

Commission Internationale pour l'Étude et l'Amélioration de l'Enseignement des Mathématiques

International Commission for the Study and Improvement of Mathematics Education

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CIEAEM 53

Verbania, Italy, 21-27 July 2001

Mathematical Literacy in the Digital Era

***Research, teacher education and classroom practice
aimed at a mathematics education for all***

Conference Venue

Istituto Tecnico Industriale Cobianchi
Piazza Martiri di Trarego
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Introduction to the theme and the sub-themes of CIEAEM 53

Mathematical Literacy in the Digital Era

Literacy has been always related to social demands. Until mid 20th century, the curricular emphasis on proficiency in the three R's, i.e. basic skills in reading, writing, and arithmetic, seemed to be appropriate for the needs of the industrial society. A more profound education, in particular a deeper insight and understanding of advanced mathematics, was considered for a long time to be important only for those few who were able to pursue advanced (mathematics and science) studies in higher education strands, for an elite that aimed at occupying the top professions in society.

Today, our civilisation has become increasingly mathematical. Mathematics is involved in the national defence, medical diagnoses, measurements of intelligence, credit cards, census sampling, managing stock portfolios, encryption, designing new cars - the list could be extended indefinitely. There is every reason to think that the trend will continue for the foreseeable future. To be able to understand the world that is increasingly shaped by mathematics one has to understand mathematics. The need to understand, to be able to competently use and judge about mathematics therefore has increased to an extent that has never been before. To be able to competently participate in society's affairs and to acquire mathematical competencies demanded at work places, a mathematics education is needed that is based on a fundamental change of perspectives: from an emphasis on basic skills to mathematical problem solving, to mathematical applications and to critical reasoning. Mathematics education can no longer be restricted to an elite education but has to be conceptualised as a mathematical literacy education for all.

Mathematical literacy does not only refer to the social, but also the cultural aspect of mathematics and mathematics education. To be mathematically literate means to understand mathematics as a part of the cultural heritage. Mathematical experiences have to be offered to all students that include knowledge about the cultural and historical background of mathematics.

The concept "mathematical literacy" is closely related to the notion of "evolution", i.e. continuous development and change, and deeply connected to a continuous improvement of mathematics teaching and learning and the consciously reflected use of technology. The concept "mathematical literacy" is dynamic: we can not say once and forever what constitutes *literacy*. To be mathematically literate depends highly on societal needs and demands and on scientific and technological development. What determines mathematical literacy can not be decided without analysing current social demands and specific features of society and discussing how mathematics education can provide a fundamental understanding of the processes of 'mathematisation' in society (CIEAEM Manifesto 2000). Mathematical literacy also is focussed on the idea of "mathematics as a human and social activity". Thus mathematical literacy has to be conceived as a *functional* literacy that emphasises a) the importance of certain competencies defined by societal needs and b) the accomplishing of concrete tasks as competencies have to be effectively applied.

When trying to analyse the concrete features that characterise the concept of mathematical literacy and makes it a functional literacy, we have to go into more depth and search for its implications at the level of school practice, curricular development, teacher education and research, and consider the relationship between the different levels and issues. We need to understand the concrete features of a mathematics education that prepare all students to live, understand and act critically in a modern mathematised society. We also need to understand the implications of a mathematics education providing mathematical functional literacy at the different levels: curriculum, classroom-practice, in-service and pre-service teacher education, and use of technology. Finally, it is important to discuss how research can contribute to a determination and concretisation of mathematical literacy and how research can enlighten us as mathematics educators and enable us to take effective practical actions.

We are aware that mathematical literacy involves many other related issues not yet addressed. However, by identifying some questions, and organising them under sub-themes of the main theme, we hope to facilitate contributions to and discussions in each working group. Each working group will focus on a given sub-domain of problems, taken as a starting viewpoint to approach our common theme. This is the role of sub-themes. We begin by presenting them in a table that emphasises their relationship. In what follows, we offer a brief discussion about each sub-theme and propose a group of key questions.

