

REVIEW

By Associate Professor Penka Todorova Shapkova, PhD

about a dissertation on the topic: " **“TEACHING MATHEMATICS TO STUDENTS WITH MILD INTELLECTUAL DISABILITY IN SECONDARY SCHOOL LEVEL”**

for the acquisition of an educational and scientific degree "doctor" in the doctoral program Special pedagogy (in English), in the field of higher education 1. Pedagogical sciences, professional direction 1.2 Pedagogy

Doctoral student: Panagiotis-Christos Trichas

Supervisor: Prof. DSc Milen Zamfirov

1. Compliance of the procedure with the current regulations

This review has been prepared in accordance with the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria (ZRASRB) and the Regulations for the Terms and Conditions for Acquiring Scientific Degrees and Holding Academic Positions at SU "St. Kliment Ohridski".

2. General biographical presentation of the applicant (education, qualifications, professional experience, etc.)

The candidate for the educational and scientific degree "doctor" Panagiotis-Christos Trichas was born in Greece, where he began his professional journey.

In 2008, he obtained a bachelor's degree in mathematics EQF-level 6 c Aristotle University of Thessaloniki (Greece).

In 2010 Special Education License Certificate EQF-level 5 from University of Macedonia, Thessaloniki (Greece).

Since 2012, Panagiotis-Christos Trichas obtained a Master's degree in Special Needs and Inclusive Education EQF -level 7 from the University of Sunderland (United Kingdom).

In 2019, the doctoral student obtained a master's degree in management and organization of educational units - EQF level 7 from the International Greek University of Thessaloniki, and from 2022. is a Master in Adult Education EQF level 7 from the Hellenic Open University, Patras (Greece).

From the presented autobiographical reference, it is striking that Panagiotis-Christos Trichas is purposefully and consistently upgrading his personal professional competences, successfully applying his theoretical knowledge and experience in educational practice in his homeland. In recent years, the doctoral student has emerged as a successful specialist in the implementation of leadership strategies in education and especially in the implementation of approaches to support children with special educational needs in the educational context in Greece. A special interest for him is teaching mathematics to students with SEN, which explains his choice of topic for his dissertation.

3. Relevance of the problem: The dissertation focuses on a significant and little-researched topic in the context of the pedagogy of children with intellectual disabilities.

4. Structure and content of the dissertation:

The macrostructure of the dissertation is in accordance with the traditional standards and norms of modern scientific research.

The work presented has a volume of 193 pages. It is structured with an introduction, five separate parts, a conclusion and a bibliographic reference containing literary sources in Latin, most of which were published in the last 10-15 years. Literary sources are correctly cited. The dissertation is written in scientific language with the relevant terminology and conceptual apparatus.

Regarding **the introductory part** of the development, it is necessary to more clearly and accurately formulate the scientific problem, as well as the subject, goals and tasks of the research. In addition, the doctoral student could outline the framework of the scientific research, comprehensively argue the concept of the research, as well as an author's position on the significance of the research problem in the context of special pedagogy.

The theoretical analysis of the problem is constructed based on the interpretation of various literary sources and is presented through four separate parts that are not separated as chapters.

In the first **part** of the dissertation, the doctoral student makes an interesting interpretation of the concept of mathematical education and examines the nature of mathematical knowledge. Learning is analyzed in the context of behavioral theory and constructivism. Special attention is given to different approaches and programs for teaching mathematics in the Greek educational context. Emphasis is placed on the interactive approach in teaching for the development of mathematical knowledge, which is particularly important for children with intellectual disabilities. The important role of the teacher in the planning, organization and implementation of the training is also emphasized, which affects the motivation of the students in the course of mastering mathematical knowledge and skills.

The second part of the development focuses on modern understandings of the essence of the concept of intellectual disability. The peculiarities of the personal development of children with intellectual disability are skillfully brought out here. The doctoral student thoroughly analyzes those areas of the personal development of these children that are most seriously affected, given the specifics of the primary disorders. The author of the dissertation emphasizes the strengths and weaknesses in the learning process that are characteristic of children with intellectual disabilities. The role of special teachers in creating specific educational programs, applicable in the context of inclusive education, developing the potential of children with SEN is emphasized.

In **third part** of the development, the doctoral student describes the specifics of educational programs for children with intellectual disabilities. The author directs his attention to the role of the educational environment and the selection of didactic materials for the development of children's mathematical skills. The family-school relationship and the possible roles of each of the participants in the teaching and learning process are emphasized.

