ABSTRACT

The main aim of this thesis was to create and practically test four sets of complex learning tasks intended for pupils in the second year of high school. The tasks are focused on the development of science literacy using the topic of biomimetics. The starting point for the development of the learning tasks was a literature review dealing with topics of biomimetics, subject integration, science literacy and learning tasks.

Biomimetics is a multidisciplinary science based on the observation of nature and searching for inspiration in nature in order to find solutions to problems that people face in life. Due to the topicality, practical overlap and interdisciplinary nature of this field, the topic of biomimetics is an excellent tool for applying integrated learning concepts (e.g. STEM concept) into teaching or for developing science literacy.

In this work, created complex learning tasks containing three subtasks each were validated in three second-year classes of selected high schools. The pupils' responses to the created tasks and the responses from the attitudinal questionnaires were analyzed using mixed research methods. Statistical methods (arithmetic mean, relative frequency, success rate) were used for quantitative evaluation. The method of inductive analysis of written gathered data was used for qualitative evaluation. Pupils' success in sets and individual tasks and pupils' opinions on the created tasks were investigated in this work.

Respondents positively commented on the overall structure and individual components of the created tasks. The topics of the tasks were rated as very interesting by the pupils. It was found out that pupils would like to have this kind of tasks included more often in lessons. This fact may be related to the finding that pupils do not commonly encounter such tasks in lessons. Most pupils did not find the tasks difficult to solve, which is evidenced by the predominantly high success scores across tasks and sets. The created tasks show a strong motivational potential for pupils.

KEYWORDS

Integration of subjects, PISA, scientific literacy, STEM, learning tasks.