The relations between the sub-themes

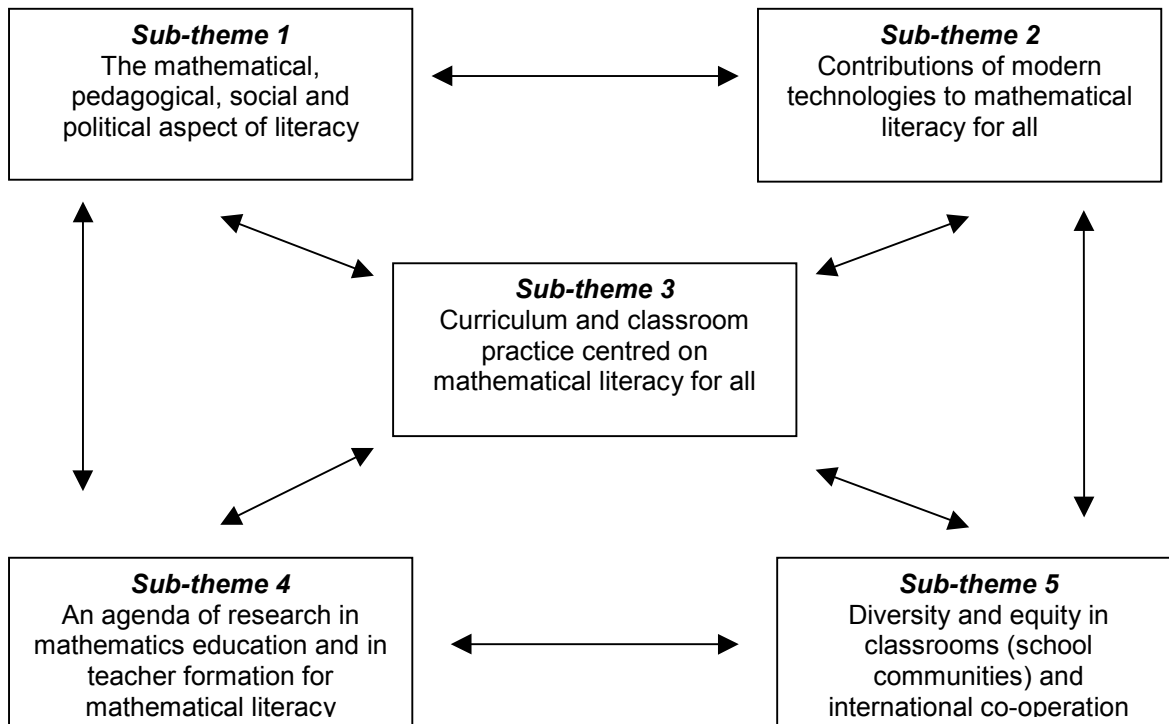
Sub-theme 1: Mathematical, pedagogical, social and political aspects of literacy

Sub-theme 2: Contributions of modern technologies to mathematical literacy for all

Sub-theme 3: Curriculum and classroom practice centred on mathematical literacy for all

Sub-theme 4: An agenda of research in mathematics education and in teacher formation for mathematical literacy

Sub-theme 5: Diversity and equity in classrooms (school communities) and in international collaboration



Plenaries

The programme includes plenary sessions where an invited speaker will focus on aspects of the conference theme. The plenaries provide a commonly shared input to the conference and form a basis for discussions in the working groups. The speakers will interpret the conference theme from the perspectives of their own experiences and research areas.

Plenary speakers:

- . *Paulo Abrantes* (P), University of Lisboa
- . *Luciana Bazzini* (I), University of Torino
- . *Emma Castelnuovo* (I), Rome
- . *Jeremy Kilpatrick* (USA), University of Georgia
- . *Richard Noss* (UK), Institute of Education, London University

Working Groups

Each participant is invited to be a member of one of the working groups that will meet every day. Working groups will focus on a specific sub-theme or on a number of interrelated themes. This will provide opportunities both for in-depth discussions and for the linking of experiences. These are planned as interactive sessions and are the heart of the conference. Some presentations may be included in these sessions but discussions and exchange of experiences and ideas are the essential aspects of this work. Each group will be directed by two “animators”.

