

OPINION

by Prof. Dr. Snezhana Hristova Nikolova

**on the dissertation on „Teaching strategies for children with dyslexia and dyscalculia”
for obtaining the educational and scientific degree „Doctor” in the doctoral program
Special Pedagogy, in the field of higher education 1. Pedagogical sciences,
professional field 1.2 Pedagogy**

PhD candidate: Dimitra Evangelos Koraka

Scientific adviser: Prof. Milen Zamfirov Zamfirov, D.S.

1. General presentation of the procedure and the PhD student

By order No. RD-38-445/ 19.07.2024 of the Rector of Sofia University „St. Kliment Ohridski“ I have been appointed as a member of the scientific jury to ensure a procedure for the defense of a dissertation work on the topic: „Teaching strategies for children with dyslexia and dyscalculia” for the acquisition of the educational and scientific degree „doctor“ in the field of higher education: 1. Pedagogical sciences, professional direction: 1.2. Pedagogy (Special Pedagogy).

The author of the dissertation is Dimitra Evangelos Koraka – a full-time doctoral student studying English at the Department of „Special Pedagogy“ of the Faculty of Education Sciences and Arts with scientific supervisor Prof. Milen Zamfirov Zamfirov, D.S.

The procedure and the presented set of materials are in accordance with the requirements of the RASRB and the Regulations for its application, as well as with the Regulations for the development of the academic staff of Sofia University „St. Kliment Ohridski“. Dimitra Koraka has fulfilled all the activities of her individual plan and has been discharged with the right of protection.

2. Relevance of the problem

The doctoral dissertation is dedicated to an important and clearly insufficiently researched problem for Greece – the need to develop and implement intervention strategies and methods in the mathematics education of students with dyslexia and dyscalculia, i.e. difficulties in acquiring mathematical knowledge. According to DSM V, arithmetic disorders, reading disorders, and writing disorders are defined as specific learning disorders. In ICD-11 (6A03), specific learning disabilities are defined as a developmental learning disorder characterized by significant and persistent difficulties in acquiring academic skills, which may include arithmetic (or reading and writing). In the academic skills affected, the student's performance is significantly below that expected by calendar age and general level

of intellectual functioning, and results in significant impairment in academic or occupational functioning.

The topic chosen by PhD student Koraka is current. On the one hand, the number of students with specific learning disabilities is growing. On the other hand, this circumstance requires both the timely identification of the problems of these students and the application of a strictly differentiated approach to their education in a general education environment. Teaching students with difficulties in mathematics is a responsible task, the solution of which requires the application of adequate approaches, techniques and strategies for acquiring mathematical knowledge.

The doctoral student sets three goals for herself - assessment of learning difficulties in mathematics; designing a therapeutic pedagogic intervention to improve mathematics learning in elementary school and investigating the effectiveness of teaching strategies that support cognitive and arithmetic skills. These goals are significant, especially in the context of the modern educational paradigm of inclusive education, enabling recognition and addressing of group and individual differences in a general education environment.

3. Knowledge of the issues by the doctoral student

The introduction of the dissertation development points to the significance of the research problem. Along with defining the objectives of the study, two main hypotheses were formulated: regarding the assessment of numerical performance and regarding the implementation of a specific intervention program for students with learning difficulties. Scientific assumptions are detailed in 8 questions: level of cognitive-psycholinguistic development; memory abilities and capacity; performance of students before and after implementation of the intervention program, etc.

The structure and content of the theoretical justification of the dissertation are proof of a good level of competence and knowledge of basic and current scientific issues. Two emphases are highlighted, detailed in separate chapters of the theoretical part, on which the research concept is consolidated:

1. Dyslexia – introduction and specifics in teaching students with dyslexia;
2. Dyscalculia – characteristics and strategies for teaching students with dyscalculia.

The good structuring of the theoretical approaches in presenting the specific learning disorders (dyslexia and dyscalculia), as well as the methods, approaches and strategies for teaching students with these difficulties, is impressive.

4. Characteristics of the dissertation development

The dissertation corresponds to the requirements for scientific development. The

research program has a well-thought-out conceptual framework, covering research requirements with a theoretical and experimental part. The dissertation was developed in a volume of 232 computer pages, of which 165 pages are the main text, 13 pages of bibliography with 153 sources in Greek and Latin and 53 pages with appendices. The content is presented in two separate parts: theoretical basis (first part) with 5 separate chapters and research approach (second part), which includes the research methodology, research results and interpretation and analysis of the findings. At the end of the dissertation are included conclusions, recommendations for practice and contributions, as well as used literature and appendices. The text includes 26 tables and 11 figures.

