THE LOCAL "SUPER COURSE" AND THE NATIONAL EXPERIMENT IN THE HUMANIZATION OF MATHEMATICAL EDUCATION (LITHUANIAN CASE)

Marytë Strièkienë & Elmundas Þalys

INTRODUCTION

Most of the participants of this Conference can share their experience in the preparation of mathematical curricula and specific programs or describe how they are improved year by year in their countries. After a well-defined school structure, a stable curriculum, and traditions of mathematical teaching have been established, it is much easier to think about courses for the gifted or about the humanization of mathematical education.

We represent a country where the national curriculum of school mathematics was introduced less than ten years ago and where reform of the overall school structure is proceeding slowly and unsteadily. Moreover, in our country the programs and standards for each age group (usually covering two years: 5-6, 7-8, 9-10, 11-12) can be announced after the corresponding textbook has been published. And, unbelievable as it may seem, the program and standards sometimes differ from the content of the textbooks, which were written for the same curriculum.

We understand that this is a problem of development, and we believe that things will stabilize in the near future. Nevertheless, for more than six years TEV Publishing House has already been conducting writers' groups which in a sense are very close to the Super Course teams. Eight years ago one of the co-authors of this paper, Marytë Strièkienë, won the national competition for the creation of new secondary-school textbooks. And the main goal of this experiment was to humanize mathematical education in Lithuania.

1. The Situation at the Crossroads.

During the independent pre-war Lithuanian Republic (1918-1940) there were many different national textbooks and teaching materials in mathematics. We cannot list all of them here, but we can direct you to the web-site http://www.tev.lt/alfa_plius_omega/, where a couple of papers by Professor A. Ažubalis of Vilnius Pedagogical University are presented with extensive lists of references. Unfortunately, all the texts are in Lithuanian, so only people who know this ancient Baltic language can take advantage of this offer. (But I am afraid that there are not very many such persons in your environment.)

During the Soviet occupation, Lithuanian national textbooks were strictly forbidden (similarly to the czarist regime in the 19th century), so now they can be found only in museums and the libraries of private persons. Even those kept in public and school libraries were withdrawn and destroyed (together with other books considered to be dangerous for the builders of communism).

Instead of that, we received free education and free access to the Russian curricula and textbooks adopted for all countries and nationalities enslaved by the socialist system. In mathematics, we had a completely standardized curriculum and teaching materials that were the same for all the Soviet republics and even for the satellite socialist countries of Central and Eastern Europe.

We do not say that this system was bad or defective. Compatible curricula as well as the standardization of educational requirements are in most cases a positive thing. (After all, the Super Course is based on similar ideas.) The problem was the way in which this program was implemented. In Soviet times we had only one level of mathematical education, starting in the fifth year (national textbooks were used in the primary schools of Lithuania, Latvia, and Estonia but not in the other republics). This level was very high: in the last years of secondary school (gymnasium) it was, higher than in university courses in many Western countries. And no excuses, no concessions to the humanities, no bad results – everything was under the strict control of the Ministry and Party Committees. (Gifted students of that time were able to prove any theorem in classical geometry in several ways. But it must be admitted that only 15 to 20 per cent of the pupils understood anything in the textbooks written by Russian academicians and professors and translated by their Lithuanian colleagues. Others tried to learn everything by rote, while the third – and biggest – group spit on education and left school after their eighth year, filling up ranks of the proletariat.)

So, Lithuania arrived at her independence with cheap, standardized, translated Soviet textbooks without any national identity. During the Soviet period there was no creative work – only translations of textbooks, supplementary teaching materials, curricula, and programs – and, consequently, no authors. Of course, this situation was not so terrible for mathematics, physics, or chemistry, but one can imagine what it was like in the humanities and social sciences. Therefore, our first task was to start

the improvement (in effect, the creation) of national programs in these spheres. Technical and natural sciences were postponed until later.