Oral Presentations and Lectures

Individuals or small groups of participants are encouraged to contribute to the conference through an oral presentation, thus communicating and sharing with others their ideas, research work or experiences. Relevant case studies are particularly welcome. Presentations should be related to the theme of the conference in general or to the sub-themes. There will be 20 minutes available for each presentation followed by an approximate 10 minute discussion. There will be some invited lectures and presentations, as well.

Workshops

Individuals or small groups of participants are also encouraged to prepare and organise workshops, a more extended kind of contribution which should focus on concrete activities and encourage the active involvement of the participants by working on materials, problems or questions relating to the sub-themes. A workshop will last for about 1:30h.

Forum of Ideas

The Forum of Ideas offers an opportunity to present case studies, learning materials and research projects as well as ideas that are not directly related to the theme. Participants are encouraged to display their work in the exhibition hall. There will be a specific time for contributors to explain and discuss their work with fellow participants.

Special sessions

There will be some special sessions that will enrich the discussion by presentations of country-specific views on recent developments in mathematics education.

Call for Papers

We hope that all participants will contribute “actively” to the conference by sharing with others their experiences and views in the various sessions, particularly in the working groups.

Moreover, you are encouraged to send a proposal for an oral presentation or an atelier, or to bring a contribution to the Forum of Ideas. In order to do that, you have to fill in the participation form and send it back before

February 28, 2001.

Proposals for oral presentations and workshops can be made by sending a two page abstract, before February 28, including:

- Title, authors’ names and affiliations
- Central idea, methodology and the expected conclusions
- Bibliographical references related and essential to your proposal

The language of the abstract should be the same as that of the presentation. Once your proposal will be accepted you will need to prepare an abstract or summary in the other official language together with overhead projector transparencies in both languages.

Please send us a computer file (if possible using Word for PC saved as .doc or .rtf) with your proposal:

-by post to: Prof. Claudia Testa, Secretary of CIEAEM53
Dipartimento di Matematica
Via Carlo Alberto, 10
I-10123 TORINO

or

-by e-mail to: cieaem53@dm.unito.it

or

-by fax: Prof. Claudia Testa, Secretary of CIEAEM53
Dipartimento di Matematica
TORINO
Fax +39 011 6702878

If you have to send your proposal by fax, please use fonts like Arial or Geneva in at least size 14 to make it readable for the receiving International Program Committee.

For a contribution at the **Forum of Ideas**, you have to send us one page with a title, authors' names and affiliations and a short description of the type of material to be presented (poster, models, video) The deadline is **30 April, 2001**.

Official Languages of the Conference

The official languages of the conference are French and English. Everyone is asked to speak slowly and clearly so that all participants can understand and contribute to discussions. All speakers must prepare their transparencies in both languages. We rely on and appreciate the help of those who can translate, to assist their colleagues within each working group. Animators - in most cases - are able to help in both languages.

Provisional programme

	Saturday, 21	Sunday, 22	Monday, 23	Tuesday, 24
9:00		Opening Session	Plenary 3	
9:30		Plenary 1		
10:00			Coffee break	
10:30		Coffee Break	Working groups	
11:00		Plenary 2		
12:30				Whole day excursion
13:00		Lunch	Lunch	
14:30		Working groups	Parallel lectures	
15:00	Registration and Welcome			
15:30	Reception from 17.30	Coffee break	Coffee break	
16:00	to 21.00	Workshops	Forum of ideas	
19:30		Official reception		
	Wednesday, 25	Thursday, 26	Friday, 27	
9:00	Plenary 4	Plenary 5	Reflection on the conference	
10:00	Coffee break	Coffee break	Coffee break	
10:30	Working groups	Working groups	Closing ceremony	
13:00	Lunch	Lunch		
14:30	Workshops	Workshops		
16:00	Coffee break	Coffee break		
16:30	Parallel lectures	Special session		
20:00		Conference Dinner		

Social Events

On July 21, the registration and a welcoming reception will start at 17.30. This is the moment to establish the first contact with the conference participants and to meet old and new friends.

