## RE(S)SOURCES 2018

# 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

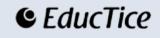
41 members

















#### 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)