THE THIRD WORLD MATHEMATICS EDUCATION IS A HOPE FOR THE WORLD MATHEMATICS EDUCATION DEVELOPMENT IN THE 21ST CENTURY

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Through the last four decades, mathematics educators have been used to change in mathematics education. Our work in international meetings reflects satisfaction with the ongoing changes. Inside each country there is another kind of discussion; different specialists blame the ongoing changes as the reason for the slow-down of mathematics education. This situation belongs mainly to countries we used to call Western Countries. The other group of countries, we use to call Eastern Countries, do not yet have such a history in mathematics education. The last four decades have not changed mathematics education there to be different than before. These countries still keep their tradition in doing well in mathematics itself as well in mathematics education. The future of mathematics education in these countries can be something else. There are some signs that Western countries can affect mathematics education in Eastern Countries negatively. In this situation the Third World mathematics education can play a special role in preserving mathematical culture.

1. The diversity of mathematics education

1.1. Brief and incomplete history of mathematics education diversity

Till the end of the school year 1957/1958 school mathematics was quite the same everywhere. Primary school mathematics mostly consisted of arithmetic. Secondary school mathematics was mostly algebra and plane Euclidean geometry, and in the upper grades algebra, analytic geometry, solid Euclidean geometry and trigonometry. In the 1950s calculus teaching spread in upper secondary school.

The launch of Sputnik in October 4, 1957 also marked the launch of a new unseen before diversity in mathematical education. In 1958 the era of the "new math" started in the USA. In that year, the School Mathematics Study Group (SMSG) led by Professor Edward Begle at Yale University, started its work. This work included the writing of new textbooks of a new curriculum. The content of these textbooks was similar to that of the 1952 photo-offset materials of the University of Illinois Committee on School Mathematics (UICSM) project, led by Professor Max Beberman. Indeed the UICSM mathematical curriculum of 1952 was named as *a "New mathematics curriculum"* ([17], p. 657), but the word new got its magic affect only after Sputnik. For specialists, "new" meant more close to contemporary mathematics. For the public, "new" symbolised rescuing from the failure of antiquated education. Sputnik hit was enough strong to make not only the USA ready to appreciate the SMSG curriculum, but to make the USA and other countries ready to rush into more radical changes under the magic label "New Math".

Radical changes begun with the disappearance of Euclidean geometry from mathematical curricula in Western countries. This was the main outcome of The Royaumont Seminar of 1959. This seminar was organised by the OECD (at that time it was OEEC "Organisation for European Economic Co-operation"). For two reasons this seminar has a special meaning in the history of mathematics education. The first reason is that this seminar changed "new math" from being mainly a local American reform to be a Western mathematical education movement. The second reason is that this seminar saw the declaration of the slogan "Euclid must go" by Jean Dieudonné ([1], p. 35). The Royaumont Seminar and its report of 1961 [11] opened the door to a series of radical changes in Western countries. Since that time mathematics education has been split into two major schools Eastern school, where Russia in the centre and Western school, where USA in the centre [7].

1.2. Some details and more accuracy

The above mentioned history is quite well known to most mathematics educators. When we come to details we can find that the Sputnik and consequently the USA reaction was a reason for the split in mathematics education. Moreover we can find that the USA has led the reform movement in the Western countries. On the other hand, we can find that the trends of this movement are not purely American ones. The European input has had a remarkable affect. Till The Royaumont Seminar neither UICSM nor SMSG had eliminated Euclidean geometry from secondary school mathematics, but The Royaumont Seminar was the turning point to go ahead towards this elimination. The Royaumont Seminar was attended by delegates of 17 countries out of the 18 members of OEEC. These countries were Austria, Belgium, Denmark, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Sweden, Switzerland, Turkey and the United Kingdom. The USA and Canada were presented as Associate members of equal rights as other members, where Yugoslavia was presented as an observer. The OEEC organisation headquarters were in France, as well as the seminar itself. The seminar had three main sections and each had a chairman. For two of these sections the chairman was from France, Professor Jean Dieudonné and the Inspector General of Ministry of Education Pierre Theron. Indeed the chairman of the third section was from the USA, Professor Howard Fehr, and the president of the seminar was also from the USA, Dr Marshall Stone, the president of ICMI, but the major reform proposals in this seminar were European.

