

# Seventh Symposium on the Study on Mathematical Work

## Second announcement

Dates : Du 27 juin au 2 juillet 2022  
Lieu : INSPE de Strasbourg, France  
Langues du Symposium : Anglais, Espagnol, Français  
Institution organisatrice : Université de Strasbourg et LDAR, France  
Site Web : <https://etm7.sciencesconf.org>

Fechas: Del 27 de junio al 2 de julio de 2022  
Lugar: INSPE de Estrasburgo, Francia  
Idiomas del Simposio: Español, Francés, Inglés  
Organización: Universidad de Estrasburgo y LDAR, Francia  
Sitio Web: <https://etm7.sciencesconf.org>

Dates: From June 27 to July 2, 2022  
Place: INSPE of Strasbourg, France  
Languages of the Symposium: English, French, Spanish  
Organizing Institution: University of Strasbourg and LDAR, France  
Website: <https://etm7.sciencesconf.org>

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### Organization of the Symposium

ETM meetings are international symposia organized into working groups, the work being based on the participants' contributions. The *Symposium* formula stimulates exchanges of ideas and enables the development of a scientific community with common interests.

The Symposium will be carried on for six days, in three languages (English, Spanish, French) as in the previous ETM meetings. Each oral communication and poster will be produced in one of these three languages; oral presentation will be supported by a slide show written in one of the other two languages.

The meeting will be organized around four main topics and each contribution should deal with one of these topics. The number of participants is limited to 25 by topic, in order to ensure greater interaction and discussions. Each topic of the symposium will be introduced by a plenary presentation recalling, in particular, the achievements of previous symposia, and sharing activities between the themes are also planned.

The organization of the symposium will aim to encourage the presence and exchanges between the participants. **The symposium includes hybrid arrangements so that some university centres in other time zones (e.g., Valparaíso, Lima, Mexico City) can host participants who will thus contribute effectively to the proposed scientific activities.**

Les thèmes du symposium	Los temas del simposio	Topics of the Symposium
Thème 1		
Perspectives et approches théoriques sur le travail mathématique Perspectivas y enfoques teóricos sobre el trabajo matemático Theoretical perspectives and approaches on mathematical work		
Thème 2		
Étude des signes, des outils et du discours dans le travail mathématique Estudio de los signos, las herramientas y el discurso en el trabajo matemático Study of signs, tools and discourse in the mathematical work		
Thème 3		
Genèse et développement du travail mathématique : rôle de l'enseignant, du formateur, du collectif et des interactions Génesis y desarrollo del trabajo matemático: el papel del profesor, el formador, el colectivo y las interacciones Genesis and development of mathematical work: the role of the teacher, the trainer, the collective and interactions		
Thème 4		
Le rôle des tâches dans le travail mathématique El papel de las tareas en el trabajo Matemático The role of tasks in mathematical work		

**Topic 1 – Theoretical perspectives and approaches on mathematical work**

Responsible: Alain Kuzniak (France) & Ivy Kidron (Israël)

This theme is concerned with the theoretical and methodological aspects of mathematical work related to the definition, construction and implementation of mathematical knowledge. It also aims to deepen the perspectives specific to the theory of Mathematical Working Spaces (MWS), in particular through the comparison with other theoretical approaches. The main objectives of the theme are as follows:

- To delve deeper into the theoretical and methodological elements defined and used in MWS theory;
- To analyze, with different theoretical approaches, the different theoretical aspects related to the construction of mathematical knowledge;
- To allow comparative and complementary perspectives on issues related to the identification, implementation and construction of the mathematical work.

This general theme will be addressed by means of specific questions that may be formulated and dealt with in the MWS theory or in other theoretical perspectives.

