THE ROLE OF THE ENJOYMENT IN MATHEMATICAL MODELLING ACTIVITIES

Caterina Bassi and Domenico Brunetto

Dipartimento di Matematica, Politecnico di Milano

According to Schukajlow et al. (2018), affective variables have been seldom investigated in the Mathematical Modelling (MM) literature. In the present work, we combine the MM cycle of Greefrath (2011) with the affect framework in Hannula (2012), focusing on the emotion enjoyment due to its link with achievement. We formulate two research questions: RQ1. Which affective factors (cognitive, emotional and motivational) linked to the emotion enjoyment are reported by students after the MM teaching experience? RQ2. Which strategies could be employed to foster students' enjoyment in MM?

To address RQ1 and RQ2, we qualitatively analysed the data collected from a MM activity performed by 18 students (grade 11). The teaching experience originated from a real-world problem posed by a stakeholder: the alderman to the culture wanted to know how young people use the library and what they would like to find there. This question was investigated by means of a survey which has been built and analysed by the students. During 8 meetings of 2 hours each, students were guided through the MM process by means of 5 activities. With respect to RQ1, we were able to identify (lack of) self-efficacy concerning the cognitive factor; value and (lack of) interest for the motivational factor; task enjoyment, boredom and anxiety for the emotional factor. Concerning RQ2, results confirm the importance of employing real-world problems to foster students' interest. Moreover, they also suggest that the design of teaching experiences in which the initial steps of the modelling cycle can be carried out with little mathematical language could enhance students' perception of self-efficacy, providing a motivational push also for the subsequent steps, where specific language must be employed. Finally, the use of digital and mathematical tools which are perceived by the students as belonging to the university and employment worlds can increase students' perception of value.

References

Greefrath, G. (2011). Using technologies: New possibilities of teaching and learning modelling. Overview. In G. Kaiser, W. Blum, R. Borromeo-Ferri, & G. Stillman (Eds.), *Trends in teaching and learning of mathematical modelling* (pp. 301-304). Springer.

Hannula, M. S. (2012). Exploring new dimensions of mathematics-related affect: Embodied and social theories. *Research in Mathematics Education, 14*(2), 137-161.

Schukajlow, S., Kaiser, G., & Stillman, G. (2018). Empirical research on teaching and learning of mathematical modelling: A survey of the current state-of-the-art. *ZDM-Mathematics Education, 50,* 5-18.

2022. In C. Fernández, S. Llinares, A. Gutiérrez, & N. Planas (Eds.), *Proceedings of the 45th Conference of the International Group for the Psychology of Mathematics Education* (Vol. 4, p. 176). PME.