REVIEW

from Assoc. Prof. Dr. Zhivko Zhekov
Medical University "Prof. Dr. Paraskev Stoyanov"- Varna

for dissertation thesis entitled

"Strategies for teaching students with dyslexia and dyscalculia"

for the award of the scientific degree "Philosophy Doctor"
in the field of higher education 1. Pedagogical Sciences,
professional field 1.2. Pedagogy - scientific specialty "Special Pedagogy"

PhD student: Dimitra Koraka
Scientific supervisor: Prof. Milen Zamfirov, PhD

1. Compliance of the procedure with the current regulations

This recension was prepared on the basis of order No. RD-38-445/19.07.2024 of the rector of SU "St. Kliment Ohridski", with which I am designated as a member of the scientific jury for ensuring a procedure for the defense of a dissertation work on the topic: "Strategies for teaching students with dyslexia and dyscalculia" for the acquisition of the educational and scientific degree "doctor" in the field of higher education education: 1. Pedagogical sciences, professional direction: 1.2. Pedagogy (Special Pedagogy). The training of the doctoral student Dimitra Koraka is in English with the supervisor Prof. Ph.D. Milen Zamfirov.

The procedure and the presented set of materials are in accordance with the requirements of the RSARB 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".

Doctoral student Dimitra Koraka has completed all the activities of her individual plan and has been dismissed with the right of defense.

2. General biographical introduction of the candidate (education,

qualifications, professional experience, etc.)

The professional path of Dimitra Koraka began in 2010 as a mathematics teacher in the private school "Analysis" Aridaia Greece.

From 2011 until today, she is a co-owner and teacher of mathematics in private schools "Analysis" Aridaia, "Mathematical Center" Aridaia, "Principia" Edessa - Greece.

After completing her bachelor's and master's degrees, Dimitra Koraka did not stop training and continuing her education in various postgraduate qualifications and courses. In 2000, she received certificates of competence in English from the University of Michigan and the University of Cambridge. From 2014 - 2017 he participated in postgraduate studies in mathematics, Hellenic Open University, and in 2009 she received a degree in mathematics from Aristotle University of Thessaloniki.

In 2020, she was enrolled as a full-time doctoral student in 1.2. Pedagogy (Special Pedagogy) at the Faculty of Pedagogy and Arts of SU "St. Kliment Ohridski".

3. Actuality of the issues of the dissertation work

Dyslexia is a persistent and specific literacy disorder occurring in children who do not have physical, mental or sociocultural disabilities. The origin of the disorder is associated with a change in neurological development, in which certain parts of the brain responsible for reading and writing are affected. Therefore, there are difficulties in the formation of the basic skills of reading and writing.

This neurodevelopmental disorder is estimated to affect approximately one in ten children and lead to school failure.

The main problem with dyslexia is that it creates difficulties for children in the process of literacy and education in the educational system. They cannot assimilate the semantic content encoded through written speech and denoting objects, through which knowledge of the environment is achieved, because they are unable to understand what is read.

It should be borne in mind that no two dyslexics are the same. Each case is unique in itself and does not necessarily present all symptoms.

4. Structure and content of the dissertation work

The dissertation meets the requirements for similar kind of scientific works.

The volume of the development is 164 typewritten pages. The text includes 26 tables and 14 figures.

The bibliography contains 153 titles in Latin, covering the period from 1971 to 2018.

Acquaintance with the work leaves an impression of a well-conceived and implemented scientific development.

It is structured as follows: introduction, first hour A-Theoretical foundations and second hour B-Research approach, bibliography and applications.

The problem, goals, hypotheses and questions / tasks / of the research are presented in the introduction.

In the first part "A-Theoretical foundations" are considered "I. Teaching strategies for children with dyslexia', which includes two chapters 'Chapter 1: Introduction to dyslexia', where in eight paragraphs and 10 sub-paragraphs - definitions of dyslexia; brain physiology and dyslexia; memory and dyslexia; psychosocial skills and dyslexia; "visual difficulties" and dyslexia; levels of language functioning and dyslexia - phonological level, morphological-syntactic level and semantic level; reading - comprehension of texts and dyslexia; writing and dyslexia; speech and dyslexia; mathematics and dyslexia; daily activities and dyslexia; types of dyslexia; special characteristics of people with dyslexia.

