Systematic reviews in the social sciences: A practical guide*. Malden, MA: Blackwell
- [24] Zadrozny, J., McClure, C., Jinhee, L. E. E., & Injeong, J. O. (2016). Designs, Techniques, and Reporting Strategies in Geography Education: A Review of Research Methods. *Review of International Geographical Education Online*, 6(3), 216-233.
- [25] Sprenger, S., & Nienaber, B. (2018). (Education for) Sustainable Development in Geography Education: review and outlook from a perspective of Germany. *Journal of Geography in Higher Education*, 42(2), 157-173.
- [26] Passadelli, A.S., & Klonari, A. (2018). Developing Geographical Literacy in Students with Dyslexia: Challenge and Reflection. In e-Proceedings of the 11th International Conference of the Hellenic Geographical Society INNOVATIVE GEOGRAPHIES: Understanding and connecting our world. Lavrion, Greece: 12-15 April 2018. http://hellenicgeosociety.org/el/11th-conference-proceedings?field_topic_tid=612&title=&title_field_value_1=Klonari
- [27] Badger, D., Nursten, J., Williams, P., & Woodward, M. (2000). Should all literature reviews be systematic? *Evaluation and Research in Education*, 14(3-4), 220–230. DOI: 10.1080/09500790008666974
- [28] Cooper, H. M. (2010). *Research synthesis and meta-analysis: A step-by-step approach* (4th ed.). Thousand Oaks, CA: Sage.
- [29] Evans, J., & Benefield, P. (2001). Systematic reviews of educational research: Does the medical model fit? *British Educational Research Journal*, 27(5), 527–541. <https://doi.org/10.1080/01411920120095717>
- [30] Torgerson, C. (2003). *Systematic reviews*. London: Continuum.
- [31] Williams, A., Kennedy, S., Philipp, F., & Whiteman, G. (2017). Systems thinking: A review of sustainability management research. *Journal of Cleaner Production*, 148, 866-881.
- [32] Klonari, A. (2002). The Status of Geography in Educational System in the Compulsory Schools. In *Proceedings of the 6th Pan-hellenic Geographical Conference 2002*, Thessalonica, Greece, 3–6 October; pp. 543–548
- [33] Mokkink, L. B., Terwee, C. B., Patrick, D. L., Alonso, J., Stratford, P. W., Knol, D. L. & de Vet, H. C. (2010). The COSMIN study reached international consensus on taxonomy, terminology, and definitions of measurement properties for health-related patient-reported outcomes. *Journal of clinical epidemiology*, 63(7), 737-745.
- [34] Washburn, E. K., Binks-Cantrell, E. S., & Joshi, R. M. (2014). What do preservice teachers from the USA and the UK know about dyslexia?. *Dyslexia*, 20(1), 1-18.

- [35] Shetty, A., & Rai, B. S. (2014). Awareness and knowledge of dyslexia among elementary school teachers in India. *Journal Of Medical Science And Clinical Research*, 2(5), 1135-1143.
- [36] Abtahi, M. S. (2012). Interactive multimedia learning object (IMLO) for dyslexic children. *Procedia-Social and Behavioral Sciences*, 47, 1206-1210.
- [37] Alwell, M., & Cobb, B. (2009). Functional life skills curricular interventions for youth with disabilities: A systematic review. *Career Development for Exceptional Individuals*, 32(2), 82-93.
- [38] Soriano-Ferrer, M., & Morte-Soriano, M. (2017). Teacher perceptions of reading motivation in children with developmental dyslexia and average readers. *Procedia-Social and Behavioral Sciences*, 237, 50-56.
- [39] Gibbs, S., & Elliott, J. (2015). The differential effects of labelling: how do 'dyslexia' and 'reading difficulties' affect teachers' beliefs. *European Journal of Special Needs Education*, 30(3), 323-337.
- [40] Kirby, A., Davies, R., & Bryant, A. (2005). Do teachers know more about specific learning difficulties than general practitioners? *British Journal of Special Education*, 32(3), 122-126.
- [41] Laasonen, M., Salomaa, J., Cousineau, D., Leppämäki, S., Tani, P., Hokkanen, L., & Dye, M. (2012). Project DyAdd: visual attention in adult dyslexia and ADHD. *Brain and cognition*, 80(3), 311-327.
- [42] Nijakowska, J. (2019). Foreign language teachers' preparedness to cater for special educational needs of learners with dyslexia: a conceptual framework. *European Journal of Special Needs Education*, 34(2), 189-203.
- [43] Ural, E.; Ercan, O. (2002). The effects of web- based educational software enriched by concept maps on learning of structure and properties of matter. *Journal of Baltic Science Education*, 14(1), 7-19.
- [44] Dehn, M.J. (2020). Working Memory and Dyslexia. Available online: <https://www.ohioslha.org/wp-content/uploads/2016/10/eHearsay2015Dyslexia.pdf> (accessed on 28 September 2020).
- [45] Feeney, A.E. (2003). Using interactive multimedia for dyslexic students in geographic education. *Journal of Geography*, 102(1), 21-28.
- [46] Eide, B., & Eide, F. (2011). *The dyslexic advantage: Unlocking the hidden potential of the dyslexic brain*. Penguin.
- [47] Tsampalas, E.; Dimitrios, S.; Papadimitropoulou, P.; Vergou, M.; Zakopoulou, V. (2018). Learning paths and learning styles in dyslexia: Possibilities and effectiveness- case study of two elementary school students aged 7 years old. *European Journal of Special Education Research*, 3(1) 25-41. Available on-line at: www.oapub.org/edu
- [48] Jones, A. L., Holtgraves, T. G., & Sander, J. B. (2019). Attitudes and knowledge of future teachers to identify struggling readers. *The Teacher Educator*, 54(1), 46-59.
- [49] Hodges, T. S., Wright, K. L., & McTigue, E. (2019). What do middle grades preservice teachers believe about writing and writing instruction?. *RMLE Online*, 42(2), 1-15.
- [50] Guo, F., Meadows, M. E., Duan, Y., & Gao, C. (2020). Geography Pre-Service Teachers' Perspectives on Multimedia Technology and Environmental Education. *Sustainability*, 12(17), 6903. <https://doi.org/10.3390/su12176903>
- [51] Bhatti, Z., Bibi, M., & Shabbir, N. (2020). Augmented Reality based Multimedia Learning for Dyslexic Children. In 2020 3rd International Conference on Computing, Mathematics and Engineering Technologies (iCoMET) (pp. 1-7). IEEE. DOI: 10.1109/iCoMET48670.2020.9073879
- [52] Maxwell, C. (2019). Teacher education on dyslexia: An analysis of policy and practice in Australia and England. *Education Research and Perspectives*, 46(Special Issue), 1-19. Available online: https://www.erpjournal.net/wp-content/uploads/2020/02/01_ERPV46_Maxwell.pdf (accessed on 28 September 2020).