Before the 1959 Royaumont Seminar, more than half of secondary schools in Germany had already replaced Euclidean geometry by the so-called motion geometry. This geometry was a simplified version of transformation geometry of Felix Klein. Thus, the call for eliminating Euclidean geometry got support from Dr. Otto Botsch, the German speaker at the seminar. Botsch was an author of a textbook on that motion geometry ([11], p. 76).

Professor Fehr was the responsible editor of The Royaumont report. The report includes clear evidence of strong opposition to the elimination of Euclidean geometry by part of the participants, especially in the discussion of Dieudonné's paper ([11], pp. 46-47). Nevertheless Fehr wrote; *"The desirability of experimentation with the programme proposed by Prof. Dieudonné was unanimously expressed by all participants"* ([11], p. 48).

Before The Royaumont Seminar, most of the twenty countries participating in the seminar had a traditional mathematical curriculum, including Euclidean geometry. Canada, the close neighbour of the USA is a good example of the stability of traditional mathematical curricula till that time. In a response to a pre-seminar questionnaire, the data of Canada shows that; "There is no trend towards change. Present programme was established in 1900. No national movement to re-examine the programme"([11], p. 181). The above mentioned questionnaire was sent to all the countries participating in the seminar and to Spain, the eighteenth member of OEEC, at the beginning of 1959. This questionnaire was given to serve as a basis for the seminar, but the seminar was held before the data obtained by the questionnaire was available ([11], p. 7). This is as well, evidence of the enthusiastic style of rushing towards school mathematics reform at that time.

Since 1959 the style of work to develop mathematics education has changed entirely. The Royaumont Seminar brought to school mathematics development the word "revolution". For instance, we find in the seminar's report conclusion in page 106 a call for *revolutionary curriculum* [11]. In The Royaumont Seminar each participating country was asked to send three delegates of an outstanding mathematician, mathematics educator or person in charge of mathematics in the ministry of education, and an outstanding secondary school teacher of mathematics ([11], p.7). It is understandable, how the work of The Royaumont Seminar, for about two weeks, with such representatives, and from 20 countries would affect mathematics education in their countries and beyond their countries. The enthusiasm to build a new revolutionary curriculum, encouraged the participants of The Royaumont Seminar to behave as a revolutionary power inside their countries. After The Royaumont Seminar some of them became involved in television programs related to the "new math" movement [9] in a time of rapid spread of the new mass media; the television. At that time, it was common that such *"new mathematicians"* visited each other's country to give support to the ongoing revolutionary work. When they started to visit the Third World countries they got even more, the halo of profits.

At the end of the 60s, new math movement projects started to spread in the Third World countries, among others the Arab States, including Egypt the host of our conference.
In the former Soviet Union mathematicians and mathematics educators watched carefully mathematics education reform in Western countries. In 1963, in Russia an experimental textbook in geometry based on transformations was produced for the ninth grade by V.G. Boltyansky and I.M. Yaglom. In 1966, the Soviet authority declared a resolution to reform the secondary schools. According to the resolution, a committee of 500 members from the Academy of Sciences and the Academy of Pedagogical Sciences, under the leadership of A.I. Markushevich started work on improving the curricula of all subjects ([8], pp. 216-218). Under A .N. Kolmogorov, the mathematics committee declared a reform of the curricula of grades 4-10, at the time when the school system consisted of 10 grades. The committee found the type of reform in progress in Western countries to be unacceptable ([4], pp. 301-305); for example, no special topic for sets was accepted for inclusion in school textbooks. Transformation approaches were accepted in teaching geometry, but not to such sophisticated level presented in the textbook produced by Boltyansky and Yaglom. Weekly geometry lessons were reserved to the study solely of geometry, as before, so that geometry was in no danger of loosing its own textbooks.