Chapter 2: Specifications for Designing Instruction for Students with Dyslexia addresses: teaching methods; multisensory teaching method; ICT in the treatment of dyslexia; dyslexia intervention and treatment; reading comprehension and dyslexia; vocabulary development and comprehension strategies; writing and spelling; understanding written language; strategies to improve non-language difficulties; the role of the teacher; surveys of teachers' knowledge of supporting children with dyslexia in the classroom.

The second part "II. Strategies for teaching children with dyscalculia' is presented in three chapters. In "Chapter 1: Introduction to dyscalculia" an overview of dyscalculia and its definitions is presented, difficulties in the learning process, stages in the development of numerical concepts and their processes, as well as accompanying conditions are indicated. In "Chapter 2: Characteristics of dyscalculia" the different characteristics of dyscalculia by age, the different theories regarding genetic predisposition and brain structural disorders, as well as the diagnosis of dyscalculia are presented, where the doctoral student pays special attention to the diagnosis in Greece.

Chapter Three, "Teaching Strategies", presents common ways of dealing with learning difficulties in mathematics as well as didactic methodology for special education. Different ways of overcoming mathematics difficulties in

dyscalculic children and the role of the teacher in the remedial process are presented.

The second part "B-Research Approach" includes:

I. Methodology of the research, where are presented - preparation for the implementation of the research; means of data collection; application of the research and an exemplary description.

II. Basis of the study - presents - main data of the study; answers to key research questions; summary presentation of the main findings of the study.

III. Interpretation of findings - findings: discussion of results; conclusions; recommendations for further action within the educational institution.

The experimental study has two main purposes : to develop assessment criteria for identifying students with learning disabilities, in particular dyslexia and dyscalculia, and to design and implement a pedagogical-therapeutic intervention in primary schools. This intervention has a significant impact on memory as children with dyslexia often have limited working memory capacity and numerical operations.

All phases of the study were conducted in the primary educational setting for the children, namely the school.

The research design was based on the overarching hypothesis that children with mathematical learning disabilities may exhibit deeper cognitive and developmental deficits, which the literature suggests are significantly related to the broader function and effectiveness of their memory capacity, and to this end a program was developed that incorporated novel interventional teaching techniques in the school setting.

Grade 3 of elementary school was chosen for the experiment as a particularly critical and transitional grade for the development, consolidation, and generalization of student mathematical thinking.

Determination of the desired sample (the target experimental group and an equivalent control group) was based on the school's detailed curriculum, and an impromptu group numeracy achievement assessment was designed for this purpose, tailored to the chronological age of these children and the expected level of knowledge based on the curriculum.

Thus, the experimental group to which the constructed intervention program was applied was identified in order to evaluate its effect on the development of both memory and basic numeracy skills of the students.

Approval was obtained from the Directorate of Research of the Ministry of Education to conduct the study, which was after approval and positive recommendation from the Institute of Education.

The choice of the region of Thessaly is determined by the fact that it is a typical medium-sized urban area where the number of foreign students is significantly limited. The aim of the study is to focus on a Greek sample of students with difficulties in reading and writing and with mathematics. This makes it possible to assess the developmental ability profile of students in the experimental group and the control group. The other three schools were chosen on the basis of their proximity.

The study was conducted during the second term of the school year for 8 school weeks during out-of-school time, two hours each day of the week except Wednesdays, and parents' explicit consent was taken for their children's participation. The configuration of the classroom for the learning needs is one of the key parameters for the successful completion of the objectives of the entire intervention of the program. The materials required for the intervention are described in detail.

The psychometric assessment (traditional assessment) was performed with the Raven Intelligence Test, the Thessaly Diagnostic Test for Learning Disabilities, and the Number Memory and Arithmetic scales of the WISC-III Greek Test. In the repeated measures, only the "Memory for Sequences" scales of the Thessaly Learning Disabilities Diagnostic Test and the two scales of the WISC-III were used.

The arithmetic scale indicates the child's meditative ability to perform arithmetic operations and measures frequency of distractibility, fluid intelligence, short-term memory and recall of information, seriation and processing of scropositive information, etc. The WISC-III Number Memory Scale is considered to measure mainly acoustic short-term memory and the child's ability to concentrate.

The Thessaly test includes a number memory scale in assessing memorization ability.

