C I E A E M
Commission Internationale pour l'Etude et l'Amélioration de l'Enseignement des Mathématiques

International Commission for the Study and Improvement of Mathematics Teaching

On behalf of CIEAEM, it is a great pleasure and an honour for me to present this manifesto to an international meeting of colleagues concerned with the study and improvement of mathematics education around the world. On the occasion of its 50th anniversary, CIEAEM presents a description of its work in the field of mathematics education and tries to outline future perspectives for research and policy in the field. You are cordially invited to send your comments to the Executive of the Commission and to participate in our future meetings - try CIEAEM, you will enjoy!

Christine Keitel, President of CIEAEM

50 YEARS OF C I E A E M:
WHERE WE ARE AND WHERE WE GO:
"Manifesto 2000 for the Year of Mathematics"

PART I: WHERE WE ARE

Origins and aims of CIEAEM

Since its foundation in 1950, the International Commission for the Study and Improvement of Mathematics Teaching (CIEAEM, Commission Internationale pour l'Etude et l'Amélioration de l'Enseignement des Mathématiques) intended to investigate the actual conditions and future possibilities for changes and developments in mathematics education in order to improve the quality of teaching and learning mathematics. The annual meetings (rencontres) which are the essential means for realising this goal are characterised by exchange and constructive dialogue between researchers and educators in all domains of practice. In its work, the Commission follows the spirit and the humanist tradition of the founders of CIEAEM. The founders intended to integrate the scientific goal to conduct research in mathematics education with the main goal to improve the quality of mathematics education. By a new mathematics education, they wanted to achieve a society where people were able to use mathematical reasoning and tools in order to act rationally and think critically as citizens and as future scientists. A humanistic view on mathematics education should be developed which guards against technocratic attitudes as well as ideological blindness.

The mathematician, pedagogue and philosopher Caleb Gattegno, University of London, is the spiritus rector of CIEAEM in its foundation. But there were two very distinguished personalities at the beginning who directed and determined the work of CIEAEM in the first ten years: the French Gustave Choquet (President), the Swiss psychologist and cognition theorist Jean Piaget (Vice-president) supported by Caleb Cattegno as secretary. Choquet brought into the discussion the ideas of a reform guided by the restructured new "architecture" of mathematics, Piaget presented his famous results of research in cognition and conveyed new insights into the relationships between mental-cognitive operative structures and the scientific development of mathematics, Cattegno attempted to connect the new mathematical meta-theory to psychological research by a philosophical and pedagogical synthesis and to create and establish relationships with mathematics education as an important part of general education.

Early CIEAEM meetings mainly brought together European mathematicians and mathematics teachers from secondary schools with a presupposed common interest and background in mathematics teaching in order to share views, experiences and intentions for the improvement of mathematics education.

From "Math Moderne" to "Mathematics for All"

The mathematicians Artin, Dieudonné, Papy, and Servais were the leading figures of the Commission in the 60s and early 70s. They pleaded for modernising mathematics teaching and a complete reconstruction of school mathematics "from kindergarten to university". The debate within CIEAEM shifted towards the reformulation and reorganisation of the mathematical content of the curricula or guidelines according to the main ideas and main methods of the "Math Moderne". Their ideas became very influential in the European and international discussions of the "New Math Movement", and their papers have been published in major publications of UNESCO and OECD. But they also raised very controversial debates within CIEAEM, in particular when it became obvious that political reforms mostly consisted in superficial changes in terminology, without consideration of the new demands of mathematics, the new social contexts, and the new conditions of learning and teaching.

In the late 70s and 80s, presidents of CIEAEM like the Polish mathematician and mathematics educator Anna Sofia Krygowska, the Italian pedagogue Emma Castelnuovo, the Canadian mathematics educator Claude Gaulin and the Dutch mathematician Hans Freudenthal, set very a different focus for CIEAEM. They tried to end the "noble isolation" of mathematics and of mathematics education and its orientation towards pure mathematics only, and to connect mathematics education closer to other sciences, to the social reality and to the social mathematical practice. It is due to their initiatives that the themes of CIEAEM-meetings were formulated and perceived more and more transdisciplinary and interdisciplinary: "Mathematics for All" became a programmatic demand. At the same time, CIEAEM-meetings grew to a big international forum.

