R E V I E W

by **Assoc. Prof. Svetlana Georgieva Dimitrova-Gyuzeleva**, **PhD**

Foreign Languages and Cultures Department, New Bulgarian University
Area of higher education: *1. Education studies*, Professional field: *1.3. Pedagogy of teaching…*
(Scientific specialty: *Methodology of foreign language teaching /English language/*)

of **Lyudmila Marincheva Marinova-Boyadzhieva**'s doctoral thesis

entitled "***A Conceptual Model of the Formation of Practical Skills in the Teaching of Biology in a Foreign Language***"

submitted in fulfillment of the requirements for the award of a PhD degree
in area of higher education: *1. Education studies*, professional filed *1.3. Pedagogy of teaching …,*
scientific specialty: *Methodology of teaching biology*

1. Student evaluation

Lyudmila Marinova-Boyadzhieva is a part-time PhD student at the Methodology of Teaching Biology Department of the Faculty of Biology at Sofia University "St. Kliment Ohridski". She enrolled in the PhD programme in 2018 after obtaining a Master's degree in teaching biology in English from the same university, and she successfully completed her studies in 2023. She has prepared her doctoral thesis under the supervision of assoc. prof. Anelia Kremenska, PhD. Lyudmila Marinova-Boyadzhieva is also an experienced teacher of biology and chemistry in English and she has been working at the Profiled High School for Foreign Languages "Dimitar Dimov" in Pleven for over 10 years – this long professional experience underlies the implementation of her research project. Along with her teaching responsibilities, Lyudmila Marinova-Boyadzhieva has constantly tried to improve her professional qualifications by participating in various training courses (e.g. "The Programme for International Student Assessment /PISA/ and key competences in natural sciences" /2014/; "Implementing innovative e-teaching tools for making education attractive" /2015/; "Teacher training for e-Twinning" /2016/; "Working with an e-platform for remote test assessment of learning" /2017/; "Developing tests for the assessment of students' learning" /2017/; "Designing collaborative STEM learning spaces in natural sciences" /2023/, etc.). She has also actively contributed to a number of international and local educational projects (e.g. the Erasmus+ projects "Get in Shape for Europe" /2018-2020/ and "Communication" /2019-2022/; the local "Innovative Schools"

project /2019-2021/ and the Sofia University project "Developing and evaluating hands-on activities for learning biology in the case of distance education in an e-learning environment" /2021/ where she promoted her innovative ICT-based approach to teaching biology in English, etc.) and some research conferences and professional forums (e.g. VII national conference on e-learning at higher education institutions /2018/, II national conference "Reflection and teaching – strategies, techniques and predictions" /2019/, IX international conference "Science and education in the digital era" /2020/, National scientific conference "Kliment's Days" /2021 & 2021/, etc.). For her active commitment to various educational causes and her professional achievements as a teacher Lyudmila Marinova-Boyadzhieva has received many prestigious awards over the years, e.g. the special *RICOH Inno Fair* award at the 2017 edition of the Science and Innovation Fair, a diploma of merit for being a digital ambassador in her classes from the Bulgarian national digital association /2018/, and a municipal award for her contribution to education /2019/.

2. Doctoral thesis evaluation

Lyudmila Marinova-Boyadzhieva's PhD thesis, entitled "A Conceptual Model of the Formation of Practical Skills in the Teaching of Biology in a Foreign Language", is the product of her professional interests and research pursuits in that field. Her research topic is significant in the context of current EU educational policies and it is in accord with the goals set in the national "Education 2021-2027" programme for increasing the quality of education, training and learning in our country (by implementing innovative teaching methods, modernising and digitalising the learning content, and improving the links of education with the labour market). In order to successfully conduct her study and achieve her research objectives, Lyudmila Marinova-Boyadzhieva builds upon theories and practices that are already well-established in foreign language teaching and learning, but comparatively new and unfamiliar in other educational fields and school subjects: she skilfully incorporates appropriate CLIL[1] techniques into the experimental teaching model that she implements in her biology in English classes aiming to boost her students' understanding of biological concepts and processes in parallel with improving their foreign language communicative competences thus empowering them to effectively integrate in the globalised world. The implementation of real-life scenarios and practical, hands-

[1] *Content and Language Integrated Learning*

on activities in the teaching of biology in English increases her students' engagement and their learning motivation by providing them with the opportunity to see the application of the acquired knowledge and skills in life, and at the same time to develop their general cognitive skills and competences for modelling and experimentation, for analysis and synthesis, for critical thinking and problem solving. The fact that the Bulgarian students acquire these competences in the foreign tongue increases their applied value with regard to the affordances they create for them for collaboration on international educational and research projects and for enhancing their career prospects (e.g. they increase their chances for landing jobs at renowned international research institutes or biotech companies). Last but not least, an interesting touch to the significance of Lyudmila Marinova-Boyadzhieva's study adds the fact that she carried out her action research for testing and verifying her teaching model during the COVID pandemic, which led her to conduct her biology classes both onsite and online, as well as in a blended (hybrid) form, requiring her to adapt her practical activities to the different learning formats thus also measuring the impact of this new variable (i.e. the effect of the e-learning environment) on the effectiveness of her teaching model and her students' attitudes and motivation.

