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Report of Mathematical Transgressions conference

Mathematics education is a sensitive area of great concern to many stakeholders. The First Mathematical Transgressions conference initiated a series of scientific meetings in order to address some peculiar educational issues, and to work towards a scientific enrichment and more coherent approach to the process of teaching and learning mathematics.

In compliance with previous announcements, The First Interdisciplinary Scientific Conference Mathematical Transgressions was held on June 15–18, 2014 in Cracow. The meeting was organized by the Institute of Mathematics of the Pedagogical University of Cracow. We herewith publish a brief exposition of the idea of the conference, subsequently we present the major goals and themes this meeting was focused on. Finally, some relevant examples of topics presented during the conference are indicated.

1 The notion of transgression

The term *transgression* was introduced by a Polish psychologist, J. Koziellecki. The concept of *transgression* is devoted to the importance of the role that crossing over personal boundaries and subverting limitations play in everyone's life. Speaking of transgression, Koziellecki (1987) uses terms of an intentional and individual psychological process, as exceeding the boundaries of one's achievement. To Koziellecki, a man is an expansive personage who intentionally crosses the boundaries of what he is and what he owns, to become who he may be.

The idea of transgression permeated all of the conference discussions. Everyone was invited to share his best practices, experiences and observations. The aim of the conference was to cross the boundaries of mathematics and its education and to foster interdisciplinary collaboration between scientists representing seemingly distant fields of knowledge.

2 The need of interdisciplinary cooperation

According to the 1st Law of Dimensional Ontology, formulated by an Austrian psychiatrist, Viktor Frankl (2010, p. 36):

One and the same phenomenon projected out of its own dimension into dimensions lower than its own is depicted in such a way that the individual pictures contradict one another.

It is worth to notice that this statement adopted as a viewpoint sheds some new light on diversity of sciences. None of single projections can provide us with a complete and precise information about the object being explored. We should be aware of the fact that hanging onto only one of them might lead to false beliefs threatening the final objective. Frankl reminds us that one projection is not enough to regard the whole object. We need to have the courage at this point to appraise our own insufficiency.

Successful education requires the revision of standard points of view, depriving of prejudices and expanding educators knowledge and methods by those resulting from interdisciplinary collaboration. In order to fully understand student's school situation and support effective school training one has to consider many distinct points of view. It is our profound belief that incorporating interdisciplinary-based discourse in scientific meetings will be reflected in the long term by raising the quality of mathematics education at all levels.

3 Aims and scope

In accordance with organizers conviction that the idea should be rooted in the native land first, and then spread into the world, the meeting opening a series of Mathematical Transgression conferences had a national range.

The event had an interdisciplinary concept and gathered a large number of researchers from all scientific fields and teachers who are dedicated to education. In particular educators of mathematics, mathematicians, pedagogues, psychologists and philosophers were invited to participate in the conference.

A key goal of the conference was to provide a platform for interdisciplinary communication between representatives of various scientific disciplines in order

to improve the quality and efficiency of modern mathematical education in Poland and found new scientific collaborations. The second aim was to bridge the gap between theory and practice by bringing closer researchers involved in the development of scientific theory and rich in practical experience teachers. The dialogue gave an opportunity to a multidimensional approach helping to understand the complexity of modern mathematical education problems and conditions. Organizers are hoping that this will result in effective socio-educational initiatives, orientated towards widely conceived development.

The Scientific Program was composed of 10 plenary lectures, 43 contributed oral presentations in sessions and a panel discussion. The conference convened more than 150 participants from different Polish universities and schools.

Debates were focused on following themes:

1. Across science boundaries;
2. Mathematics, its nature and experience at different levels of education;
3. Hypothetical causes of difficulties and disorders in learning mathematics;
4. Mathematical activities development;
5. Trends, challenges and deficits of education in Poland;
6. Educational research and national exams results — what are they informing about?

The topic of the panel discussion was: The quality and efficiency of contemporary education in the light of educational research and knowledge & skills tests results.

4 Presented topics

The conference opened with a welcome address from prof. Kazimierz Karolczak, Vice-Rector for Research and International Relations of the Pedagogical University of Cracow, prof. Władysław Błasiak, Dean of Faculty of Mathematics, Physics and Technical Science, prof. Jacek Chmieliński, director of Institute of Mathematics and prof. Anna K. Żeromska, the conference chair.

There were three plenary lectures given on the first day morning:

- Prof. Antoni Leon Dawidowicz (Jagiellonian University, Cracow) – *Human knowledge is indivisible*;
- Prof. Zbigniew Semadeni (University of Euroregional Economy, Józefów – Warsaw) – *Transgression as a significant component of the nature of mathematics and a process of mathematization*;

- Prof. Marianna Ciosek (Pedagogical University, Cracow) and prof. Stefan Turnau (University of Rzeszów) – *Mathematical false beliefs and their hypothetical causes*.