Mathematics education as a scientific discipline and a reflective practice

The changing conditions for teaching and learning mathematics by extending compulsory schooling, and the increase of school population in advanced secondary education raised a growing interest in research in mathematics education. The influence was noticeable in the themes of and contributions to CIEAEM-meetings. CIEAEM became more attractive to not only a European, but also a broader international audience: for colleagues from non-industrialised and socialist countries, and also more and more for primary and secondary school teachers. Since the 80s, the number of participants and the diversity of countries represented at CIEAEM increased and the relevance of the themes and the quality of presentations and discussions, in particular the collaboration between practitioners and researchers at CIEAEM meetings, improved substantially. Ups to 400 participants from about 35 countries from all continents of the world now consider CIEAEM-meetings as important and prominent events.

Developments in mathematics education as a scientific discipline and reflections within CIEAEM changed the topics and subjects of themes for the meetings, the research fields and the debates. Shifting from a concentration on content and methodological questions in mathematics education themes later addressed broader epistemological, psychological, sociological and technological problems. Among those the conditions of the educational environment (interaction, evaluation, and assessment) and the problems in connection with newly developed technologies and their effect on content and on the learning and teaching environment of schooling received a major emphasis.

Strong links between scientific knowledge and craft wisdom in CIEAEM

Since the beginning, creating links between scientific knowledge and craft wisdom and reinforcing the collaboration of mathematics education research and practice have been at the heart of CIEAEM and not a mere by-product. This is what distinguishes the organisation from other and is reflected in all of its work and at all the meetings. Currently, however, in many countries there is an increasing polarisation between practitioners and researchers and mathematicians and mathematics educators. Politicians find this an attractive situation and take advantage of it by using the division to minimise academic "interference" in their agenda for education, for example in furthering back to basics approach. In response to TIMSS and economic globalisation, there is a tendency to want to standardise curriculum across groups of countries based on economic grouping in order to compete with each other. CIEAEM can be and should take a very strong position to help improve both, the quality of mathematics teaching and learning as well as the research in mathematics education. In this way it can also help to protect other academic organisations from anti-intellectualism permeating into governmental policies on education.

Peculiar Features of CIEAEM

The particularity of CIEAEM can be best described by addressing four distinctive characteristics: the themes of the meetings, the specifically designed activities on the meetings, the composition of the group of participants, and the two official languages used in parallel in all activities: English and French. Various forms of working and deliberate and secured support in foreign language provision to all participants by the Commission allow to facilitate and effectively realise the exchange and the debates at the meetings and to connect individual and collective contributions into long-term co-operation. In the friendly and exciting atmosphere of CIEAEM meetings many common projects have started and were encouraged and continued beyond the meetings.

- Themes of the Meetings/ Les Thèmes des Rencontres

Each meeting of CIEAEM is organised around a commonly agreed *theme* addressing generally important or especially relevant problems. Prior to the conferences, themes are outlined and substantiated by related aspects in form of discussion papers or basic texts, together with proposals for sub-themes and questions to be worked on prior to and during the meeting.

- Working Groups/ Les Groupes de Travail

The major constituent of the meetings are the *working groups* which bring together teachers, teacher educators, and researchers from various institutions working in the fields of mathematics, history of mathematics and education, psychology, sociology and philosophy. Working groups focus on a specific sub-theme or on relationships among sub-themes, reflecting the collective and commonly shared input; they allow participants to follow up issues in-depth, to go into details and to create links between experiences and research questions. Discussions, exchange of experiences, problems, and views are prepared in form of individual and collective presentations or workshops. Animators who ensure language provision and mark new questions, research desiderata or proposals for common projects and practical experiments to be presented at the end of the conference direct the working groups. The working groups are the "heart of the conference".

- Plenary Lectures/ Les Plenières
The *Invited Plenary Lectures* serve as a commonly shared input to the meeting as a whole and to the discussions in the working groups. According to the preferences, research areas and experiences of the speakers they offer a special "bouquet" of approaches to the theme. Speakers are chosen from within CIEAEM as well as from outside, reflecting diversity in views and perspectives.