- From a didactical perspective, what do we call mathematical work in a school context? How can it be identified? What are the methods of analysis and study of the mathematical work? How are the ideas of genesis and circulation defined and employed in the MWS theory? Do these concepts have equivalents in other theories?
- The MWS theory intends to closely combine epistemological and cognitive aspects in the construction of mathematical work. How are these two aspects taken into account in different theories? How can differences and commonalities be characterized? What are the new insights offered by this study of differences and similarities?
- A didactical perspective on mathematical work implies a reflection on the implementation of this work and on the construction of mathematical knowledge. How, then, can mathematical work and the process of knowledge construction be initiated for a subject? Is it a construction of knowledge in a given time or in the long term and in constant evolution? How is an individual's mathematical work organized and developed? How to guide and facilitate the control of mathematical work? How can the social and emotional factors be taken into account? What is the relationship with learning theories?
- The expected mathematical work is not independent of the mathematical domains that are taught. How to characterize, in different mathematical fields, the process of construction of mathematical knowledge and the resulting specific mathematical work?

In the MWS theory, paradigms are used to account for the rules, practices, and properties that are accepted in a school community around the mathematical domains being taught. What is the specificity of the notion of paradigms in the school context? How are they taken into account in specific studies related to mathematical or pluridisciplinary domains? How do paradigms intervene in other theoretical frameworks?

**Topic 2. Study of signs, tools and discourse in the mathematical work**

Responsible: Michela Maschietto (Italie) & Jesús Victoria Flores Salazar (Pérou)

Topic 2 is devoted to the study of the tools of mathematical work, the associated signs and their relationship to discourse. In the framework of the theory of Mathematical Working Space (ThMWS), the focus is not only on questions already addressed in previous symposia, concerning the geneses and their coordination, but also on the role of discursive genesis compared to other geneses, semiotic and instrumental. This general issue will be approached on the basis of specific questions that can be formulated and treated by the ThMWS or other theoretical perspectives. In particular, the contributions may focus on the following points:

- Interactions and didactical situations. We question the potential offered jointly by technological environments and sign systems to develop the student's mathematical work. Particular attention may be given to the presence of material or digital artifacts as well as to semiotic aspects.
- Mutual control of signs, tools and discourse. We will focus on the introduction and use of artifacts, both material and digital, in relation to the manipulations and associated gestures, the semiotic aspects present in the artifact and the different forms of discourse.
- Design of artifacts, material or digital. New artifacts can be designed for educational use, some of which drawn from historical sources. What are the characteristics that promote specific mathematical work? How to explain the students' cognitive processes in analyzing mathematical work? How to study and analyze the link between material and digital artifacts?
- Specificities of online education. What are the different uses of digital platforms, online exercise collections, video conferencing? and what are the implications for the mathematical work produced by the students?
- Proof and reasoning. The question here relates to the types of proof and reasoning that occur during mathematical work, at different levels of primary, secondary and higher education. In particular, the new technological possibilities invite us to rethink the very definition of referentials. How do analyses which focuses on semiotic aspects play an essential role in the analysis of the different forms of reasoning that appear in the student's mathematical work?

**Topic 3. Genesis and development of mathematical work: role of the teacher, the trainer, the group and interactions**

Responsible: Inés M<sup>a</sup> Gómez-Chacón (Espagne) & Patrick Gibel (France)

This third theme focuses on the progress of the reflection on the role of teachers and interactions in the construction, or training, of an adapted and efficient mathematical work. This reflection was initiated and developed in previous symposia and has taken on crucial importance with the necessary adaptations due to the pandemic of 2020 and 2021.

In particular, contributions may focus on the following points:

- The design and implementation of didactic situations to develop mathematical work in class are the responsibility of the teacher. What are the didactic choices made by the teacher in designing these situations?
- The effective implementation of these situations in the classroom requires the establishment of interactions between the pupils and the teacher in order to develop mathematical work. These interactions can occur during the collective phases, or during group work. How does the teacher anticipate and manage these interactions? How does the teacher organise the different phases, individual, group, collective?
- Analyses of the interactions produced in class become necessary to understand the way in which mathematical work is developed. How do these analyses take into account different interdependent dimensions, such as: epistemological, cognitive, didactic, technical, affective, cultural?
- In order to design and implement their teaching, teachers also rely on their knowledge, particularly mathematical and didactic knowledge. Several questions can be asked on this subject: how can we identify the various types of knowledge on which the teacher relies? Does this knowledge allow the teacher to design a coherent and efficient teaching?
- The above questions underline the importance of teachers' knowledge for teaching and therefore raise the issue of teacher training. How can this knowledge be taken into account and developed in the framework of prospective and in-service teacher training? What training methods, particularly distance and group training, should be used? What is the role of the trainer? What place for interaction in training?