On July 22, the participants will be welcomed in an official reception at 19.30 by the municipality of Verbania

A whole day excursion will be organised on July 24 for all participants and accompanying persons. We will visit some beautiful places of the Lago Maggiore. Lunch is included.

A special dinner is offered to all participants and accompanying persons on July 26.

Accompanying persons

Accompanying persons are invited to participate in all social events of the Conference, together with the participants. Moreover, some special tourist activities will be organised for them. Further details will be included in the Third Announcement.

Registration and conference fees

If you wish to participate in the international conference of CIEAEM 53 in Verbania and receive the Third Announcement you have to fill in the included **registration form** and send it back **by 28 February**. **By the same date** you are kindly requested to **pay the registration fee**. If you want to make a reservation in one of the hotels included in the hotel list you must **fill in the accommodation form** and send it back with the deposit of one night to the secretary of CIEAEM53.

You can pay the registration fees:

-by money transfer on the following bank account

BANCA POPOLARE DI INTRA
ABI 05548, CAB 22410, SWIFT CODE BPINIT24, ACCOUNT 138824 (CIEAEM 53)

-by credit card (**only** if you register on line)

If paying by money transfer, please send a copy of a corresponding document where your name is indicated, as soon as you make the transfer.

If for any reason you cannot participate, your conference fee will be reimbursed by June 15, in case of later cancellation than June 15, reimbursement will not be possible.

Registration can be done by sending the registration form to the secretary of CIEAEM53 or by on-line registration.

Registration on-line is possible (and encouraged) from 1 February, 2001 onwards.

The registration fee includes all documents for the conference and the proceedings. **The payment of the registration fee is a necessary pre-condition for the evaluation and acceptance of submitted papers.**

The conference fee includes coffee and lunch every day and all social activities for both, participants and accompanying persons (except children under the age of 12).

Registration fee for conference participants is 200.000 Lire (104 Euro); for accompanying persons (except children under the age of 12) is 80.000 Lire (42 Euro) if you pay by bank transfer. If you pay by credit card you have to increase the amount by 5%.

The conference fee is 260.000 Lire (135 Euro) if you pay by April 30, 2001, by bank transfer, and 135 Euro (plus 5% - if you pay by credit card), it will increase to 330.000 (170 Euro) if paid after April 30, 2001.

PARTICIPANT	REGISTRATION FEE	CONFERENCE FEE
	Money transfer	Money transfer
	200.000 Lire	260.000 Lire (before April 30) 330.000 Lire (after April, 30)

ACCOMPANYING PERSON	REGISTRATION FEE	CONFERENCE FEE
	Money transfer	Money transfer
	80.000 Lire	260.000 Lire (before April 30) 330.000 Lire (after April, 30)

Accommodation and hotel reservations

The organising committee has made arrangements for special rates for all colleagues and accompanying persons at several hotels. Some arrangements in hostels have also been made.

For reservation, please complete and send back the hotel booking form **by February, 28, 2001** to Claudia Testa, secretary of CIEAEM 53, as well as a **deposit of one night** (according to the price of your first choice accommodation) to confirm reservation.

Location

The territory of Verbania stretches along the shores of Lake Maggiore and extends up into the surrounding hills, that rise gently up towards the alpine peaks. The area boasts a mild climate and offers the visitor the opportunity to enjoy nature first-hand through boating excursions, visits to its gardens and hikes in the nearby mountains. Other tourist attractions include first-rate museum, and a number of impressive examples of religious art and architecture.

Verbania is the ideal starting point for excursions to Val Grande National Park, Monte Rosa and the Ossola Valleys. The town also offers a well-developed range of accommodation to satisfy every visitor's taste and pocket: from first-class hotels and holiday flats to youth hostels and campsites. Numerous restaurants, trattorias and farmhouse kitchens offer typical dishes representative of regional cooking.