- Individual and Collective Presentations/ Les Présentations Individuelles et Collectives
Individuals or small groups of participants are invited to contribute to the theme of meeting or to a sub-theme by an oral *Presentation* by presenting their ideas, their research work and their experiences with others. Pertinent and significant research links to the theme of the meeting should be demonstrated. Relevant case studies that offer specific potentialities are particularly welcome. Presenters involve, whenever appropriate, their colleagues in questions or even short activities for the participants.

- Workshops/ Les Atéliers
The *Workshops* represent a more extended kind of contributions prepared and organised by individuals or small groups: they focus on concrete activities and encourage active participation by working in groups or individually on provided materials, problems, or particular and concrete questions in connection with the sub-themes.

- Forum of Ideas/ La Foire des Idées
The *Forum of Ideas* offers the opportunity to present case studies, systematically documented learning materials, and recent research projects as well as current ideas or debates which are not directly related to the theme or sub-themes. The forum of ideas is often located in an exhibition room.

- The Constitution and the Newsletter of CIEAEM/ La Constitution et le Bulletin de la CIEAEM
Since 1992, CIEAEM has established an additional means for the communication among Commission members: the publication of a Newsletter for internal discussion. This opened up a forum for written exchange of problems and of questions to be dealt with, of policy-statements, and various kinds of interesting ideas e.g. themes for future meetings. The language of the Newsletter is English and French. Since 1996 CIEAEM has an officially agreed constitution and since 2000 a legal status as a non-profit organisation for the study and improvement of mathematics education.

- The composition of the group of CIEAEM-participants
CIEAEM-meetings are a working place where teachers and researchers debate and collaborate intensively in an engaged and stimulating climate. Continuous exchange of research work, practical experiences and views around real problems and crucial themes raise critical and constructive discussions on developments in research in mathematics education as well as in educational policy and practice in schools and teacher education institutions. Practitioners and researchers are treated as equal partners in this collaboration. CIEAEM emphasises that links between research and practice have to be re-constructed continuously by mutual efforts, and that changes in mathematics education have to be nourished by both, practice and theory, by critique and transformation of practice as well as critique and application of research into educational development.

PART II: WHERE TO GO

Developing "Mathematics for All" and "Mathematical Literacy"

In this "Manifesto 2000", we wish to address new (and old) policies concerning mathematics education in various parts of our world: We aim at an agenda for future activities rather than a balanced account of achievements and limitations of mathematics education. What are the strategies in research and practice that support developing and providing essential and appropriate teaching and learning opportunities, that ensure access to all levels of institutionalised schooling in the elementary, secondary, tertiary sector of education and in non-academic adult education? How to create appropriate social conditions to establish a teaching and learning practice guided by principles of social justice and equity? In what follows, questions and ideas are raised which might guide future work

Recovering awareness and support of the democratic society

International comparative studies like TIMSS have raised public debates about school mathematics and prompted a loss of social appreciation, distrust and accusations. This more recent trend adds to the old critique complaining that education and employment system do not match. Another critique denounces insufficient learning opportunities and a lack of transparency of the assessment system that particularly concerns mathematics as the prominent means of selection in the educational system. In fact, the role of mathematics in society is constantly changing: for the society as a whole mathematics is more and more influential and powerful, for the individual at the same time it becomes much less "visible".

The transition of mathematics education from an elite orientation to a mass education, first politically celebrated as the democratisation of education and a success of the social justice movements of the 60s and 70s, today is discredited. It is considered with suspicion, disgust and accusation. This led to a loss of social recognition of mathematics teaching and contributed to the prevailing notion of education as a social burden, a social cost. Education is in danger of being no longer perceived as a public duty or vital public service. The effect of mass education on various economic and social issues, and institutional responses to external needs and demands are very controversially discussed. In the public discourse, education institutions are not only expected to make provisions for an ever growing number of traditional students - although under conditions of reduced budgets - but also to a wider variety of people from all age groups and in different stages of life. Apart from changing labour market demands for new, extended or upgraded qualifications, education institutions are scrutinised more often than in previous decades in terms of their contribution to local, regional, national and even global social and economic needs. Public service, technology transfer, wealth distribution, solutions to various problems, production of a highly qualified workforce, reduction of inequality ... to name but a few of the multitude of expectations and demands.