2. The revolution was just a coup

Inside and outside the USA, the "new math" movement was criticised from its beginning. The specialists' critics were not enough to stop the work of reform leaders. Only after the spread of parents' anger towards the new math curriculum, specialists' critics became effective. In the USA, from the beginning of the 60s Morris Kline was active in criticising the "new math" movement. He mainly criticised the formal structure of the new math secondary school curricula. In 1973 as the public was of the opinion that the "new math" was the reason for the children's weakness in arithmetical skills, he intensified his criticism in a book under the title "Why Johnny Can't Add". In a book of 173 pages, only the first three pages were related to the title of the book, i.e. related to the weakness in arithmetical skills. The main thing he wanted to pronounce was given in the subtitle of the book *"The Failure of the New Math"*[3]. The critics of specialists in the "new math" in other Western countries were similar to the critics in the USA, and as well, the effect of the public opinion was similar. The only difference was that the critics in the USA were more evident, and in time they were earlier than in Europe. At the end of the 70s, specialists were ready to declare the end of the "new math" era and the beginning of the new movement "Back-to-Basics". This finally happened at ICME 4, 1980, Berkeley USA. Those who attended this congress can not forget the difficult time of change. The presentations and discussions of the congress reflected this difficulty. It was a time of frustration for those who were still involved in the "new math" reform activities. It was a time to blame the leaders of that reform. Some of these leaders did not attend the congress, among them Hans-

Georg Steiner, who led the reform in Germany and was a member of the Congress International Program Committee. In unofficial discussions with American colleagues, they expressed the fact that the USA presidential elections were near, and at such time nobody can neglect public opinion. Thus, throwing away the "new math" from school had become an unavoidable political issue in the USA. Before 1980, similar political issues were established in other Western countries, especially in the United Kingdom. In 1976, the Prime Minister James Callaghan gave a blessing to the new label "Back-to-Basics" ([9], p. 32).

The worst in the "new math" reform was the style of reform, including the using of slogans. The "new math" era continued 10-20 years. Instead of being the revolution of mathematics education it was just the first coup in a series of unsuccessful coups.

3. School mathematics in the 80s

"Back-to-Basics" was a well-chosen slogan to meet the expectations of the public. On the other hand, the slogan's poor content was not enough to keep to mathematics educators the special prestige they gained at the time of the "new math". Mathematics educators were not happy to see how the spotlight on them was dimming all the time. The declaration of the "Back-to-Basics" was a declaration of changing the roles; the common people led mathematics educators and not the opposite. In 1984, at ICME 5, Adelaide, a new slogan was found. This was the so-called "Ethnomathematics". Neither the new word "Ethnomathematics", nor the content explaining the new coup, were enough to bring back the spotlight lost since the end of the "new math" era. In 1988, at ICME 6, Budapest beside Ethnomathematics, problem solving and computerization were underlined.

In agreement with the "back-to-basics" label, putting emphasis on arithmetical skills, even at the primary school level, would not be enough to meet with the elementary principles of the pedagogy of mathematics. The so-called Ethnomathematics, or even "everyday life mathematics", was not to solve this pedagogical problem. Adding problem solving, was a way to meet with the main pedagogical aim of teaching mathematics; *"mathematics is an instrument for intellectual development"*. Since the time of the "new math", the teaching of computer science topics within mathematics curriculum, was one of the appreciated trends of that time ([18], p. 11). As well, the using of computers as a modern educational technology was appreciated ([18], p. 31). In the 80s with the rapid progress of microcomputers, both the introducing of computer science topics and the computer-based instruction got more realistic grounds. On the other hand, working with computers can bring back the spotlight missed since the end of the "new math" era. In 1988, at ICME 6 one of the plenary addresses given was by Academician Andrei Ershov, USSR, who called for radical changes in school mathematics under the title "Computerization of schools and mathematical education"[2].

