An example of developing a research program, together with a program of preparation of young researchers

Prof. Filippo Spagnolo
Giorgio Santi
Benedetto Di Paola
Maria Lucia Lo Cicero
An example of developing a research program, together with a program of preparation of young researchers.
An example of developing a research program, together with a program of preparation of young researchers

The PhD of Palermo is a doctoral school based on didactics, history and epistemology of Mathematics, Physics and Chemistry

Our training was based on a threefold activity: courses, visits abroad and research thesis:

- Courses ranged across a broad variety of disciplines. As regards Mathematics: Mathematics Education, General Didactics, Neurosciences, History and Epistemology of Mathematics …. Courses were mainly held by scholars coming from all parts of Italy and abroad.
- The PhD of Palermo has always encouraged students to visit renowned scholars abroad;
- The spirit of our theses was to encompass both theoretical and experimental aspects of mathematics education.
During our PhD we attended many conferences, also presenting some results from our research projects.

From our experience we singled out basically two different types of conferences.

- **Conferences in which participants do not have a completely active role and the main effort is to learn from presentations given by other lecturers.**
An example of developing a research program, together with a program of preparation of young researchers.

Participation and organization of National and International Conferences, Congress and European Project in Math Education

This is an important source of information about the state of the art in Mathematics Education research. It is extremely useful also both for young researchers and PhD students to understand the complexity of Mathematics Education as an established field of knowledge and where it is going (Networking theories WG16)
An example of developing a research program, together with a program of preparation of young researchers whose aim is not to give only new information but to give participants the opportunity to share their research experiences with other scholars.
The focus is not on the final product but on the processes and the emergence of new scientific results. These are precious occasions for young researchers to share with renowned and experienced scholars questions, issues, methodologies, inconsistencies, research procedures, analyses, discussion of results, construction of a theoretical framework, … that underlie research in mathematics education.
An example of developing a research program, together with a program of preparation of young researchers

Participation and organization of National and International Conferences, Congress and European Project in Math Education

The participation to WGs allow young researchers to grasp the spirit that characterizes research in our field of knowledge.
An example of developing a research program, together with a program of preparation of young researchers.

One of our best experiences from this point of view is the CERME conference.

- **Peer-review**: experience reviewing, inclusive spirit …;
- **WG**: study of other participants papers, research questions;
- **Social interaction** and **communication** towards a common framework for the research topic, the activity spans along several editions of CERME
- **Papers are accepted after the WG activity**;
An example of developing a research program, together with a program of preparation of young researchers.

PhD of Palermo and G.R.I.M. has always invited students to take part in CERME.

Our first experiences at CERME did not allow us to fully take advantage of the opportunities this conference gives to young researcher.

But one learns from his mistakes!
An example of developing a research program, together with a program of preparation of young researchers.

- Participation and organization of Schools for Teaching and Researching in Math Education

- WG, Expert, study of thesis research topic, active role of participant (presentations, analysis of protocols, design of an experiment, discussion with expert and peers)

- Training based on Working in a team of Research guided by an expert.
Students are exposed to:

- different philosophical and theoretical approaches to the same field of research;
- different methodologies;
- different research questions;
- different cultural and social backgrounds driven from peers of different nationalities.
An example of developing a research program, together with a program of preparation of young researchers.

-**DG** that give access to tools that are essential for a good researcher in Mathematics Education.

For example Prof. Paolo Boero: “*How to get a good research report or paper.*”

-**IDG** allow to discuss specific research issues with an expert.
Participation and organization of Schools for Teaching and Researching in Math Education

Yess-5 allows to understand what a scientific community is, and to have a first-person experience of being part to such a community.
Participation and organization of Schools for Teaching and Researching in Math Education

Relatively to our researches, we basically learned:

- How to set research questions,
- How to define a theoretical framework,
- How to study the background of a theoretical framework,
- How to choose the methodology, design of an experiment…
- How to analyse protocols (qualitative and quantitative),
- How to define the structure of the thesis and how to draft an article (APA style, reference, quotations, etc.)
Some important topics:

- embodied cognition
- APC space
- multimodality
- connecting theories
- sociocultural approaches
- (in multicultural contexts)
- argumentation theory
- modelling
- comparison of educational systems of different nations
- gestures locutional/illocutional
- algebraic thinking …
As local organizers we had the opportunity to see the other side of the coin of research in Mathematics Education.