- How to regain social recognition of mathematics education as a social task and a public service? How to develop public involvement and participation in mathematics education? In many countries, non-formal and non-academic adult education is a strong force for democratisation and change, how to support these activities?
- How to gain systemic change which is not restricted to just formalised structural change, but occurs on the level of meaning and culture, of social justice commitments? Is there a chance to regain the support of extra-institutional agents for change such as parents, peer groups, employers or others? Should that influence be counter-balanced? Can we better address particular problems and consider the poor and non-industrialised countries? How to build and share democratic competencies, but avoid cultural imperialism?

Changing social and political views about mathematics education

Mathematics still is one of those school subjects that provoke strong feelings of anxiety, aversion and incompetence. Pupils (and teachers) still dislike school mathematics as a compulsory enterprise without significance for them. How can a subject raise such strong emotions and block both, interest and ability to think mathematically? Why is mathematics for a majority of pupils so meaningless and difficult that they consider themselves as "mentally handicapped" in mathematics, as doomed to failure? Mathematics still is associated with "giftedness" by parents and pupils, by teachers and politicians, making it an exclusive discipline. "Mathematical giftedness" or "talent", a "natural" ability to think mathematically, and hence a "natural interest" in mathematics then is obviously more often lacking than existing. And this transforms mathematics into a particularly appropriate means of social selection leading to increasing dislike and anxiety. Theories of mathematical giftedness entail attitudes to teach mathematics in a school for all to the few: only those that are gifted and "socially useful". For the sake of identifying the gifted, more selection and individual differentiation in terms of tests is justified, and the chances of collective learning experiences are ignored or neglected. As long as a social focus on the "gifted" persists, the majority will not be educated appropriately.

- Should we keep the highly selective framework and methods of mathematics education, but give up the privileged position of the subject as part of the core of general education? Or do we seek to keep mathematics at the core of the curriculum but find ways of teaching the subject to all students? How to overcome the limitations of this dichotomy?
- Can we still indulge or afford to conceive mathematics education as a special education for some few, and make it compulsory for all? Can we permit that the common learning of many pupils is hindered or even blocked by anxiety and frustration?
- The notions "mathematical ability", "individual differences" and the "gifted pupil" are ideologically collective constructions, based on convictions or prejudices, a possible vehicle of purpose and interest. Moreover, the

prejudice of "mathematical giftedness" readily associates itself to other hereditary features such as gender and ethnicity – how can we act against that?
- Is the perception of excellence or high achievement in mathematics different in different cultures, societies and communities, perhaps depending on class, gender and ethnicity? Does it respect social awareness and political responsibility? What are different strategies to counteract conflicts, lack of justice and equal treatment in teaching and learning mathematics in the classroom and in the school or broader society? What are the influences of changing social environments on the attitudes towards mathematics, and on the performance expectations of teachers and parents?

Teaching and learning to live in a mathematised world

The goals of general education, (in particular of secondary education) have changed - from a universal education (Bildung) for an elite to an education for all. This change implies a shift in the perspective of mathematics education: it is predominantly concerned with those members of the technologically determined mass society who are affected by the increasing "mathematisation" of all social domains as "victims", as passive participants in a play designed by others. Mathematical abstractions and formalisations applied to social reality create formal systems and hierarchies, formal models or ways of argumentation that eventually become quasi-natural social rules. By transformation into technology, application and continuous use, these formalisations turn into representations of "natural" social order and "natural" patterns of social organisation, institutions and regulations - a formatting of the society by mathematics has taken place. Mathematics education has to provide understanding of the processes of "mathematisation" in society. And it has to create a critical judgement about it, transparency of the part of mathematics played in social conditions and enlightenment about the social use of mathematics. How can mathematics teaching and learning be presented not only as an introduction to some powerful ideas of our culture, but also as a critique of ideas and their application? Do we teach about how mathematics is used in our society? Do we sufficiently understand in what ways, society is becoming increasingly "mathematised"?