4. Mathematics education in Western countries

4.1. Common symptoms of mathematics education problems

The different tendencies arisen in the 80s have continued to affect mathematics education in the 90s. Where in international meetings the common tone reflects satisfaction with the ongoing changes, at the local level the situation is different.

The weakness of today's students is a common complaint. The loudest voice, in this concern, is the voice of university professors. They blame, before all, the secondary school mathematics education. In secondary schools, the interest in studying mathematics is not high as in the time of the "new math" or before. In different cases, most of secondary school students do not choose mathematics as one of the subjects of final examination, and in particular cases they do not choose mathematics at all as one of the subjects of study in senior secondary school. In the secondary school's final examination, the grades like "excellent" and "very good" have lost their original meaning. In most cases, such grades are given to only smarten the examination results. In special years, in particular countries, getting 10% of the maximum score can be enough to pass mathematics exam. On the side of the universities, the departments of mathematics find difficulty to get students of respectively high level in mathematics. In different places, in particular years, the number of applicants to the mathematical department can be too small to organise a study for them. Not all of those who got a place to study in the departments of mathematics finish this study. A considerable percentage leaves the department of mathematics to join other departments, or they leave completely the university. Similar problems exist in the university departments of related fields, especially the department of physics. Similar problems again we find in teachers colleges. This is one of the main reasons of complaint about the level of today's mathematics and physics teachers. There is also a complaint about the level of primary school teachers in respect to teaching mathematics and science.

Bertrand Russell wrote "At the age of eleven, I began Euclid, with my brother as my tutor. This was one of the great events of my life, as dazzling as first love. I had not imagined that there was anything so delicious in the world" ([15], p. 30). We also complain about the fact that it is now difficult to get students of such interest in learning mathematics.

In mathematics education, when we complain we are complaining about problems we have. On the other hand, these problems are just symptoms of deeper problems.

4.2. Reflections on school mathematics changes

We can find different reasons for the above mentioned kinds of complaining, but the main reason is the series of coups in school mathematics since the era of the "new math".

Since the time of the "new math" the branches of mathematics textbooks have disappeared. Before the "new math" era, different efforts in this century were made to unify mathematics curriculum. For instance, at the beginning of the century unified mathematical curriculum became a pedagogical issue in the USA. This issue had spread at that time in Illinois secondary schools to be called later the "Chicago movement". This movement was criticised, because it did not care about the need for continuity of studying each branch, especially geometry, as a structure [16]. Indeed we need to use algebra in teaching/learning mathematics and we need to use geometry in teaching/learning algebra but this can not happen unless each branch is itself well unified. Thus, the so-called "Chicago movement" and similar efforts before the "new math" were just a temporary fashion.

One of the main ideas of the "new math" movement was the unifying of mathematical curriculum, using general abstract concepts and structures. In practice, each textbook contained different separated topics. The attempts to unify these topics were weak and artificial. It was common to see in one textbook a lot of different topics, up to more than twenty ones, among them geometry topics. The enthusiasm for including new topics as much as possible produced textbooks of chips. Thus, the textbook topics were neither unified properly, nor formed properly any branch of mathematics.

