

Scientific terminology in biology instruction: perspectives on teaching and learning biology using didactic case studies

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In teaching science subjects, including biology, many scientific terms are used in the classroom. In biology lessons, students learn these terms to be able to describe various biological structures and phenomena, understand them, and communicate about them. However, many scholars argue that biology lessons are overloaded with scientific terminology and that teachers in the classroom often focus more on mastering scientific terms than on developing a deep understanding of fundamental biological principles. In this paper, we would like to focus on different strategies for acquiring scientific terminology in biology lessons within the theoretical framework of content transformation (Gericke et al., 2018), including didactic and cognitive (epistemic) transformation, with the transformational turn as an intrinsic connection between them (Janík et al., 2025). For analysis of biology teaching and learning, the content-focused approach and the 3A Methodology (M3A) were used (Janík et al., 2025). Together, 20 didactic case studies covering different biological topics based on the M3A were included in the multiple-case study, and teaching and learning situations were analysed with an emphasis on using scientific terminology in the classroom. The paper will present several identified categories of how teachers promote mastering scientific terminology in their biology lessons, including several distinct didactic formalisms: (a) developing scientific terminology through constructive cognition (active learning); (b) linking everyday and scientific terminology (educational reconstruction); (c) overloading biology lessons with scientific terminology (transmissive approach often associated with stolen cognition); (d) misdirected learning towards misconceptions instead of mastering scientific terminology (misleading cognition); (e) shedding the content (concealed cognition). Examples of every category will be documented by selected transcripts of teaching and learning situations, and conceptual structure diagrams.

References:

- Gericke, N., Hudson, B., Olin-Scheller, C., & Stolare, M. (2018). Powerful knowledge, transformations and the need for empirical studies across school subjects. *London Review of Education*, 16(3), 428–444.
- Janík, T., Slavík, J., Češková, T., Najvar, P., Minaříková, E., & Jáč, M. (2025). On content transformation in the classroom: transdisciplinary perspectives on subject didactic research using didactic case studies. *Journal of Curriculum Studies*, 1–27.