- Who benefits from and whose interests are served by mathematics education today - is there a major change compared to 50 years ago? Who defines the economical demands and on which basis of information and analysis? Which are the changing needs of the labour market in terms of qualifications in mathematics?
- How to overcome the opposition of economic demands and social or pedagogical needs: should mathematics education be considered as part of general education or rather in a perspective of a professional training for some few?
- Who defines competencies to be provided by mathematics education: politicians, researchers, or teachers? If we recognise the fact that mathematics, by its social use and technological development, has become more implicit and invisible although more widespread as social and material technology, how is this reflected in mathematics teaching? What are the role of researchers, the school, and the teachers in these definitions of competencies?
- What kind of research in mathematics education may contribute to creating a new view of mathematics education practice? What impact can it have if the work of schools is more closely related to parents and assigns them an interventive role?
- Within schools, most, perhaps all, of the modelling processes dealt with seem to be actively and deliberately designed, developed and executed collectively and democratically, but is this the reality in our society beyond the school? How are pupils to be enabled to criticise models and modelling, including the formalised techniques that underpin so much of the use or abuse of mathematics in society?
- How to make the society aware that mathematics education could promote accountability and give full scope to a democratic vision to establish new forms of social contracts, communications, and discourse? That it could help to control decisions based on mathematical modelling? That it is crucial to competently understand, judge, and actively counteract the replacement of democratic political decisions by the mathematical and technological expertocracy? That mathematics education is a powerful tool in basic democratic virtues: to empower people to think critically and to adopt critical attitudes?

Reflecting realities and fictions: The promises of information technology

Within a few years the discussion in mathematics education about modern information and communication technology has changed completely: it has been overrun by the evolution of reality. Viewing the omnipresence of technology from nursery to nearly every area of life concerns for the "introduction to the use of computers" and a "basic understanding of programming" has become obsolete, use and understanding of its functioning have completely split. Now, considerations to one part aim at modern technology as a tool to support, facilitate, organise and rationalise learning and teaching. There are some promising examples which show how to improve the management of information and communication by new technologies for the students and teachers, to change roles of students and teachers in multi-media applications, to integrate aspects of distant education and virtual schools and universities, and to find new ways of differentiation of content in the "normal" teaching and learning mathematics.

With respect to the curriculum, content matter can be extended to subjects too complex for treatment in traditional instruction and in application and problem solving a much more appropriate simulation of reality is possible. By far less evident is how mathematics education should respond to the change going on in the notion of reality itself: the blending of the real and the virtual worlds, the loss of reliable discrimination of reality and its manipulation. A tremendous problem emerges from the fact that the new technologies open up unprecedented chances and risks in various fields like bio-technology and military development, based on models and simulations beyond theoretical comprehension and beyond the validity of existing empirical knowledge. No attempts have been made so far to furnish reliable intellectual and moral basis equipment to the coming generations that inevitably will have to deal with these challenges.

- How can the development and spread of new information technologies really give better access to mathematical knowledge for all? How can technology empower people to cope with problems of knowledge production, distribution, and appropriate use?
- What determines the goals behind the dissemination of new technologies: economic or social interests?
- If understanding of the social implications of the work of mathematicians and scientists has deteriorated as they become only elements in a segmented hierarchical system-like bureaucracy, how can lack of control be overcome?
- How can a basic recognition of the reach and possible consequences of scientific innovation be conveyed? Is optimism in this respect, as widely propagated, a virtue or a crime? Can mathematics education do anything about it?
- How do new technologies actually support the managing of information and communication by students, the creating and using distance education and virtual school and universities, new differentiation of content and organisation? How do they change the role and interplay of students, teachers and multimedia means by widespread use of technology?
- If we have to acknowledge that technology brought into the Third World mostly de-empowers people and continues their exploitation, how can mathematics education help in this situation? What does it mean to educate for knowing "what to do" instead of "how to do it" in mathematics? How could mathematics education emphasise the development of more judgement and wisdom than of particular skills?

Accepting the obligations of globalisation

In 1985, CIEAEM already asked for an inclusion of social and political dimensions within mathematics education, but it was at ICME VI in 1988, that for the first time the social and political dimensions of mathematics education were acknowledged by a broad international audience as a legitimate challenge, a matter of world-wide consciousness and recognition. One important focus was on analysing conditions and causes for the restricted teaching and learning opportunities for pupils of certain minority groups defined by gender, class, and ethnicity in industrialised countries; another one was the worrying fact that the majority of young people grows up under conditions of poverty, discontinuity and disruption in the non-industrialised world.

