

# REVIEW

by **Dr. Margarita Yordanova Panayotova**

Associate Professor at "P. Hilendarski" University of Plovdiv, Faculty of Biology,  
Department of Botany and Biological Education  
of a PhD thesis for awarding the educational and scientific degree "**Doctor of Philosophy**"

field of higher education: 1. Pedagogical Sciences

professional field: 1.3. Pedagogy of training in...

doctoral program: *Methodology of teaching in biology*

**Author of the PhD Thesis:** Nikola Stefanov Vakrilov

**Topic:** Debate as a method of teaching biology in secondary school

**Research supervisor:** Assoc. Dr. Delka Karagyozeva-Dilkova, "Paisii Hilendarski" University  
of Plovdiv

## 1. General description of the presented materials

By order No. ПД-21-1021 from 07.06.2022 of the Rector of "Paisii Hilendarski" University of Plovdiv (PU), I have been appointed as a member of the scientific jury to perform a procedure for the defense of a PhD thesis on the topic "*Debate as a method of teaching biology in secondary school*" for the acquisition of the educational and scientific degree. "Doctor of Philosophy" in the area of higher education 1. Pedagogical sciences, professional field 1.3. Pedagogy of training in..., doctoral program *Teaching methodology in biology*. The author of the PhD thesis is **Nikola Stefanov Vakrilov** - a doctoral student of individual study plan at "Botany and Biological Education" department, with scientific supervisor Assoc. Prof. Dr. Delka Karagyozeva- Dilkova of "Paisii Hilendarski" University of Plovdiv.

The set of paper materials presented by Nikola Vakrilov **is** in accordance with Art. 36 (1) of the Regulations for the Development of the Academic Staff of the PU, and includes the following documents:

- request to the Rector of the PU to disclose the procedure for the defense of a thesis work;
- CV in European format;
- protocol from the departmental council related to reporting the readiness to open the procedure and preliminary discussion of the PhD thesis;
- PhD thesis;
- abstract in Bulgarian and English;
- list of scientific publications on the topic of the thesis;
- copies of scientific publications;
- declaration of originality and authenticity of the attached documents;
- certificate of compliance with the requirements of the Act on the Development of the Academic Staff in the Republic of Bulgaria (ZRASRB) and the regulations for its application.

The PhD student has attached a list of 7 items publications with corresponding photocopies certifying their publication in full text. There is no need to reduce the attached publications, since in each of them different issues from the Teaching Methodology in Biology and in the PhD thesis are analyzed. All preliminary procedural and regulatory rules for the completion of the documents provided for in this procedure have been complied with.

## **2. Brief biographical data for the doctoral student**

Nikola Vakrilov completed his higher education at "Paisii Hilendarski" University of Plovdiv in 2011. –Biology major, after which he acquired an additional pedagogical professional qualification as a teacher of Biology and Man and Nature, as well as a master's degree in Ecology and Ecosystem Protection. His work experience as a biology and health education teacher (about 6 years in total) includes work in various schools in the city of Plovdiv and the region. He has been continuously developing his personal pedagogical skills and competencies through his participation in various practical seminars and trainings. Since 2015, he has been publishing in the international journal for sharing good pedagogical practices, "Knowlodge", in which he has seven publications. With them, Nikola Vakrilov declares his affinity for scientific pedagogical research, which quite logically leads him to enroll as a doctoral student of individual study plan for the department " Botany and biological education" of the Faculty of Biology of "Paisii Hilendarski" University of Plovdiv.

## **3. Relevance of the topic and appropriateness of the set goals and tasks**

The relevance of the issues developed in the PhD thesis in both scientific and applied terms stems from the fact that "in Bulgaria there exists limited experience in researching debate as a teaching method, and this necessitates the present study to verify its effectiveness in the preparation of students in Biology and Health Education" (p. 89).