5. Methodology and organization of the research

The research program is presented in the *second part* of the dissertation.

Students, for the experimental and control groups, were selected based on a diagnostic approach using a curriculum-aligned mathematical performance test. For the study, third-grade students, demonstrating significantly lower results than their peers, were selected. The study included 15 students for the experimental group and 10 students for the control group from public schools in the region of Thessaly, Greece, who scored less than or equal to 140 units on the first numerical performance criterion. Also included in the total sample were 96 students who scored less than or equal to 140 units on the first numerical performance criterion.

The subsequent process of research implementation is accurately described. All stages take place in the school environment outside regular school hours. Game sessions are scheduled daily for the second class period of the program. The intervention program lasts for six weeks, two study hours a day, four days a week, or a total of 64 study hours. The materials used to implement the intervention are described correctly and in detail.

Two methods were used to collect research data: assessments of students' numerical results (pre-intervention, post-intervention and three months' post-intervention) and measurements of their psychometric characteristics related to cognitive and psycholinguistic development (via the Euromedica Center Learning Disability Diagnosis and Raven test).

The research toolkit was selected according to the target group, which focuses on improving the working memory and arithmetic performance of third grade students, specifically on their basic skills of addition and subtraction. It provides an opportunity to objectively collect and analyze scientific data to improve memory – to repeat sequences of numbers on an auditory and visual level; for mathematical operations and symbols; to remember images, symbols and actions on an auditory and visual level. Data from the study

were analyzed using the statistical software package SPSS 8.0, and Microsoft Office Excel'97 was used to create graphs.

In the *fifth chapter – Research findings*, the obtained results are reported and analyzed. An analysis of the eight key research questions according to their set criteria is presented sequentially. A comparative study of the results of the experimental and control groups before and after the intervention of the innovative program was included.

The statistical analysis of the data was carried out in detail, according to the established hypotheses. The results of the research are visualized through tables and figures, and this enables both their easier perception and their adequate interpretation. From the summary presentation of the results, it was found that significant improvements were observed in the experimental group between the 1st and 2nd measurement in all scales, including memory assessment and numerical scores.

In the described Discussion of the results, PhD student Koraka concludes that the intervention program has a significant positive impact on the performance of the Experimental Group, a contribution to which is the interactive and game approach used in its implementation. The need to identify students' difficulties, the implementation of effective educational programs and of collaboration between different specialists to create an inclusive and supportive learning environment in which to reveal the development potential of each child.

From the analysis of the obtained data and the formulated conclusions, it can be seen that PhD student Koraka has the competence to independently and correctly interpret the results in relation to the set goal and the formulated hypotheses.

6. Contributions, recommendations and questions

The contributions of Dimitra Koraka's dissertation are in terms of:

- ✓ development and implementation of individual training practices;
- ✓ improving cognitive skills (memorizing numerical sequences);
- ✓ application of learning through games to cultivate skills;
- ✓ targeted correction of learning difficulties;
- ✓ methodological innovations in data collection and analysis.

I accept the formulated contributions from PhD student Koraka, which are specifically brought out only in the dissertation. In the abstract, they are presented very generally, without the necessary clarity and detail.

It would be especially useful for the practice of Dimitra Koraka to promote effective educational strategies specifically designed for students with dyslexia and dyscalculia, as

well as the results of the research conducted.

My question is: Do you think teachers in Greece are inclined to start implementing this new educational model, and is it likely that remedial and supplementary support programs will be integrated into school curricula in the near future?

7. Evaluation of the abstract and publications

The abstract is developed on 50 pages. He adequately presented the basic aspects of the dissertation research, the obtained results and their analysis. Unnecessarily, in my opinion, a part of the bibliography used is attached at the end of the abstract. A list of publications on the topic of the dissertation research is missing in both the abstract and the dissertation. They are indicated only in the CV of the doctoral student. Presented at Education and the Arts: Traditions and Perspectives Science and Practice Conferences in 2022 and 2023. They relate to types of dyslexia, strategies for teaching children with dyslexia, and the contribution of assistive technology to mathematics learning.

CONCLUSION

The dissertation development is in accordance with the requirements for writing a similar kind of scientific works. It is designed carefully and competently.

My evaluation of the dissertation, contributions, publications and abstract is positive. This gives me reason to propose to the Honorable Scientific Jury to award the educational and scientific degree „doctor“ to SU „St. Kliment Ohridski“ in the field of higher education 1. Pedagogical sciences, Professional direction 1.2. Pedagogy (Special Pedagogy) of Dimitra Evangelos Koraka.

28.09.2024

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Prof. Snezhana Nikolova, PhD