Lyudmila Marinova-Boyadzhieva's dissertation itself comprises 330 pages, incl. 35 appendices, amounting to 80 pages. The main body of the thesis consists of five chapters presenting the results from the critical survey of the literature on the matter and the discussion of her empirical research findings, as well as a reference list with the impressive 239 entries (incl. relevant local and international educational policy documents). It should be mentioned here that the analysis of the PhD thesis does not reveal any instances of plagiarism and all the literary sources used are duly and academically appropriately referenced.

The critical survey of the relevant literature and the presentation of the theoretical foundations of the research study reveal Lyudmila Marinova-Boyadzhieva's familiarity with the major works in the scientific field and her understanding of the current state of the researched problems and questions. In her analysis she demonstrates skills to correctly interpret the available scientific publications, subordinating her conclusions to her own research goals and developing a convincing argument, introducing her own opinion in the debates and sharing her practice-driven and experience-based views.

For the purposes of her action research, Lyudmila Marinova-Boyadzhieva develops a well-justified by the reviewed theories conceptual model for the formation of students' practical skills

as a result of teaching biology in the foreign language, based on the synergy of implementing a competence-based approach to learning and the method of content and language integrated learning (CLIL). It reflects the international achievements and local best practices in this research field, and at the same time it takes into account the specific characteristics of our education in biology, highlighting the need for change in the way natural sciences are traditionally taught in Bulgarian schools. Lyudmila Marinova-Boyadzhieva's conceptual model comprises a set of six hands-on tasks and activities (as well as their e-learning environment adaptations) aiming at developing students' natural sciences competencies through modelling biological systems and experimenting with biological processes ("home laboratory"), presenting the results from project work though video or pictures, designing topic-based crosswords and comic strips, using digital microscopes to perform assignments. Her conceptual teaching model has first been piloted and then verified with 179 students from grades 9. and 10. of the Profiled High School for Foreign Languages in Pleven, and her longitudinal action research study spanned over a period of four school years, incorporating in-person, online and blended formats of learning. For the purposes of her empirical research Lyudmila Marinova-Boyadzhieva skilfully combines a number of sound quantitative and qualitative research methods to gather the needed data to assess the effectiveness of her teaching model: e.g. formative experimentation and summative evaluation, observation and questionnaire surveys. The results from the research intervention have been evaluated by the researcher herself, as well as by a colleague of hers, an expert in the same field; students have also been provided with the opportunity to self-evaluate their learning in order to triangulate the findings and increase their validity. Data from all the stages of the experiment are described in detailed, statistically analysed and carefully interpreted: the findings clearly illustrate the effectiveness of the researcher's conceptual model for the improvement of students' acquisition of natural sciences competencies in parallel with their communicative skills during their biology in English classes. There is no statistically significant relation between the format of conducting the classes (in-person, online or blended) and the quality of the students' performance and project results from their practical assignments, nor does it seem to affect their learning motivation. In addition, the incorporation of real-life scenarios and practical, hands-on activities in the teaching of biology leads to a steady trend of increased learners' interest in biology as a science.

In conclusion, I should say that I accept the researcher's contributions outlined at the end of her PhD thesis. The information on the conducted action research study is comprehensive and well-presented. The data analysis and the interpretation of the research results have been done with the required precision, accuracy and credibility. She has already announced some of the findings in her PhD research related publications (there are 2 in Bulgarian and 2 in English listed at the end of her abstract, the most recent of which is co-authored with her supervisor), which contributes to the popularisation of her innovative conceptual model for the teaching of biology in English among her colleagues and the wider professional community.

3. Conclusion

Considering all of the stated above, I am convinced that Lyudmila Marinova-Boyadzhieva's PhD dissertation (along with the abstract and her research-related publications) meets the minimum national requirements under the Development of Academic Staff in the Republic of Bulgaria Act for conferring a PhD degree in the area of higher education *1. Education studies*, professional filed *1.3. Pedagogy of teaching …* (*Methodology of teaching biology*), and I recommend to the scientific jury to positively assess her PhD research thesis.

26.04.2024 Signature:

/Assoc. Prof. Svetlana Dimitrova-Gyuzeleva, PhD/