The degree and levels of relevance of the problem are summarized in the following:

- *the object* ("the process of learning through debates when learning educational content in Biology and Health Education" ) and *the subject of research* ("the mastering of key competencies and increasing the motivation of students, achieved as a result of applying a methodical model of learning through educational debates" );

- *the specific tasks* developed in the PhD thesis - "theoretical study of debate as a teaching method", development of a specific interactive didactic model for its application in the 7th, 8th and 9th grades, conducting the pedagogical experiment in order to test this model" ;

- *methods and stages of the pedagogical research* corresponding to the set goal and tasks.

The presented methodology for the application of the debate as a teaching method for mastering key competencies and increasing the motivation of students is practically oriented, which determines the relevance of the thesis in terms of applied science.

The pedagogical research generally corresponds to the formulated goal and the tasks set based on it. They are in line with creating a proven good pedagogical experience for the application of debate in the teaching of Biology and health education.

#### **4. Knowledge of the problematic area**

The clarification of the research problematic area outlined in the subject and goal of the pedagogical research is mainly developed in the first chapter of the thesis development. It analyzes the different aspects of the research thesis. The main concepts: debate as a teaching method, student motivation for learning, key competences, etc. are revealed based on an in-depth analysis of relevant learning theories, theories of motivation, the competence approach. The grounds for defining *debate as a teaching method* are sought in revealing the relationship "learning goals - approaches - methods for fulfilling the goals" in the field of teaching Biology and Health Education. We can trace in this order the priority role of interactive methods (or debate) for the development of students' interest, attitude, communicativeness as elements of positive motivation for learning, as well as competences in the field of natural sciences, learning skills and skills for support for sustainable development and for a healthy lifestyle, empirically proven in the third chapter of the PhD thesis.

108 literary sources in Cyrillic and 21 in Latin are under theoretical and analytical scrutiny, most of them by leading and well-established authors in the relevant field. The PhD student knows the state of the problem, but could more critically analyze and evaluate the literary material.

#### **5. Research methodology**

The research methodology chosen by Nikola Vakilov is relevant to the set goal. Appropriately selected and diverse research methods are applied in both stages of pedagogical research - in the preparatory one (theoretical analysis and synthesis, selection and research of normative documents and scientific publications) and in the transformative - empirical research one (experiment, testing, survey). The system of criteria and indicators created by the doctoral student allows to adequately verify the effectiveness of the developed methodical model for holding educational debates in the teaching of Biology and Health Education. Didactic tests and a survey are developed to report the selected indicators, and appropriate mathematical and statistical methods are used to process the empirical data.

The chosen methodology and the created toolkit provide an excellent opportunity to obtain an adequate answer to the tasks set in the thesis work.

#### **6. Characterization and evaluation of the PhD thesis**

Nikola Vakilov's thesis, submitted for review is an impressive volume of 294 pages. It consists of an introduction, three chapters, contributions to the thesis research, a bibliography, three appendices, and a list of the titles of the figures, diagrams, and tables in the thesis. The structuring of the chapters is not quite uniform - the first chapter, which presents the theoretical statements on the problem, is 80 pages long; the second chapter, which presents the design and methodology of the study, is only 9 pages, and the third chapter, in which the obtained results are discussed, is 92 pages. In view of a more optimal distribution, it would be appropriate for the volume of the first and third chapters to be shortened.

The **introduction justifies** the relevance of the topic and outlines the issues that will be analyzed in the theoretical study.

In the **first chapter** of the thesis, an expedient and comprehensive review of psychological-pedagogical and scientific-methodological literature, as well as normative documents in the educational sphere, is made. The current state and prospects of Bulgarian education are outlined and in this context the theories of learning and motivation as a basis for the implementation of the educational reform are examined. The second emphasis in the theoretical research is placed on the advantages of interactive learning methods, the competence approach and the place and role of debate in them. As a third emphasis, the methodological features of biology education are presented in the "goals-approaches-methods of education" correlation. At the conclusion of the theoretical analysis, the main construct of the thesis research is clarified - debate as an interactive method, its elements, types and its development in historical terms. I find the chapter extremely valuable from a theoretical and practical point of view. point tab. 3 (p. 88), in which the role of each participant in a debate team is presented.