The "Back-to-Basics" did not bring back Euclidean geometry. The use of one textbook for mathematics continued after the "new math" era. The topics of these textbooks are mainly topics of branches of mathematics, among others plane Euclidean geometry. The attempts to include the so-called problem solving, computer sciences, using of calculators and using of computers are different from one country to another and from one textbook series to another. Today, the authors of these textbooks are mainly schoolteachers and even primary school teachers in the case of primary school textbooks. So, for about three to four decades the teaching of arithmetic, algebra, plane geometry, trigonometry, solid geometry, calculus is not the same as before the "new math". The name "Problem Solving" has become a slogan, which attracts even some educators with no degree in mathematics to advocate and even give examples of such problems. With the increasing of the space of "problem solving" in textbooks, school mathematics has become a fragmented school subject. "Problem solving" introduced in today's textbooks is not solely related to a specific mathematical topic. Moreover, not always these problems are suitable to the age of students, to whom they are offered. In some cases, these problems are in fact puzzles, the solving of which is in need of special tricks. Today we have different contradictions concerning "problem solving". The textbooks content illustrate clearly some of these contradictions. As an example, in a textbook of the 80s, where "problem solving" was of interest to the authors, in the chapter of geometry the textbook asked students to calculate the area of a right-angled triangle, the length of the hypotenuse being 8 cm and the corresponding height 5 cm. For years students were graded correct if they were able to multiply 8 by 5 and divide the product by 2 to get the so-called area of 20 cm^2. This example shows clearly how education in geometry has declined. Neither the slogan "Problem Solving" nor "Everyday Life mathematics" can excuse asking such students of seventh-grade (i.e. for 13 year-olds) to calculate the area of an "imaginary" triangle. What about mathematics teachers, what excuse can we find for them? How are they not able to see such mistakes? Despite the fact that today's textbooks can have good problems of the so-called "problem solving" type, similar proper mathematical mistakes are not rare in such textbooks.

4.3. Contradictions in mathematics education

It is remarkable that we can notice the spread of strange conceptions through mathematics educators in the West. One of these conceptions is that school mathematics is something different from mathematics ([14], p. 10). In contradiction, the same specialists offer sometimes a so-called "problem solving", the solution of which is in need of mathematical structure. In such cases it is common that nobody finds the solution. As an example, the problem of searching for a point inside a triangle, with the help of which we can divide the triangle into three equivalent triangles [12]. A similar contradiction can be demonstrated in the next example. A post-graduate student is doing a Ph.D. thesis in mathematics education. His thesis is based on a questionnaire for measuring secondary school students' beliefs. In a conference workshop in 1998, the participants were asked to draw a figure of an octahedron. When this young mathematics educator failed in drawing such figure, he just gave the next comment; "I can not draw solid figures". The contradiction here is that; he is continuously speaking in favour of "problem solving". So, what about the drawing of octahedron? Is it something unrelated to school mathematical problems? In mathematics we always solve problems. In the so-called "problem solving", it's enough to give the answer in a form of a word, or a number, or something similar, or demonstrate the solution in oral way. In a real mathematical problem finding a solution is among others in need of delivering mathematical text.

Even in research in mathematics education we meet with such strange conceptions. In the "Kassel" comparative study, the Hungarian students got the best results and the Finnish students got the worst. In a conclusion of a report about these results we find the next comments. In problems with no need for a lot of mathematical content, the Finnish students were better and this is due to the differences in students conceptions; "Finnish students understand mathematics as open system more than other students" ([13], p. 7). This was a statement of mathematics educators based on comparative studies in students' beliefs. The last example here is not about such specialists, but it points out more than anything else the main problem we have now in Western countries. In a comparative study between Finnish and Russian students two M.Sc. students wrote that Russian students learn the proofs of propositions, where Finnish students learn how to use them ([5], p. 118). Today it is common to offer mathematics propositions as ready rules. This is not only in Finland. The possibilities of using computers in mathematics have prompted the NCTM of the USA to start a reform to build the so-called *"Standard-based Curriculum"*. One of the main assumptions of the proposed curriculum is that mathematics has become more computational and less formal. This forgets the fact that mathematics offered by computers is a result of formal mathematics. Moreover, this forgets the fact that mathematics is a culture and there is no short cut to a culture. Mathematics as a structure is a result of continuous work for more than 2500 years. This can not be replaced by unstructured problem solving. We have to remember that mathematical culture is built on the shoulders of mathematicians before the era of computers. Did Newton need computers to learn or produce mathematics? It is not fair to forget that today's child is in need to develop his formal thinking as it was always before. In this matter mathematics' deductivity is an essential tool for every child.