The primacy of economic aspects in the development of non-industrialised countries moulds their cultural development, education and mathematics education in particular. International co-operation risks to unwillingly deepening Euro-centred structures in education, thus carrying on cultural imperialism. Given the ubiquity of poverty and violence in a major part of the world, can co-operation in the field of mathematics education contribute anything to an escape from this situation?

European and international co-operation among education institutions has led to comparisons of institutions and systems, and to some adaptation in structures and contents, to enable exchange and recognition. Yet increasing co-operation goes along with a new spirit of competition which is not necessarily helpful for those at the lower end of the scale.

- How can communities with different political, cultural, and social conditions make ways to learn from each other more productively? What is required to overcome Euro-centrism and cultural oppression in mathematics teaching and learning, in the design of curricula, learning materials and learning environments?
- How can international co-operation more forcefully install partnership and equity in the debate, instead of more of a one-way type of transfer? What has to be done to make international exchange better match these requirements?
- How can we find a balance of lending our aid to those who welcome it without falling back to cultural imperialism? Would that imply a re-structuring of co-operation?
- What must be done to appropriately examine the impact of a transfer of ideas and experiences for other cultures? Is it possible to incorporate such examination in the modes of co-operation?
- Is it possible to discuss ideological biases and the oppression of minority groups in the same context as violence and poverty in the developing countries, and would that approach promise elucidation on the phenomena?
- What happens to cultural and social diversity by globalisation? Does internationalisation of mathematics education and globalisation equally respect the equity and autonomy of the partners in exchange and co-operation? What is the impact of competition among and within mathematics education institutions?

Coping with new claims of evaluation

In an unprecedented disposability of knowledge about educational systems world-wide, attitudes towards sacrosanct institutions, as national educational systems used to be, more and more give way to economically inspired approaches to education. Comparisons with other systems impose themselves; evaluation and quality management become key words for re-organisation. Moreover, as a counterbalance to globalisation and unification, a trend towards self-containment and a (relative) autonomy of smaller, local or regional units has emerged. In many countries, it is realised that the general steering of education institutions has to shift from full state control to what has been termed ‘remote control’. Institutions are expected to develop their own profile and new mechanisms of budget allocation. In this context, not only new approaches to institutional management and governance have to be and have already been developed but also new instruments to increase quality and performance and to achieve the agreed institutional goals. Evaluation became a key instrument for governmental steering in the face of deregulation, more institutional autonomy and a higher emphasis on accountability, involvement, engagement and the development of corporate identity. Traditional models of ex ante control of quality and peer review have frequently been exchanged for new and more complex modes of quality assessment, assurance and improvement, often involving external reviewers.

An actual, most controversial debate concerns the quality of teaching and learning mathematics. What are the criteria or methods of evaluating quality in teaching and learning mathematics? Quality management proves to be more effective for institutional management and administration in education than for issues of teaching, learning and research. The effects of recent developments on the structure and content of mathematical curricula can be described by a number of trends which tend to be similar in many countries: assessing quality of teaching, learning and research; attempts at definition of standards; a shift towards learner orientation and assessment of learning outcomes, evaluation to be more continuous, and attempts to upgrade good teaching in the value hierarchy of academic reputation.

- How to deal with measures of setting common standards, either by tests, "world examinations" or by benchmarking in mathematics education? Do we need "world-standards" and what is the benefit and for whom? Who will be the winner and the loser if performance-based criteria and methods for distribution of resources for teaching and research are generally applied?
- Creation and application of new methods for the organisation and assessment of teaching and learning mathematics such as modularization, diversity of access and multiple exit points: is there any substantiated consideration of the pedagogical effects implied?
- Do we have evidence that standards improve the learning of mathematics and what is their impact on social and cultural conditions of learning? What kind of mathematics is referred to in those standards? How do standards match the social images of mathematics, and the social expectations and values of the use(rs) of mathematics?