The Ministry of Education developed a new concept of mathematical education in 1993 and announced an open competition to create a mathematics curriculum. In 1994 three competing programs were published and distributed to schools and institutions for evaluation. The publishing of the experimental textbooks was supported by the Open Society Fund–Lithuania (the Soros Foundation). In 1995 the two best projects for a national mathematics textbook were selected and published: *Mathematics and the World: 5th Class*, by N. Cibulskaitë and M. Strièkiene, and *Mathematics 5*, by A. Bakštys and G. Bakštys. These textbooks were rather different from each other, even though they had been written for the same curriculum. The teachers (at that time) N. Cibulskaitë and M. Strièkienë wrote a picturesque textbook based on fun, joy, and play for pupils beginning to study mathematics in secondary school. The university professors A. Bakštys and G. Bakštys tried to preserve the features of the former Soviet textbooks, but with a national coloring. The choice of the schools and teachers was overwhelming: about 70 per cent ordered *Mathematics and the World*, some others preferred the old translated textbooks, and only a few asked for the strict, rather theoretical approach. Perhaps the sad experience of previous years played some role in this decision, but Lithuania from her very first independent step moved in the direction of humanized mathematics.

2. The first Lithuanian textbooks: beginning and nowadays

Lithuanian Ministry of Education concentrated its attention to the reform of education taking into account future integration into overall European cultural system.

The main goal of changing educational structure and principles was turning from strictly centralized and authoritarian school towards a humanistic national school. It was assumed to be based on the principles of democracy, creativeness, personal freedom, and personal responsibility. "Perestroika" (rearrangement) of the system of mathematical education started almost from zero, since there were neither national curriculum nor textbooks for basic and secondary school. As a starting point, we stated that any textbook, even in natural sciences, should be the reflection of existing traditions, level of culture, and even of economic relations. Since Lithuania changed its social system, cultural goals, the concept of national education as well as programs of mathematics, replacing old Soviet textbooks by new national ones was a natural step. From the beginning there were formulated many requirements for new textbooks - even too much, so there appeared only a few groups of authors willing to compete.

The authors of the *Mathematics and the World* as well as other competitors tried to solve two parallel questions: first, textbooks should be not worse than the previous ones in the mathematical sense, and the second, they should at the same time help students to prepare themselves for future professional, social, or scientific activities.

Everyone can declare that teaching mathematics is supposed to excite the thirst for knowledge, meet the abilities of a pupil and should be based on the everyday life experience. But in post-Soviet Lithuania not the only authors, but also most of the reviewers and observers of different level were (and some of them still are) the supporters of the academic style of teaching. Fortunately, it appeared that wishes of the authors correspond with the ideas of the mathematicians rallied in the publishing company TEV. Teachers-practitioners Nijolë Cibulskaitë and Marytë Strièkienë decided that the main point is to excite the curiosity of students. They succeeded to prove that mathematics is not only calculations or mechanical solving of the abstract problems and to show that learning mathematics can give pupils knowledge about their own country and the surrounding world as well. The financial support of the Open Society Fund, active joint meetings with TEV specialists, inspired work of artists and designers allowed to create in 1995-1996 the series of textbooks for the 5-6 grades which are still popular and desired at schools. You will be able to acquaint with these books yourself during the exposition at the Conference, but for those who cannot read neither Lithuanian, nor Polish or Russian, we would like briefly to present their features.

There are minimal theoretical parts for all topics – not more than one page. All problems are created taking into account the life experience of a pupil and are related to social and geographical environment: what he or she knows, where he or she lives, what he or she sees around. That helps to perceive, e.g. that the longest Lithuanian river is much shorter than most long rivers in the world, that there are many birds in the world which are much smaller than the smallest Lithuanian one, or that a very big elephant which they often see in the movies is much smaller than many sorts of whales. Comparing of numbers and quantities allows a pupil to learn more about the surrounding world.

There are given a lot of links to geography, history, natural sciences, investigations of human being. Since teaching is connected to real life, pupils less frequently ask why they must be learning one or another thing. On the other hand, even purely mathematical ideas are more understandable when presented in the realistic contents. Special attention is paid to practical activities: making models, composing figures, evaluation and comparing different subjects, mathematical excursions. (The most interesting thing is that they really take place in the teaching process, even the parents get involved.)

