

Editorial

The *Didattica della matematica. Dalla ricerca alle pratiche d'aula* journal is now in its thirteenth issue, the first in 2023. It thus ushers in its seventh year within the Centro competenze didattica della matematica of the SUPSI Dipartimento formazione e apprendimento. The Centre aims to promote and disseminate research, reflections, projects and practices, devoted to the in-depth study of the many aspects that make up the complex and fascinating discipline of mathematics education. Among the numerous significant experiences promoted in recent years, we would like to mention here the interdisciplinary work carried out as part of the project funded by Swiss National Science Foundation, called *Italmatica. Comprendere la matematica a scuola, tra lingua comune e linguaggio specialistico*. This four-year research project managed to combine the mathematics and linguistics worlds, giving rise to a further dissemination project which involves the creation of different textual contents always focusing on the intertwining of these two disciplines. One of the activities of this project provided for the organisation of a literary-mathematical contest entitled *Matematica a parole* which received, in the months leading up to this journal issue, more than five hundred submissions drawn up by students and adults from Ticino and Italy. We consider this result a great success and a further indication of the importance of a synergetic work between research dimensions and concrete effects, in terms of both classroom practices and dissemination to the entire population. It is precisely this conviction that eight years ago gave rise to the idea of structuring this journal into two distinct but at the same time increasingly united sections, *Riflessione e ricerca* and *Esperienze didattiche*.

The first article in the *Riflessione e ricerca* section of this issue presents the results of a case study in which three undergraduate students interact in solving a problem; through the analysis of the explanation processes conducted by a student who interfaces with the difficulties of her two classmates, the contribution highlights the role of backward reasoning and its relationship with forward reasoning. The second article proposes an investigation into the influence that the didactic methodology of the flipped learning could have on motivational factors in mathematics teaching-learning processes; the analysis of about 200 narrative texts produced by Italian upper secondary school¹ students at the end of a teaching experiment shows that flipped learning can positively influence motivational factors, particularly those linked to intrinsic elements. The third article analyses a didactic activity, centred on the heights of the triangles, experimented in 7th grade Italian lower secondary school² classes; the activity, an inquiring-game with digital feedback implemented in GeoGebra, is followed by a class discussion, from which excerpts have been extrapolated and analysed showing the potential of a didactic design that is attentive to the delicate relationship between conceptual and figural components of the learning of geometry.

There are four articles in the *Esperienze didattiche* section. The first contribution describes a didactic itinerary carried out in a 7th grade class with the aim of investigating the development of students' beliefs and skills regarding the use of analogy in solving mathematical problems. In particular, it is shown how an itinerary, designed to deepen and refine students' awareness of different types of analogy, favours a process of knowledge transfer and an exploratory attitude open to solving unknown situations. The second contribution retraces the numerous mathematical activities of a didactic itin-

1. The upper secondary school in Italy lasts five years and corresponds to the grades from 9 to 13.

2. The lower secondary school in Italy lasts three years and corresponds to the grades from 6 to 8.

erary to discover the solar system, as experienced by the pupils attending the last year in a kindergarten section. The aim of the itinerary is to initiate the children into the development of important prerequisites useful for tackling primary school with confidence: knowledge of topological concepts and spatial relations, the strengthening of executive functions, enumeration and counting skills. The third contribution presents an experiment, carried out in an 8th grade class, consisting of game-based learning activities interchanging with traditional ones; the aim of the paper is to investigate the development of students' beliefs regarding the role of game-based learning activities in mathematics and the relative motivation increase during class time. The results show that, after the teaching and learning experience, in the majority of the cases, there was a change in the students' beliefs in favour of the significance of game-based learning activities in mathematics. Finally, the fourth contribution describes a didactic experience, carried out in a 9th grade class, consisting of multiple activities aimed at promoting the use of different semiotic registers in the mathematisation and modelling processes; the aim of the paper is to investigate the students' beliefs and skills regarding the use of semiotic representations in understanding and solving a mathematical situation; the results show how encouraging a conscious use of semiotic registers and representations fosters a deeper understanding of mathematical problems and their solving processes.

The great variety of topics and contexts in terms of both research and experiment illustrated in this journal issue reflects the great vitality of the research and school worlds that accompanies the everyday life of researchers, teachers and students.

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