CIEAEM: An agenda for action

Over the 50 years to which amount the activities of CIEAEM, mathematics education has considerably developed towards a scientific foundation and understanding of its subject, issues, and goals. During this period research occasionally tended to more detached positions, at times turning strongly towards mathematics as a science, or to psychology, and epistemology. The unique construction of CIEAEM was meant to forcefully hold on course: the orientation towards a real and concrete improvement of mathematics education. Bringing together researchers, educators and teachers, research has not been allowed to go on for its own sake only, and practitioners have not been allowed to indulge in simplistic approaches. CIEAEM insists on research responsibility and on broadening the horizon of practice.

Similarly, mathematics education is going on in a tension of growing internationalisation and national, regional, even local self-sufficiency. Spectacular international projects make headlines, but their adaptation into regional structures is rarely guided. Co-operation is announced, but eventually a spirit of competition is created. A few may benefit from this type of project, the lower ranking majority is more likely to draw the wrong conclusions from the outcome of such studies. Here again the very structures of CIEAEM secure a different approach: Internationalisation is not a single project or event, it is an on-going process. In fact it is a prominent feature of CIEAEM conferences that a major part of its members attend to the meetings continuously over many years, thus guaranteeing a follow up of ideas, projects, and their transfer into practice. International orientation is complemented by anchoring CIEAEM meetings in the regional mathematics education scene of the places where they are arranged. Careful preparation and substantial pre-structuring of the commonly adopted theme bring together the international steering commission and the local organising committee. An interesting regional audience is addressed, and often participants join further activities of CIEAEM subsequently. Thus the international scope of orientation is continuously linked to "home" aspects of mathematics education. Competition within CIEAEM means the efforts of organising committees to make every meeting more successful, more substantial, and more memorable than the previous ones.

From its history, CIEAEM is a European creation. However, the particular scheme of CIEAEM has more and more attracted participants from less- or non-industrialised parts of the world. Their views and concern occupy an ever-growing part of CIEAEM activities and open up exciting – and worrying – perspectives to mathematics education as a global enterprise. CIEAEM faces the dilemma to exchange and share views, to offer aid and to co-operate in solutions without imposing Euro-centred views, and without fostering cultural alienation. The experience of CIEAEM is that mutual understanding, human and professional esteem, and an honest and attentive discourse overcome these risks. Seriosity of work, the "family"-character of meetings, and the continuity of contacts have proved to be assets of CIEAEM.

We recognise that the CIEAEM approach by its very structure forbids dramatic performance in the public, which mainly make sensation. This, however, is more likely to arouse political interest, and political action. So we strive for strengthening our position otherwise.

- CIEAEM wishes to actively promote (develop and make public) a research agenda in mathematics education reflecting its roots in classroom practice. The agenda of CIEAEM activities is to include a research framework that would make the diversity of its participants a feature of strength; it also informs politicians and policy makers of what their priorities should be.
- We wish to inform, influence and support teachers, graduate students and researchers in the selection of worthwhile topics for research in mathematics education. We want to support those who apply for funds from government and non-government agencies by providing them with a helpful framework for writing proposals.
- We wish to inform discussions between mathematicians and mathematics educators using our special practice-based approach. CIEAEM is to provide a mathematics education contribution to debates on educational research. We wish to support the establishing of mathematics education as a discipline that serves to critique theory as well as to provide a contribution to practice.

- CIEAEM wishes to develop new and powerful ways of communication among all engaged and actively involved in important issues of mathematics education research and practice and to offer a forum for debates and collaboration.

Join CIEAEM in order to enrich and strengthen our position and to succeed in our endeavours!

Past Meetings of CIEAEM:

1. August 1950; Debden (UK):	Relations between secondary mathematical curricula and intellectual capacity development of adolescent
2. April 1951; Keerbergen (B):	The teaching of geometry in the first years of secondary schools
3. August 1951; Herzberg (CH):	The functional curriculum from kindergarten to University
4. April 1952; La Rochette (F):	Mathematical and mental structures
5. August 1952; Wellerbach (L):	Relations between mathematics teaching ,modern science and technique requirements
6. July 1953; Calw (D):	The connections between the pupils thinking and the teaching of mathematics
7. August 1954; Oosterbeek (NL):	The modern mathematics at school
8. April 1955; Bellano (I):	The pupil coped with mathematics. A releasing pedagogy
9. August 1955; Ramsau (A):	The probabilities and statistics teaching at the university and the school
10. August 1956; Novi Sad (Y):	The primary school teachers training
11. April 1957; Madrid (E):	Teaching materials
12. August 1958; Saint Andrews (UK):	The question of problems in the mathematics teaching
13. August 1959; Aarhus (DK):	The Universities and the schools coping with their mutual responsibilities
14. August 1960; Krakow (PL):	Basic mathematics
15. July 1961; Founex-Coppet (CH):	Languages of the mathematics
16. August 1962; Morlanwelz (B):	Experimental and axiomatic attitudes in the teaching of the mathematics
17. August 1963; Digne (F):	A reconstruction of the mathematics for those between 10 and 18.
18. August 1964; Oberwolfach (D):	Contribution of psychology to a modern mathematical teaching
19. April 1965; Milano Marittima (I):	The place of the geometry in a modern mathematical teaching
20. April 1966; Dublin (IR):	First steps in calculus in a modern mathematical teaching
21. April 1967; Gandia (E):	The teaching of the mathematics for those between 6 and 12
22. August 1970; Nice (F):	Progress in mathematics since 1945. Study of new concepts
23. August 1971; Krakow (PL):	The mathematical logic at school
24. August 1972; Morlanwelz (B):	Algorithmic thinking in the school teaching.
25. August 1973; Québec: (CND):	The mathematical activity development in the education
26. August 1974; Bordeaux (F):	Probabilities and statistics in the primary and secondary education
27. August 1975; Tunis (Tunisie):	Teaching mathematics, why?
28. August 1976; Louvain-la-Neuve (B):	Some questions related to the use of problems in the teaching of mathematics
29. August 1977; Lausanne (CH):	Evaluation in the teaching of mathematics
30. August 1978; Santiago (E):	Connections between mathematics education and the subjects to which it serves and from which it is induced
31. August 1979; Veszprem (H):	Mathematics for all and for everyone.
32. July 1980; Oaxtepec (Mexico):	Mathematical and pedagogical aspects of mathematisation and applying mathematics.
33. August 1981; Pallanza (I):	Processes of geometrisation and visualisation
34. August 1982; Orléans (F):	Means and materials for the teaching of mathematics
35. August 1983; Lisboa (P):	Mathematics education in relation to the reality of schools and society
36. April 1984; Frascati (I):	Restricted meeting: Aims, priorities and future modes of action
37. August 1985; Leiden (NL):	Mathematics for all ... in the computer age
38. August 1986; Southampton (UK):	Mathematics for those between 14 and 17, is it really necessary?
39. August 1987; Sherbrooke (CN):	The role of errors in the learning and teaching of mathematics
40. July 1988, Budapest (H):	Restricted meeting: Structure and politics of the commission.
41. August 1989; Bruxelles (B):	Role and conceptions of mathematics curricula
42. July 1990; Szczyrk (PL):	The teacher of mathematics in the changing world
43. July 1991; Locarno (CH):	Restricted Meeting of the Commission: Preparation of the future meetings
44. August 1992; Chicago (USA):	The student confronted by mathematics
45. July 1993; Cagliari (I):	Assessment focussed on the students
46. July 1994; Toulouse (F):	Graphical and symbolical representation in mathematics education
47. July 1995; Berlin (D):	Mathematics (education) and common sense
48. July 1996; Huelva (ES):	Restricted Meeting of the Commission: Constitution of CIEAEM
49. July 1997; Setubal (P):	Interaction in the mathematics classroom
50. July 1998; Neuchâtel (CH):	Links between theory and practice
51 July 1999; Chichester (GB):	Cultural diversity and mathematics education
52. April 2000; Amsterdam (NL):	Restricted meeting of the Commission: Preparation of the future meetings

Future Meetings:

53. July 2001; Verbania (I) :	Mathematical Literacy in the Digital Era
54. July 2002; Spain:	Mathematics Education between practical life and mental construction.

CIEAEM
Commission Internationale pour l'Etude et l'Amélioration de l'Enseignement des Mathématiques

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