Editorial from Bronisław Czarnocha

In this new issue of MTRJ, we turn to the central matter of classroom teaching-research: teaching experiments and classroom investigations of mathematical creativity of our students. We present two teaching experiments connected with teaching calculus.

The first one is a teaching experiment during which the advanced college topics of Infinite Series together with Frieze Patterns and Wallpaper Groups were taught to middle school students during a Bridge to Enter Advanced Mathematics summer program (BEAM). The authors, college faculty teaching the course, draw interesting reflections comparing the learning process of middle school students with that of college students. In particular, a successful idea of reviewing pre-requisites to the upcoming topic to be conducted by the "just-in-time" method is suggested for college teaching. The authors report success in enabling learning advanced mathematical topics in middle school; they point out however, to the behavioral difficulties of this population.

The second teaching experiment, also in Calculus, here for Engineering students addresses familiar procedural/conceptual divide in the mathematics knowledge of incoming university students. The teaching experiments addresses the divide by focusing student attention on transitions between different representations of the same concepts. Interesting problems are designed to promote student reflection and translations to different representations. The presentation contains examples of instructor/student dialogues with the help of which instructor directs student attention. Authors report an increase of understanding of mathematical concepts by the experimental group in relation to the control group.

These teaching experiments are followed by the report of our colleagues from BMCC of CUNY about the design and implementation of a new developmental course of Intermediate Algebra and Trigonometry based completely on Open Educational Resources (OER). The theme is very much "just-in-time" at CUNY which strongly promotes use of OER materials. The report shows nuts and bolts elements of the design and implementation. The course included an online platform, videos relating to the text discussed, as well as conceptual algebra games. The course was piloted by several colleagues/instructors and accepted into the mathematics department's curriculum.

We present two book reviews, one by Małgorzata Marciniak, directing oneself to the classroom learning written by the previous dean of Education at CCNY, Dr. Posamentier who shows us his deep knowledge of the classroom cognition as well as his appreciation of subtle moments in the history of early mathematics. The second review, by Roy Berglund is of the book written by Cédric Villani, the director of the *Institut Henri Poincaré* in Paris and a recipient of the Fields Medal in 2010. There we learn about pathways of thinking of a research mathematician, its advances and traps. Being the director of the *Institut Henri Poincaré,* he closes his story with the recollection of the Aha!Moment which led him to the final proof of the theorem – very similar to Henri Poincare famous descriptions of his own Aha!Moments. That particular ending leads us to the second part of the current issue and that is mathematical creativity of our students with a special attention to the creativity of Aha!Moment.

The next three papers addressing mathematical creativity of our students refer, in different degrees to Arthur Koestler's bisociation, the theory of Aha!Moment described in his Act of Creation.

Our colleague from LaGCC, Małgorzata Marciniak, reflects upon creativity of her students, especially research students whom she mentors in mathematics research projects, and upon her own creativity in discovering new patterns in sushi making. Both he and her research student realize that creativity takes place all the time in everyday life. And that is of course the "added value" of doing research project in which one can observe his own creativity; we can transfer our newly developed awareness of creativity into other domains of life. In other words, once you see and witness creativity somewhere, you see and can witness it everywhere. Marciniak emphasizes the role of a group in facilitating student creativity.

William Baker and his colleagues delve into details of facilitating Aha!Moments of creativity in the social environment of a class. The method of investigation is accomplished by class visits of a second professor, the teacher-researcher. In these classes the teacher presents some methods of teaching which might facilitate the moments of understanding or making meaning. One can call it a mini-lesson study. The teacher-researcher observes the classroom and takes notes, which are discussed after the class. Baker adopts a particular angle in his investigations, that of "internalization" that is, in Vygotsky's understanding, "an internal reconstruction of external operation".

Bronisław Czarnocha and Hannes Stoppel present the first part of the discussion describing internal structure of the creativity occasioned by Aha!Moments. What strikes them as surprising is that the three different levels of the bisociative structure of Aha!Moments observed in mathematical classroom or in mathematicians reports correspond closely to the types of bisociative structure discovered by a new bisociative search engine BISON. That prompts them to wonder on what is really human in human creativity.