Then all delegates took an active part in a panel discussion mentioned above. Several prominent guests became members of the panel: Katarzyna Hall, Minister of National Education for years 2007–2011, prof. Tadeusz Gadacz, prof. Krzysztof Konarzewski and prof. Katarzyna Potyrała. One of the invited guests, professor Zbigniew Marciniak was unable to take part in this discourse because of the immediate call from the Ministry and duties he was involved in.

Members of the Panel shared their viewpoints on modern education, discussed noticeable achievements in this area (e.x. PISA success, significant increase in the number of those who have higher education) as well as points that still remain to be addressed. The panel discussion lasted for two hours.

The afternoon lectures were given by:

- Prof. Edyta Gruszczyk-Kolczyńska (Academy of Special Education, Warsaw) – *Mathematically gifted children: myths, research results, interpretations and conclusions*;
- Małgorzata Dobrowolska (Gdańskie Wydawnictwo Oświatowe, Editor-in-Chief) – *Seemingly small changes in education and their considerable impact on teaching of mathematics*.

After plenary lectures all participants of the Mathematical Transgressions conference worked in two parallel sessions. The first day was ended by the Conference Dinner held at the Europejski Hotel where delegates were cordially invited by organizers.

On the second day there were another four excellent plenary presentations delivered by:

- Prof. Maria Szyszkowska (University of Warsaw) – *Philosophy as a source of wisdom and the foundation of the exact sciences*;
- Prof. Zbigniew Marciniak (University of Warsaw, 2007–2009 Secretary of State in Ministry of National Education, 2009–2012 Secretary of State in Ministry of Science and Higher Education) – *How I understand the in-depth teaching of mathematics*;
- Prof. Helena Siwek (Pedagogical University, Cracow; Pedagogical University in Warsaw, Faculty of Socio-Pedagogical Sciences in Katowice) – *Methods of functional concept of teaching mathematics at various levels of education*;

- Prof. Wojciech Krysztofiak (University of Szczecin) – *Arithmetic competence model*.

The final day of the conference concluded with the tenth plenary lecture by Professor Aneta Borkowska (Maria Curie-Skłodowska University, Lublin) on *Specific and non-specific cerebral factors in causing disorders and difficulties in learning mathematics*.

Sessions and lectures were chaired by distinguished scientists. All talks were held in a “discussant-style” format to facilitate participation from the entire audience. A single 35-minutes long lecture was followed by 10-minutes for questions. Organizers provided 20 minutes for each session presentation plus 5 minutes for discussions. There were up to 4 persons presenting their papers during each session. The conference ended on Wednesday, June 15 with the closing remarks of prof. Jacek Chmieliński and dr Bożena Rożek. The author of this report announced the date of the second – this time – international edition of Mathematical Transgressions conference and invited gathered participants to join the meeting. Now she is highly honored to invite all of the readers of *Didactica Mathematicae*.

5 Mathematical Transgressions 2015

The Organizing Committee is pleased to invite you to participate in the II Interdisciplinary Scientific Conference *Mathematical Transgressions*. The conference will take place in Cracow, Poland, from Sunday 15 March to Thursday 19 March 2015.

Topics covered by the Conference Sessions include:

1. Didactics of mathematics as a scientific discipline in statu nascendi.
2. Psychology of mathematics. Psychological aspects of learning mathematics.
3. Philosophy of mathematics: Platonism versus problem solving view.
4. The relationship between theory and practice in mathematics education.
5. Underachievement Syndrome in learning mathematics.
6. A trap of didactical contract.
7. Teaching mathematics in 21st century: new methods, new objectives and new content.

Keynote Speakers:

- Joseph Krajcik, Michigan State University, USA;
- Kobus Maree, University of Pretoria, South Africa,
- Sylvia Rimm, director of Family Achievement Clinic in Cleveland, USA,
- Bernard Sarrazy, Université de Bordeaux, France,
- Alan Schoenfeld, University of California, USA,
- Erich Ch. Wittmann, Technical University of Dortmund, Project Mathe 2000+, Germany.

If you would have any knowledge of individuals, who would wish to participate in this kind of scientific meeting, please feel free to inform them, that under this link: <http://ikntm.up.krakow.pl/II/?ac=en> they can find more details.

References

- F r a n k l, V.: 2010, *Wola sensu*, Wydawnictwo Czarna Owca, Warszawa.
K o z i e l e c k i, J.: 1987, *Koncepcja transgresyjna człowieka*, PWN, Warszawa.