**The second chapter** of the thesis is devoted to the design and methodology of the pedagogical research. Here, the doctoral student presents the planning, organization, stages and tools of the empirical research carried out in the period 2014-2016. During the first stage of the research, based on a theoretical analysis of literary sources, a *methodical model for conducting an educational debate was developed* . Its testing is carried out during the second stage of the research in 4 schools in the country, with 685 students covered, which is a good indicator of its scope. As instruments for measuring the criterion of *key competences*, tests for the 7th, 8th and 9th grades are developed in two versions (presented in Annex 3), and the feedback on the impact of the model on *the students' motivation to learn* (the second criterion) is provided through a survey constructed by the PhD student (given in Annex 1). All this illustrates the doctoral student's excellent competencies regarding the essence and requirements for conducting the pedagogical experiment, and the proposed tests and survey have a high practical value.

**In the third chapter** of the thesis, the results of the transformative didactic experiment are presented and discussed. The data from the conducted survey and didactic tests are processed using various statistical methods including the SPSS program. The results for different quantities and variables are visualized in 47 figures (diagrams) and 111 tables. For some survey issues, a comparative analysis is made with the results of similar studies by other authors (Georgiev - 2005; Andreeva - 2009; Ansar et al. - 2016; Setyadi et al. - 2017; Ainun et al. - 2019; Nani et al. . - 2021). This shows the doctoral student's excellent awareness of the researched thesis problem. When analyzing the results of the tests, the achievements of the students who participated in the preparation of the debates and those who were in the position of "audience" are compared. It is found that their achievements are also higher, which proves the positive influence of debate on their learning.

The thesis concludes with a summary of four **conclusions**, which confirm the working hypothesis and give reason to consider that the goal of the research has been achieved.

After the bibliography of 133 sources, there are also three appendices containing questions from the conducted survey (appendix 1), the methodical models of the experimental topics (appendix 2 – 63 pages) and tests for checking knowledge in two versions (appendix 3 – 26 pages).

## **7. Contributions and significance of the development for science and practice**

The contributions formulated by the doctoral student are objectively derived (in the relation between the goal and tasks of the research - hypothesis - theoretical model - pedagogical experiment) and defensible in the context of the analysis of the results of the pedagogical experiment.

In my opinion, the main contributions of the thesis can be reduced to the following:

1. Development of a *methodological model to conduct an educational debate*, which is directly aimed at forming key competences in the context of the normatively determined key competence "*skills to support sustainable development and a healthy lifestyle*". This key competence is formulated at the standard level and is present in all curricula, but as expected results in most cases it is not provided meaningfully. i.e. the constructed model is a contribution to the practice of teaching biology.

2. An algorithm for constructing and holding a debate in general biology lessons in the 7th, 8th and 9th grades is described, in view of which there is definitely a deficit in pedagogical practice.

In this sense, the thesis has a contributing character both in a theoretical and purely applied aspect and is a good basis for development in the direction of other topics of the curriculum in "Biology and Health Education" and in other types of lessons.

## **8. Evaluation of publications on the thesis**

The PhD student has presented a total of seven publications, all published in the international peer-reviewed journal "Knowledge". In two of the publications the PhD student is a single author; two publications are co-authored with two authors, in which Nikola Vakrilov is the lead author, one of which is co-authored with his scientific supervisor; three publications are with three authors, in which he is again the lead author. In the mentioned publications, both the concept and individual topics of the theoretical thesis study are presented. In this aspect, the legal requirements regarding this part of the procedure have been met.

The amount of points for publications of the doctoral student (group D) – 41.6 points **significantly exceeds** the minimum national requirements (30 points) under Art. 2b, para. 2 and 3 of ZRASRB and Art. 1a, paragraph 1 of PPZRASRB for area 1. Pedagogical sciences, Professional direction 1.3. Pedagogy of training in....

## **9. Personal participation of the doctoral student**

Reference in the specialized system of "P. Hilendarski" University of Plovdiv indicates that there is no evidence of plagiarism in the thesis and abstract submitted for review. Besides them, Nikola Vakrilov has also submitted copies of 7 publications in which he is a single or leading

author. In the case of collective publications, the contribution of the doctoral student, indicated in the reference for the minimum required points for the indicator "Articles and reports published in non-refereed peer-reviewed journals or published in edited collective volumes", is clearly reflected. I am fully convinced of the personal participation of the doctoral student in the conducted thesis, and that the formulated contributions and obtained results are his personal merit.