#### Topic 4. Le rôle des tâches dans le travail mathématique

Responsible: Elizabeth Montoya Delgadillo (Chili) & Stefan Siller (Allemagne)

In this theme, we want to address the question of the place and role of tasks in the construction of mathematical work produced in traditional or virtual classrooms by pupils and students with the support of their teacher. The question of the teacher's mathematical work will also be considered. This general problematic will be approached from particular questions that can be formulated and treated with the theory of MTE or other theoretical perspectives. In particular, contributions may address the following issues:

- On the design and use of tasks in relation to the intended mathematical work. The design of a mathematical task and the precise definition of its goals have been the subject of research, particularly in relation to problem solving. This research has focused on the objectives and the choices made by teachers in implementing them as well as on the students' activities. It has also looked at the tools used to represent, explore and solve tasks.
  - What do these developments tell us about the way mathematical tasks are designed and used?
  - To what extent are the principles of task design and implementation used in different theories compatible or antagonistic?
  - What are the specific methods that make it possible to account for the work of designing and adapting tasks to a specific mathematical task?
- On the determining role of particular tasks. Research in mathematics didactics has highlighted particular tasks that are decisive in the development of coherent mathematical work: emblematic tasks in the ETM theory, fundamental situations in TSD, modelling tasks, etc.
  - How can these particular tasks be recognized and developed?
  - What study plan should be developed for their experimentation and analysis?
  - How can we think about and study the role of these tasks in the teaching of mathematics?
- On students' mathematical work. Observation and analysis of classroom activities and individual approaches to problem solving provide a basis for examining and characterizing tasks, their evolution and adaptation in a school context. How can the personal mathematical work of students be accounted for from observations or experiments in solving a task or problem?
- On the mathematical work of teachers. Task solving is not only for students, teachers are also confronted with it. In the context of research on teaching, it seems necessary to us to explore how the teacher solves a task according to his/her own knowledge and cognitive processes.

### Call for Papers and Proceedings

Oral communication or poster should be proposed first through a short summary (three pages), and should deal with an explicitly identified topic chosen among the four that are addressed by the Symposium. It should be based on an investigation and connected to at least one of the scientific axes of the symposium. The summaries will be evaluated by the Scientific Committee.

Each accepted proposal within a theme must then be developed into a paper in the style of the [CERME template](#) (12-point body text). Papers should not exceed 12 pages for an oral contribution and 3 pages for a poster. Details of each theme and the list of theme leaders are available in the second announcement.

All the selected contributions will be published in an online prepublication which will be available during the Symposium.

At the end of the event, the contributions will be edited by the authors for publication in a book or an international journal.

The second announcement in French and also in Spanish, with details of each theme, is also available (see link below to download PDFs or view online).

### Important dates

- Submission of a 3-page abstract to the Scientific Committee on **30 November 2021**
- Notification of the review by the Scientific Committee before **15 January 2022**
- Submission of the entire contributions before **30 April 2022**
- Registration to the symposium before **11 May 2022**
- The [ETM7](#) will take place **from 27 June to 2 July 2022**
- Submission of the papers for publication before **30 September 2022**

Registration fees	<u>Before 15 April 2022</u>		<u>After 15 April 2022</u>	
	Academics	Students and young researchers	Academics	Students and young researchers
Presential	240 €	100 €	280 €	140 €
Remote	120 €	50 €	160 €	90 €

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More information to come on the [symposium website](#).