5. Mathematics education in Eastern countries

Russia is the metaphor of Eastern mathematics education. Russia started its long tradition in mathematics and mathematics education under the leadership of Leonhard Euler in 1730. Since that time, mathematics education has been developed rapidly in agreement with the principles of evolution ([7], pp. 423-425, 430-432). Neither the "new math" movement in Western countries, nor the call for Computerization of schools and mathematical education by Russian Academician Andrei Ershov was accepted. The changes in European political life at the end of the 80s and the collapse of the Soviet Union at the beginning of the 90s have brought pressure on the Eastern countries to change their mathematics education. In relatively small countries like the Baltic countries, changing mathematics curriculum to be similar to that of Western countries has become an urgent issue. It has been an urgent need to stress the independence from Russia and the belonging to Western Europe. Moreover, the attractive-looking Western textbooks have inspired these countries to match mathematics education in the West with the attractive-looking Western style of life. The effect of Western mathematics education on Eastern mathematics education is increasing all the time, to even touch mathematics education in Russia. Indeed, till now Russia still has different textbooks for different branches of mathematics, but the so-called "problem solving" is spreading gradually in these textbooks. This can interrupt the continuity in learning the structure of each branch. Today in Russia there are different factors, which have a negative effect on mathematics education ([7], pp. 433-435), but the increasing participation of Russian mathematics educators in international conferences has a special affect. In such conferences the language of the conference is normally English. This makes Russian participants feel that the world of mathematics education is something else than what they have. The paradox here is that as much as Russian mathematics educators listen to good presentations of Western trends, as much this affects negatively on Russian mathematics education tradition.

6. The development of mathematics education in the Third World

Till the beginning of the "new math" era school mathematics in the Third World was quite the same as everywhere else. The host country of our conference Egypt can serve as a centre of this discussion. In Egypt, primary school mathematics was mainly arithmetic. Junior secondary school mathematics was arithmetic, algebra and plane Euclidean geometry and the senior secondary school mathematics was algebra, plane Euclidean geometry, solid Euclidean geometry, Analytic geometry and trigonometry. In the six years primary school, mathematics was provided through arithmetic textbooks. In junior and senior secondary schools each branch had its own textbook and its weekly lessons. In the 50s the school mathematics of the first year of junior secondary school (Grade 7) got a form of unified curriculum and therefore the students of this grade received only one textbook in mathematics "General Mathematics". Also in the 50s, an elementary course in calculus was established for the students of final year of senior secondary school (Grade 12). It is also remarkable that in the 50s, for the second year of senior secondary school (grade 11) a course in the history of mathematics was established.

At the end of the 60s Egypt and other Arab countries were involved in a "new math" project aided by UNESCO. According to this project textbooks were written by 22 authors to Senior Secondary School (grades 10-12). Eight out of these authors were from outside the Arab World. They were: H. Fehr, Columbia University, J. Fey, University of Maryland, M. Håstad, National Board of Education, Stockholm, C. Hope, Worcester Training College, UK, M. Jelinek, UNRWA/UNESCO, Beirut, D. Kurepa, University of Belgrade, F. Watson, University of Keele and P. White, University of Southern California. These textbooks were written first in English and then translated into Arabic. The textbook for Grade 10 was written in 1970. Before getting its translation ready, in September 1970 three state schools out of 310 schools and three other smaller private schools started studying the first chapters of this book without textbooks; they were later to receive the first chapters in separate parts. The teachers who were involved in the "new math" project worked not only with enthusiasm, but also with pride being "new math" teachers. These feelings were not enough to prevent them from being unsatisfied with the structure of the new textbooks. One of the main reasons of being unsatisfied was the poor content of Geometry Education. The three new topics in geometry, Affine Geometry, Transformation Geometry and Coordinate Geometry of chapters 6, 9 and 11 of Grade10 textbook were not enough to replace weekly lessons in Euclidean Geometry and as well in Analytic Geometry in the traditional Curriculum.