- Working in a team was an essential element for the realization/outcome of the school. An intense and fruitful Communication, Collaboration, and Cooperation with Dina, Paolo Ferdinando and the experts was the key element that allowed us to support such an important and prestigious burden.

- We learnt so much from the lifelong experience and skill of the YESS Program Committee members.
An example of developing a research program, together with a program of preparation of young researchers.

Participation and organization of Schools for Teaching and Researching in Math Education

Without their help, we would not have overcome alone some of the main difficulties that we had to face both during the preparation of the school and in Poggio San Francesco.

**From an organizational point of view** we learnt how to manage and integrate several aspects (scientific and logistic) that allowed the realization of the school.

The importance of fixing adequate deadlines and respecting them. The organization of the school starts two years in advance!

The importance of a clear, concise communication that highlights the essential information.
We consider the organization of YESS-5 as a metaphor of the activity of a researcher.

A research requires:

- scientific skills (object the of research);

- positive interaction with other researchers (working effectively in a team and interacting with other groups);

- organization of the research activities (integrating different elements that allow to carry out the research activity, financial support, fixing and respecting deadlines, communication with others and research results etc.)
An example of developing a research program, together with a program of preparation of young researchers are at the core and heart of our society (ERME), and make every ERME activity a significative and formative experience. Something we truly believe in and to which we are happy to give a contribution.
An example of developing a research program, together with a program of preparation of young researchers.

Thank you for your attention.

The YERME experience

Dziękuję za uwagę

Prof. Filippo Spagnolo
Giorgio Santi
Benedetto Di Paola
Maria Lucia Lo Cicero
The University of Palermo was born in 1807 for wanting of Ferdinando III of Borbone, the “rex utriusque Siciliae”, sheltered to Palermo running away from Naples in revolt. In the Year 2006 it celebrated so its 200th anniversary.

The University today has twelve faculties with nearly 60,000 degree’s students and 1,200 professors.

The activity of the School of Mathematics in Palermo has a very ancient history referred just to the “Circolo Matematico di Palermo” (1884).

As regard the teaching active courses, the department of Mathematics and Applications has the followings degree’s courses:
1. mathematics;
2. mathematics for the industry and the finance;
3. computer science;
4. mathematics for the computer science and the scientific communication.
An example of developing a research program, together with a program of preparation of young researchers.

From the 1979, the Research Group In Mathematics Education of the G.R.I.M. (Gruppo di Ricerca sull’Insegnamento delle Matematiche) works strictly close the Department of Mathematics. The group is constituted of about 30 teachers (from Elementary school, Low Secondary school, High Secondary school and University).

The group promotes, the relationship between the University and the world of the school in Sicily and not only.

The research activity of the group is documented on the web site: [http://dipmat.math.unipa.it/~grim](http://dipmat.math.unipa.it/~grim)
Partner of the FAMA project:
France, Italy, Portugal, Spain, UK

Research questions of the project:
- How family members (including parents, siblings, and other relatives) perceive / define “Family Math Involvement”?
- What are their experiences with mathematics?
- What are their expectations (foreground) in how teachers teach mathematics? The way that teachers use to teach mathematics to their children is similar/different to their memories? How?
- What are their expectations (foreground) in helping them their children?
- How they get involved in their children’ mathematics activities (homework)?
- What kind of difficulties they identify helping their children with mathematics?
- How they face / solve them?
- What kind of resources they have available for help their children with mathematics? (Including libraries, on-line resources of mathematics, networking with other relatives, friends, attending after-school activities, etc.)
- What kind of resources they would like to have available for help their children with mathematics?

To answer these research questions FAMA consortium will conduct a study using:
Questionnaires; In dept interviews; Focus group
An example of developing a research program, together with a program of preparation of young researchers

**Classroom Teaching Research project**

**Partner of the Classroom Teaching Research project:**
China, USA, Italy, Korea, Malaysia

**Goals**
Find common effective teaching strategies for ALL students in real classroom teaching at K-12 levels, especially for students with learning difficulties in math.
Provide research-based useful and practical guidelines about the effective teaching strategies for students with learning difficulties in math in professional development for classroom teachers and pre-service teachers.

**Research**
Observe and videotape lessons from each site to study classroom teaching
Analyze teaching perspective strategies or learning perspective strategies in support students with learning difficulties or gifts in the video lessons, focusing one content area each year
Methods of analysis including using software
Share findings with the group during the annual group meeting
Discuss the differences and similarities and find the common effective strategies
Plan for next year research theme or topic