Verbania can be reached as follows:

By plane: the nearest airport is **Milano Malpensa**.

By train : line **Milano – Domodossola**

By car : Highway **A26**

Important Dates

28 February 2001:	Deadline for sending the participation form, registration fee and proposals for individual and group presentations.
April 2001	Response from the International Programme Committee with acceptance of presentations or proposed modifications
April 30, 2001	Deadline for reduced conference fee. Deadline for proposals for Forum of ideas
June 2001:	Sending of Third Announcement to participants already registered.
June 15, 2001	Deadline for cancellation with reimbursement.

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HOTEL LIST

All prices are in euro per person per day

Hotel	Price for room (breakfast included)	
Hotel Pallanza **** (Bus)	Single room	140.000 Lire (72 Euro)
	Double room (one person)	180.000 Lire (93 Euro)
	Double room (two persons)	210.000 Lire (109 Euro)
Hotel Ancora **** (Walking distance)	Single room	130.000 Lire (67 Euro)
	Double room (one person)	180.000 Lire (93 Euro)
	Double room (two persons)	200.000 Lire (104 Euro)
Hotel Europalace **** (Bus)	Single room	100.000 Lire (52 Euro)
	Double room (one person)	140.000 Lire (73 Euro)
	Double room (two persons)	160.000 Lire (83 Euro)
Hotel Belvedere *** (Bus)	Single room	120.000 Lire (62 Euro)
	Double room (one person)	150.000 Lire (78 Euro)
	Double room (two persons)	160.000 Lire (83 Euro)
Hotel Miralago *** (Walking distance)	Single room	80.000 Lire (42 Euro)
	Double room (one person)	110.000 Lire (57 Euro)
	Double room (two persons)	150.000 (78 Euro)
Hotel Pesce D'oro *** (Bus)	Single room	90.000 (47 Euro)
	Double room (one person)	110.000 Lire (57 Euro)
	Double room (two persons)	150.000 (78 Euro)
Hotel Residence Zust *** (Bus)		
	Double room (two persons)	160.000 Lire (83 Euro)
Centro S.Francesco (Walking distance) Hostel	Accommodation in multiple room	25.000 Lire (13 Euro) for each person
Villa Congreve (Bus) Hostel	Accommodation in multiple room	30.000 Lire (16 Euro) for each person, bus included +hostel-card: 30.000 Lire

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REGISTRATION FORM

(Please use Block Capitals)

Participant:

Surname: _____ First Name: _____

Address: _____
Country _____

Phone: _____ Fax: _____

Email: _____

Institution: _____

Accompanying Persons:

Surname: _____ First Name: _____

I would like to receive the next document in: English French

I can speak: English French Both English and French

I am interesting in the sub theme :

Payment form

I enclose payment for registration : registration fee
conference fee TOTAL

By Money transfer to Bank account.....

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Please send this registration form to :

Claudia Testa, Secretary of CIEAEM53
Dipartimento di Matematica,
Via Carlo Alberto, 10
I-10123 TORINO

email: cieaem53@dm.unito.it

**IF YOU WANT TO PAY BY CREDIT CARD, PLEASE USE THE
REGISTRATION ON LINE FORM**

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ACCOMMODATION FORM

Surname First Name:.....

Address:.....

Phone:..... Fax:.....

E-mail:.....

- I wish to book accommodation in

1^ choice.....

2^ choice.....

3^ choice.....

fromto (.....nights, depart)

- I wish to book a room for

1 person 2 people(double bed).....2 people sharing a room(twin beds)..... More people.....

Please indicate the name(s) of the person(s) with whom you are sharing

.....

Payment form

II enclose payment for accommodation deposit

By Money transfer to

BANCA POPOLARE DI INTRA
ABI 05548, CAB 22410, SWIFT CODE BPINIT24, ACCOUNT 138824 (CIEAEM 53)

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