Students who started the "new math" curriculum in senior secondary schools in Egypt in 1970 graduated in 1973. In 1974, through ALECSO (Arab UNESCO) project, "new math" textbook was written to the first grade of Junior Secondary School (Grade 7). All the eight authors of this textbook were Arabs. They were mathematicians, mathematics educators and inspectors of the ministries of Education. This textbook was a mixture of tradition and "new math" curricula. Among others, more than half of the textbook was devoted to Euclidean geometry. The new in the part of geometry was the use of set notation and David Hilbert's notation for segment, ray, straight line and the measure of angle. By the end of the 70s, the "new math" era was over in Egypt. The "new math" curricula expanded slowly in Egypt from the beginning to the end of the 70s. For example, in state senior secondary schools it expanded from three schools in 1970 to 12 in 1971 and to 13 in 1976 [6]. Thus, at the end of the short "new math" era the majority of mathematics teachers were still able to teach mathematics of the traditional curriculum, among them skilful teachers in teaching Euclidean plane and solid geometry. Today mathematics education in Egypt is quite the same as it was before the "new math" era. Some residues of the "new math" era are still seen in today's textbooks. These residues can be of positive affect, among them the use of the above mentioned notation. Primary school mathematics is more rich than ever before, where elementary Euclidean geometry is a main part of mathematics textbooks. Most of junior secondary school students are able to give more than one proof of the non-existence of the triangle mentioned above in part 4.2. and they can easily find the point needed inside the triangle in the example mentioned in part 4.3. This is due to the study of mathematics as a structure. This includes not only the study of related theorems, but also the rich experience of solving different proper mathematics problems and as a result the developing of deductive thinking in its proper time; the formal operation stage in the words of Piaget. On the other hand such problems as such mentioned above in 4.2 and 4.3. are of great difficulty not only to the students of secondary school in the West, but also to their teachers.

7. The Third World is a hope

Mathematics as a structure is now difficult to be brought back in the Western group of countries. One of the reasons is time. Mathematics as a structure is missed in Western countries for three-four decades. The new generation of teachers, who got their school education at the time of the "new math", knows little and even nothing about Euclidean geometry. Those who were teaching mathematics as a structure, among them skilful teachers in teaching Euclidean geometry are now close to the age of retirement, or have already retired. In addition, for those who have not yet retired, time has weakened their previous skills of the pre "new math" era. The series of coups in mathematics education has brought strange conceptions of school mathematics, among them school mathematics is not mathematics; school mathematics is *"problem solving"* and *"real world problems"*. These kinds of conceptions have become, with the time, dominating ones. In the USA, because of the Sputnik, the public supported formal abstract mathematics as the only way to gain the race in space, and as well in science and technology. Today the public in the USA does not support more than mastering mechanical skills, that is why the modest "Standard Curriculum Reform" of the NCTM does not expand easily in the USA. Speaking today about the needs for reform to secure the nation's future, and similar theses to these introduced at the time of Sputnik, do not help any more [10]. In a global cultural point of view, mathematics education is in a danger today because of the increasing effect of Western mathematics education on Eastern mathematics education. For this reason the Third World mathematics education is a hope for the world mathematics education development in the 21st century.

In the Third World countries, education for each individual means a different thing than it means in other countries. Education there is the most reliable way, if not the only one, to secure the economic future of each individual. For children from poor families in the Third World, education can mean even moving to a higher class in their societies. In such background, education in the Third World is not only highly appreciated, but it is a field of competition. Mathematics in this context has a special status. Mathematics is appreciated as a valued field of study not only by the authorities and educators, but also by children's parents and the public. The results can be seen in different aspects of the school life there, among them the high number of lessons devoted to mathematics at school and the competition of students to study mathematics in senior secondary schools. Getting a place to study mathematics at the universities is not easy. Thus, mathematics departments and corresponding departments of teachers colleges get students with strong background in mathematics. All of that mentioned above about mathematics education in the Third World can explain the success of the Third World countries in International Mathematical Olympiads up to getting the first place in the so-called unofficial results. We are living in a time of crisis in mathematics education, especially in the West, but the Third World represents a hope. The Third World mathematics education can play a special role in preserving mathematical culture.

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