In **fourth part** described models of teaching mathematics to students with intellectual disabilities, such as direct instruction where students can use pocket calculators.

The fifth part of the dissertation contains the research methodology, the goal related to the study of teaching techniques in the mathematical education of students with mild mental retardation, the tasks, the hypotheses, as well as an analysis of the obtained results. It would be good if this part was a separate third chapter.

In relation to the design of the study, a sample of 100 teachers working in mainstream schools in Greece is presented, but there is no additional information in which cities they work, as well as what teaching experience they have, which would be interesting, given the research tasks that the PhD student has set himself .

For the purposes of the empirical study, a questionnaire of 21 questions was used, for which more complete information is lacking.

Here, the PhD student includes an analysis of the research data and describes the statistical data processing method used.

Data were collected online, and study participants were randomly selected. The results of the empirical study are presented through tables and diagrams with a clear sequence. The data from this study were analyzed using the SPSS 25 statistical program.

5. Abstract and publications:

The abstract has a volume of 65 pages, being constructed according to the requirements and correctly reflecting all the main parts of the dissertation. In terms of language, the text should be clarified in some places. Hypotheses sound vague in translation. The publications presented by the doctoral student are five in number, developed according to the topic and content of the dissertation.

6. Scientific and scientific-applied contributions:

The dissertation research has scientific and scientific-applied contributions in the following areas:

1. The study of various literary sources allows the doctoral student to systematize the existing methods of teaching mathematics for students with special educational needs and, in particular, for children with intellectual disabilities, and to analyze trends in the implementation of effective strategies to support the learning of these children in the context of inclusive education.
2. The study tracks how effective the approaches used by teachers for teaching mathematics to children with intellectual disabilities are. The obtained results are important in the search and validation of strategies that support the learning of children with SEN.
3. The ideas proposed by the author for teaching mathematics to children with intellectual disabilities can be widely applied to other children with developmental disorders.

7. Critical notes, recommendations and questions:

1. The introduction should be specified in the dissertation and included in the abstract, as it is missing;
2. I believe that given the topic of the dissertation, as well as in order to refine the development in terms of structure and content, the theoretical part should be narrowed down and divided into two chapters in order to meet the requirements for a balance between the theoretical and experimental part of the dissertation . The third chapter should present the research design with a correctly described object and instrumentation. Regarding the research object, information on the age, workplace and profile of the teachers could be included, and for more clarity, the questionnaire used could be reflected by an appendix at the end of the development. It would be good to present the research data in a separate fourth chapter, given the criteria for the structure of the dissertation work.
3. The doctoral student emphasizes the quantitative processing of the data from the study, but the qualitative analysis performed can be more in-depth;
4. The role of statistical methods for proving hypothesis is not taken into account. The statistical analysis using the SPSS25 program remains invisible and it is not clear how statistically significant the results of the study are. Since the discussion of the results is the essence of the dissertation work, which is related to the analysis of the own results in the context of the literature data, it would be good to pay more attention to the statistical analysis, through which the hypotheses are excluded or confirmed. The discussion should summarize what has been achieved so far, what is new to compare with what is already known in the scientific literature.
5. The number of conclusions is usually equal to the number of tasks achieved, and therefore it would be good to specify them further.
6. At the end of the development, the contributing moments are not indicated, which can be more convincingly presented by structuring them as "fundamental" and "practical".
7. Errors are noted regarding the technical and structural design of the dissertation and the abstract. That is why it is necessary to format the contents of the pages, to standardize the font of the tables, to number the literature at the end.
8. The doctoral student could offer interesting and creative didactic materials to support the teaching of mathematics and to develop cognitive processes: attention, memory, thinking and speech in children with intellectual disabilities who are not the direct subjects of the research.

Questions:

1. Can the intended teacher questionnaires evaluate the effectiveness of approaches to teaching mathematics to children with intellectual disabilities in secondary school?
2. Why are teachers' opinions important and what do they suggest as trends in educational practice in Greece?

CONCLUSION

My dissertation work proposed for review on the topic: "Mathematics training of students with mild mental retardation in high school education" is the personal work of the PhD student Panagiotis-Christos Trichas.

The notes and recommendations made are rather a proposal for improving the quality of the dissertation work. Regardless of them, I give my positive assessment of the work of Panagiotis-Christos Trichas and propose to the members of the respected scientific jury that he be awarded the educational and scientific degree "doctor" in the field of higher education: 1.2. Pedagogy.

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The review was prepared by: Assoc. Prof. Penka Shapkova, PhD

