

Improving Mathematical Literacy with a Modification of the Thought Process through Critical Thinking, Non-routine Problems and Motivation

VIKTORIJA ILIESKA^{*}, ANKICA SPASOVA[†],
METODIJA JANCHESKI[‡]

^{*}Primary school "Kole Nedelkovski", Skopje

[†]Primary school "Tihomir Miloshevski", Skopje

[‡]Ss. Cyril and Methodius University,

Faculty of Information Sciences and Computer Engineering, Skopje

Mathematics is often perceived as an abstract and incomprehensible subject, and it is accompanied by feelings of anxiety and apathy among students. In the case study of Macedonia, we can undoubtedly look for the reasons in the following triad: society, parents and the teacher-student relationship. Today's modern society requires citizens with new skills and knowledge needed to create new technologies and innovations; citizens with willingness to solve challenges in unknown circumstances. The key is quality education that will produce competitive individuals in the labor market, with competencies for reading and exchanging information, using practical knowledge and acquired skills, as opposed to reproducing factual memorized knowledge. Developed countries reward individuals not for what they know, but for what they can do with their knowledge. PISA's research indicates that the quality of educational systems and policies is tightly linked to teachers. Teachers pave the pathway for students to answer the most important questions in education: "What do I know?" and "What can I do with my knowledge?" We should not forget the motivational component as well.

For our paper, we are particularly interested in one of the three areas of PISA: mathematical literacy with an emphasis on the novelty of 2018 - the global competence for the assessment of knowledge in the field of innovation. We understand the urgency to research how well students are able to apply their own knowledge, in our context mathematical literacy, and we recognize the role that mathematics brings in building constructive, engaged and reflective citizens. The aim of the paper is to provide conceptual solutions to support students' development of competences

for solving problems that include the ability to transfer knowledge, creative and critical thinking, through solving non-routine problems from different perspectives, argumentation and in-depth understanding of the problems' structures.

Bloom's taxonomy plays a vital role in achieving our goals and it evolves around the following stages: applying, analyzing, evaluating and creating. The teacher here is a coordinator and motivator in students' learning and the process of creating new ideas, products, and new ways of understanding things using previous knowledge. Instead of imposing an "unknown" language, they should try to "play" the game together through students' interests. Through critical opinion as a process in which the subject analyzes facts, looks for a connection between them, evaluates them and synthesizes conclusions – let us participate in the "creation" of the new modern order.