Report
WG4 - Transitions towards digital resources: change, invariance, and orchestration

Coordination Team

Paul Drijvers
Verônica Gitirana
John Monaghan
Samet Okumus

Assistant Team

Corinne Badiou
Sonia Igliori
Rogério Ignácio
Marlene Tognifode
José Orozco

41 members

Main themes identified

1. Instrumental genesis
2. Instrumental orchestration
3. Documentational approach
4. Teacher education
5. Design

1. Instrumental genesis

Questions to be addressed in the book:

- What does IG mean? i) instrumentation ii) instrumentalization. How are these defined and illustrated?
- How do the affordances, constraints and potentialities play out in the instrumental processes?
- What are the schemes that users can engage in as they represent mathematical concepts?
- Are teachers and students able to engage in IG processes? If so how does this play out or manifest in the digitally resourced classroom?

2. Instrumental orchestration

The group identified five topics, that beg for further elaboration within the IO approach and that will be addressed in the book section chapter:

1. Teacher-centered or student-centered orchestrations?

2. Extending the repertoire of orchestrations?

3. Chaining orchestrations

4. Didactical performance

5. Teachers' and students' gestures

3. Documentational approach

The group identified different uses of Documentational Approach to Didactic to the transition toward digital resources:

1. The analysis of teachers' practice, integrating with the idea of orchestration, by identifying different types of orchestration.

2. To improve by researching their own practice, by a reflective investigation of the researchers documentation, in his/her lecturer practice.

3. To analyze preliminary documentational genesis in prospective teachers who design, use and try out them.

3. Documentational approach

4. To investigate epistemological posture o preservice teachers within lesson planning.

5. To investigate how students learn by interacting with teacher documentation (or part of the system).

6. An extension of the documental approach by looking at students' documentation (engineering).

7. To improve the context of the textbook.

4. Teacher education

1. Kinds of capacity/skills

Before teaching:

- be producers/designers
- a priori analysis of mathematical and didactical goals, and anticipated student actions including obstacles in the use of tools
- capacity teacher to evaluate mathematical content and pedagogical content knowledge

After teaching:

- reflect on mathematics content, pedagogical goals, student engagement/learning

During teaching:

- orchestrate and be sensitive to student ideas as they use technological tools

2. Interventions to develop these capacity/skills

5. Design

The following 7 sub-themes were addressed

1. The different roles of the actors in the design, for example teachers, researchers, co-designers, students, etc. (Tiphain & Jorge)
2. The affordances of the design, i.e. the design of an environment in which the resources can be used to achieve the desired goals (Pedro)
3. Different approaches to design, such as 'design for use' (hypotheses of how to use the resource) and 'design in use' (how the resource is used) (Marianne & Anders Stele)

5. Design

4. The implementation of a design. Various factors play a role in this, such as accessibility, complexity and the necessary technical skills that are required to use the resource (Marianne & Anders Stele)

5. The design as a way to describes how a resource can be used to solve a problem, which includes instrumentation and instrumentalisation (Chris)

6. Collaboration and re-design are important to optimize a design (Tiphain & Jorge)

7. Conception of a computational environment for supporting teachers' system of resources (Frank)