The main goal of these textbooks was to prove that mathematics propagated by us is not such a formal, vast, and alien frontier that many people perceive mathematics to be. And it seems that this goal was achieved. Nowadays, new authors, experienced teams of teachers, professors, and scientists are busy improving programs, preparing and publishing more weak, more strict and even really academic publications for grades 5 and 6. But *"Mathematics and the World*" series is still on the top of the popularity. Next year the students, who have started with this book, will be finishing school. But we expect that next generation will also choose the same course, which we hope to update, improve and perfect using the results of our joint work.

3. The Lithuanian "Super Course": TEV Experience

TEV Publishing House is a unique phenomenon in Lithuanian educational life. Founded and managed by five doctors of mathematics and located at the Institute of Mathematics and Informatics in Vilnius, TEV worked for more than five years after its founding mainly as the typesetting company for well-known Dutch and American publishing houses: Elsevier, Kluwer, Plenum, Academic Press, Sage, and others. After winning the competition to publish experimental textbooks on mathematics and after the great success of the first attempt, TEV decided to alter the strategy and to invest more in local publishing. All foreign typesetting work was gradually passed on to our twin company, VTEX, and since 1998 TEV has completely devoted itself to the publishing of scientific and educational literature. Moreover, after a successful start with two books *Mathematics and the World*, it was found that there are almost no other original, highly educated (in the mathematical and global sense), and creative authors. To continue writing Lithuanian national textbooks we needed either outstanding personalities or a qualified and intellectual team. Unfortunately, during Soviet times most teachers became simple performers who could properly (and at the highest level) apply any methods of teaching or methodological instructions but could not create anything by themselves. So, we started by assembling a team: we invited the most active teachers, university professors, mathematicians from different fields, and creators of the first national curriculum to get together in seminars organized by TEV. Various questions regarding curriculum and specific programs, teaching standards, the level of mathematical education, the syllabus for different years, and the textbooks and supplementary teaching materials needed as well as other issues related to mathematical education were discussed twice a month on weekends. So, we chose an approach leading away from theoretical investigations toward a real creative group (which I dare to call our local "super course" in the title of this paper). At that time, this was the only possible choice, and as we now see, it was the right one.

TEV is currently the biggest supplier (about 80 per cent of the market) of official teaching materials in mathematics and informatics for the basic school. There are created the complete sets of textbooks (including teacher's books, workbooks, exercise-books, translations into Russian and Polish for national- minority schools, etc.) for each year from the fifth to the tenth class. At present, textbooks for the eleventh and twelfth classes are in preparation.

TEV is also continuing to organize theoretical seminars and writers' camps, where the contents of selected textbooks are discussed and the initial brainstorming sessions are held. During the last five years, we have been conducting, together with the Ministry of Education, an experiment in the evaluation of textbooks. The essence of this experiment is that about 25 classes in Lithuania are selected to receive free mathematics textbooks for one year before they are officially adopted. The teachers participating in this experiment work according to the new program, have joint meetings with the team of authors as well as TEV editors, and write reports and suggestions for the improvement of the materials, i.e., they also take part in the creation and evaluation of the textbook. Consequently, about thirty people (5-7 writers, 3-5 consultants in different fields of mathematics, and about 20 teachers) work together with TEV supervisors for a couple of years on one textbook. Later on, the same team (but now without the experimenters) writes the corresponding supplementary materials. TEV now has several teams of authors, each comprising about fifteen persons, who are working on various mathematical projects.

As you can see, Lithuania already has its own, rather experienced "super course" team, which is ready to join your movement – if Super Course will invite us.

Marytë Strièkienë
Senior Officer
Ministry of Education
Volano 7/2, Vilnius
LT-2600, Lithuania
e-mail: maryte@smm.lt
ph.+370-5-2743149 (of.)

Dr. Elmundas Žalys
President of Joint Lithuanian-
Dutch-Russian Company TEV
Akademijos 4, Vilnius
LT-2021, Lithuania
e-mail: tev@tev.lt
ph. +370-5-2729318