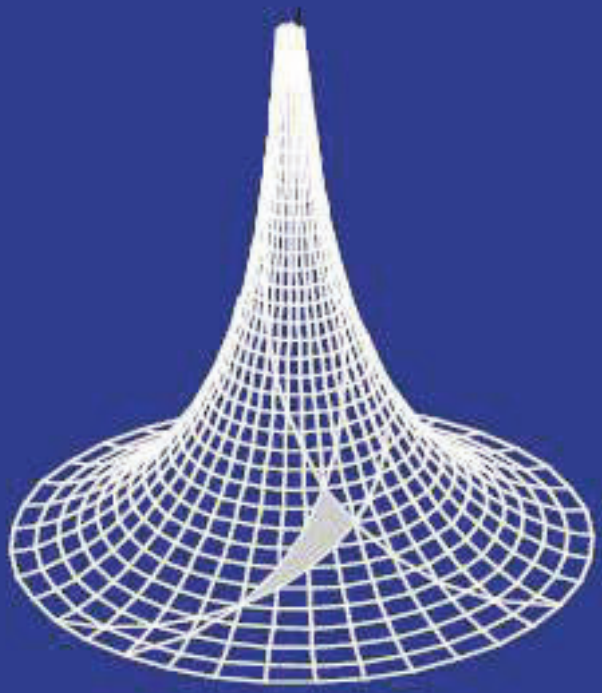
21 (2023) 1

Teaching Mathematics and Computer Science



Doctoral School of Informatics
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Teaching Mathematics and Computer Science

Teaching Mathematics and Computer Science (Teach. Math. Comput. Sci. or TMCS) is an open access journal devoted to disseminating new research and theory in the fields of education of Mathematics and Computer Science. All articles are double-blind peer-reviewed.

Published by the University of Debrecen, Doctoral School of Informatics and Doctoral School of Mathematical and Computational Sciences.

The current website contains the issues from 2019, starting with Vol. 17. ***For the previous issues, please visit the*** *archive site****.***

Frequency: 2 issues per year
Language: English

ISSN 1589-7389 (Print)
ISSN 2676-8364 (Online)
DOI: 10.5485/TMCS

Charge: Publications (and submissions) are free of charge for the authors.

Abstracting and Indexing: ProQuest, Matarka, Scilit, SciSpace

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Publisher

University of Debrecen, Doctoral School of Informatics and Doctoral School of Mathematical and Computational Sciences.

Responsible editors: Sándor Baran, Head of the Doctoral School of Informatics and Zsolt Páles, Head of the Doctoral School of Mathematical and Computational Sciences

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ISSN 1589-7389 (Print)
ISSN 2676-8364 (Online)

Márton Kiss: Report of Meeting Researches in Didactics of Mathematics and Computer Sciences: 31 March – 2 April, 2023 Oradea, Romania. (2023). *Teaching Mathematics and Computer Science*, *21*(1), 83-107. https://doi.org/10.5485/TMCS.2023.R032

around developing a cooperative board game that gives students an intuition on how to use a comparison test to determine convergence. My aim is to help students get a solid grasp on the concept of infinity by familiarizing them with the topic of infinite series and improper integrals.

Ioannis Papadopoulos: *Mental argumentation and the use of structure in problem solving*

Mental argumentation, in the context of problem solving, is considered as property-based thinking, developed exclusively in the mind, aiming to find the solution to a given problem without the use of paper-and-pencil or any form of writing. It is a topic of interest because it works contrary to the common image that mathematics is nothing more than the manipulation of symbols created in an automatic way without any underlying meaning. Figuring out a problem mentally indicates that its content makes sense to the individual in one or another way. Therefore, mental processing of mathematical tasks can be considered as a signal of sense-making in mathematics. In this sense, mental argumentation highlights the power of seeing as a strategy of thought which combines the visual perception of mathematical objects with existing knowledge and past experiences. Indeed, to a great extent (without being limited to this), mental argumentation involves considering the problem situation in terms of a whole and is strongly linked to the solver's ability to see and use the underlying structure of the problem. Although most teachers recognize the importance of mental argumentation, they are unsure about its exact nature as well as when, where, and how it can be effectively implemented. To demonstrate how mental argumentation can support problem-solving, I will use the topic of 'equation' as my first example. Solving an equation might be a problem for students who do not possess the necessary algorithm. Mental argumentation, based on seeing and using the equation's structure, can help them get the solution. Then, a small collection of problems will be presented and discussed to demonstrate how mental argumentation can facilitate problem-solving in at least three different ways.

Gabriella Papp: *E-tests as motivational opportunities in mathematics classes*

We can read in many studies what techniques are used in the educational process to deepen knowledge and what can motivate students to learn. In the spring semester of the 2021/2022 school year, we carried out action research within the framework of a course, where we examined how much it motivates students if they write an e-test as a retrospective in order to deepen the material of the lesson. The selected course was 20 hours. During the research, the students wrote

one input, 6 motivational, and one output e-tests. At the conference, we will present the results of the action research and the experiences we have gained, as well as the students' opinions regarding the motivating effect of the tests.

Erika Perge, Tibor Guzsvinrecz: *Tests to assess spatial ability in the education of engineering students*

Improving spatial ability is an important part of various subjects in elementary school, high school, and college-level education. Moreover, a number of professional courses also exist with the same goal. Tests to measure different aspects of spatial ability are based on traditional paper-based or modern digital methods. I hereby present a few such tests used by instructors educating students of engineering at the Faculty of Engineering, University of Debrecen.

Marianna Pintér: *Using bedtime math stories for kindergarten math sessions to make math education fun and engaging for kindergarteners*

Preparing for the planned mathematics sessions often causes anxiety for practicing kindergarten teachers. One of the reasons for this is that they are uncertain how they could enable activity-based knowledge acquisition for children in the areas defined in the ONOAP, taking into account age and individual characteristics, so that they do not transfer knowledge but accustom children to action and thought activities. Laura Overdeck's *Bedtime Math* series of books can provide you with ideas for this. The problems and puzzles in the books are designed to be fun and challenging and encourage children to think critically and creatively about math. In my presentation, I will show some examples of this by presenting each actual part of the book and the corresponding draft sessions.

Ildikó Pomuczné Nagy: *Content and teaching of the topic of number theory in the 11th grade of high school*

Considering content and teaching of the topic of number theory in the 11th grade of high school, NAT 2020 dedicates an entire chapter to the topic of number theory in the 11th grade of the high school curriculum. Number theory is also the topic of chapter IV of the centrally published textbook, which contains 12 lessons. This is considered a novelty compared to the previous 11th-grade teaching materials that date back several decades. In my presentation, I will present the course material included in the centrally published textbook, and I would also like to touch on the antecedents of the topic in the lower grades. I highlight the knowledge and problem-solving methods that are new in the new curriculum and look back at older curricula from the point of view of teaching number theory.

In this paper, we intend to address these concepts of motivation and engagement, and to identify motivational patterns in achievement contexts.

Ibolya Veress-Bágyi: *Statistics learning environment*

In my presentation, I am looking for an answer to what we mean by a learning environment and what the expected characteristics of a statistics learning environment are in 2023. We examined the presence of the key elements of the Ben-Zvi et al. (2019) statistics learning environment model in statistics classes in economics higher education.

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