## **10. Abstract**

The content and quality of the abstract (with a volume of 32 pages) follow the structure and reflect the main results achieved in the dissertation, conclusions and scientific contributions of the scientific work. My conclusion is that the abstract meets all the standard requirements for a synthesized and adequate presentation of the primary document, the scientific text, as well as the objective reflection of the content of the thesis. The scientific and technical requirements according to the relevant national and internal regulations for the content of the abstract have been met.

## **11. Critical remarks and recommendations**

I have the following comments on Nikola Vakrilov's peer-reviewed thesis, which in no way diminish the value of the work:

- The presented content of the dissertation (on four pages) is too detailed and needs corrections (up to the third level of scoring);
- The presentation of the different theories of learning and motivation, the goals, approaches and methods of learning, which are the theoretical basis for constructing the *methodical model for conducting an educational debate* , it could be enriched with analytical evaluations, which will give completeness to the arguments used by the doctoral student for their choice;
- Some of the tables in the third chapter are without comment and could be presented more summarized, with a view to reducing the volume of this chapter.

The mentioned remarks, against the background of the completely personal contribution of the doctoral student in the research, are aimed rather at Nikola Vakrilov's future activity as a researcher in the field of teaching methodology in biology, especially in case of possible plans to publish the achieved results. I am convinced that in this area it will be useful for improving the practice of teaching biology.

## **12. Personal impressions**

I know Nikola Vakrilov from his visits to the department during the implementation of the activities of his individual study plan as a doctoral student. I was impressed by the material presented for enrollment. He subsequently demonstrated professional development that led him to finalize this procedure. The development of the current topic, which has no analogue in the pedagogical practice of biology teachers, is a big enough challenge that he accepts, despite his limited experience as a teacher. And he does it excellently, for which he deserves admiration.

### 13. Recommendations for future use of thesis contributions and results

I will allow myself to make the following recommendations to the PhD student:

1. To experiment the application of the developed methodological model for conducting debate in other types of lessons, e.g. in a lesson for new knowledge, in a combination lesson, etc., as well as in other learning content, e.g. in the lessons on Hygiene and Health Knowledge in Biology in the 8th grade.

2. To form the methodological model for holding a debate as a separate article and to propose it for publication in specialized magazines in Bulgaria, more accessible to Bulgarian teachers, such as sp . "Education in natural sciences and high technologies", "Natural sciences in education" (Chemistry) journal, "Pedagogy" journal and others.

3. To issue in the form of a manual or guide the methodological developments of the general lessons in biology and health education in 7., 8. and 9. class, in one of the tests to assess student achievement.

### CONCLUSION

The PhD thesis undoubtedly *contains scientific and applied results, which represent an original contribution to the Teaching Methodology in Biology* and meet all the requirements of the Act on the Development of the Academic Staff in the Republic of Bulgaria (ZRASRB), the Regulations for the Implementation of ZRASRB and the relevant Regulations of "Paisii Hilendarski" University of Plovdiv.

Despite the comments made, I am convinced that the doctoral student **Nikola Stefanov Vakrilov** possesses in-depth theoretical knowledge and professional skills in the scientific specialty "Teaching Methodology in Biology", demonstrating qualities and abilities to conduct scientific research independently.

Due to the above, I confidently give my *positive assessment* of the conducted research presented by the above-reviewed thesis, abstract, achieved results and contributions, and I propose to the honorable scientific jury *to award the educational and scientific degree "Doctor of Philosophy"* to **Nikola Stefanov Vakrilov** in the field of higher education: 1. Pedagogical sciences, professional field 1.3. Pedagogy of teaching in..., doctoral program "Methodology of teaching in biology " .

20/08/2022

Reviewer: .....

/Assoc. Prof. Dr. Margarita Panayotova/