The Athena test also includes its complementary Commons Sequences scale, which tests a child's knowledge of more common and less common sequences, such as days of the week, months of the year, etc. With the Thessaly Test memory scales, there is also the possibility of assessing memory for visual

sequences, which is achieved by administering two scales to the child - Memory for Images and Memory for Shapes.

The Thessaly Test and the two aforementioned WISC-III scales allow the investigator to confirm the hypothesis of a short-term memory deficit.

The total sample of the study includes 121 students of III Primary School studying in the second grade, 3rd and 4th schools of Thessaly district, in five different departments. For the purpose of the study, the students were divided into four separate groups.

The study refers to the following groups of students:

- Total sample of the study - 121 students of 3rd grade of 2nd, 3rd and 4th elementary schools in the district of Thessaly.

Individual groups

- Experimental group - consisting of 15 students who scored less than or equal to 140 units on the 1st numerical performance criterion.

- a control group - consisting of 10 students who also scored less than or equal to 140 points on numerical achievement criterion 1.

- An experimental group and a control group - consisting of 25 students (N15+N10) who also scored less than or equal to 140 on the 1st numerical performance criterion.

- 96 of the students who scored greater than 140 points in the 1st numerical performance criterion, i.e., out.

The data of the study was processed using the statistical package SPSS 8.0 and Microsoft's Office Excell '97 program was used for graphing.

The total sample (N=121) consisted of 67 boys and 54 girls. The experimental group in which the intervention program was implemented consisted of a total of 15 children, of which 7 were boys and 8 were girls. The control group consisted of 10 children, of which 5 were boys and 5 were girls.

The chronological age of the students in the experimental group and the control group (N=25), ranged from 99 months (8 years and 3 months) to 111 months (9 years and 3 months).

The two groups, experimental and control, were assigned according to the requirements of the experimental study - initially equated in terms of arithmetic scores, based on the score they collected in meeting the first arithmetic criterion. Then, the remaining measures were administered - cognitive psycholinguistic level assessments with the Raven's Intelligence Test, the WISC-III number memory and arithmetic scales, and the Thessaly test.

The results showed that there was no statistically significant difference in any of the baseline measurements between the two groups.

What is impressive is the good scientific style of presentation of the material and the doctoral student's ability to comment and summarize a large number of literature sources.

In the interpretation of the literature, the PhD student's ability to creatively analyse literature from different scientific fields stands out.

In Chapter 3, the results of the quantitative and qualitative studies are presented in a coherent and detailed manner, illustrated with detailed tables and graphs.

I fully agree with the presentation and analysis of the results in the 'Discussion of results', 'Conclusions' and 'Suggestions for further implementation in schools' sections made by the PhD student.

5. Scientific-theoretical and practical-applied contributions

This dissertation makes significant contributions; it not only provides practical strategies for teaching students with learning disabilities, but also offers methodological frameworks for further research. These contributions have potential implications for improving educational practices and developing policies that more effectively meet the needs of all students, especially those with learning disabilities.

I fully agree with the contributions outlined by the doctoral student.

6. Abstract

The abstract (50 pages) reflects well and in a synthesized form the overall content of the thesis. It includes 14 figures and 26 tables.

7. Publications on the topic of the dissertation (content and fulfillment of scientometric requirements).

There are three publications on the topic of the thesis. Their titles reflect the research problem and can be considered as publications on the dissertation topic.

8. Personal impressions

I have no personal impressions of the doctoral student.

9. Notes, recommendations and questions

How do you explain the lack of a statistically significant difference in the

results of either initial measurement between the two groups.

10. Conclusion.

The dissertation work of Dimitra Koraka, in its relevance and scientific performance, meets the conditions and requirements for the award of the degree of Doctor of Education and Science under the Law for the Development of Academic Staff in the Republic of Bulgaria, the Regulations for the Development of Academic Staff of Sofia University "St. Kl. Ohridski".

Expressing my positive attitude to the value of the dissertation work and the overall positive assessment of the dissertation research, I propose to the esteemed Scientific Jury to give a positive vote and to award to Dimitra Koraka the educational and scientific degree "DOCTOR" in the professional field 1.2. Special Pedagogy.

Varna
30/09/2024

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Assoc. Prof. Dr. Zhivko Zhekov, PhD