Authoring Interactive Constructionist Activities and Learning Analytics as a Social Creative Process: the MC2 project

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1. Background - the M C Squared project

This workshop revolves around the Mathematical Creativity Squared (M C Squared) project that is developing a platform and associated tools that allow learning designers and teachers to engage in collective forms of creative thinking when developing educational resources for mathematics. The project is developing an authoring tool that allows creating interactive e-books called 'c-books' ('c' for creative) for mathematics and an authorable data analytics engine.

The project has initiated and is supporting four 'Communities of Interest' (CoI) [1] in four EU countries (England, France, Spain and Greece) that consist of several stakeholders from various 'Communities of Practice' [2] (including publishers, developers, researchers, school educators) who are working together with the shared goal to creatively think and design resources reflecting 21st century pedagogy for Creative Mathematical Thinking in schools and the workplace.

Catalyst in this process is the Digital Mathematics Environment (DME)[6] that enables the authoring of interactive pages that include diverse 'widgets' (dynamic, exploratory or constructionist digital tools designed to foster creativity in students' mathematical expression, investigation and meaning generation). An authorable learning analytics engine and a graphical interface will allow customizing the information and support provided to teachers and students by the widgets.

To stimulate and support the collaboration process the DME enables versioning of the productions and exchange of views between the COI members in shared discussion workspaces. In this way the c-book itself and its data can be perceived as 'boundary objects' [3] among participants who belong to different communities to discuss pedagogy and intervention agendas [4].

2. Description and Workshop Objectives

Workshop participants will be introduced through a brief presentation to the project that will focus on how teachers, designers, researchers, teacher-educators are jointly working on cBooks and how this advances their understanding of creative mathematical thinking but also contributes to research on processes to support and stimulate social creativity.

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Subsequently, participants will be given the opportunity to use the DME authoring tools. Based on their background they will undertake the role that members of the MC2 COIs have. They will be asked to collaborate and discuss with other participants through the discussion tool, design short activities for mathematics and reflect on the role of creativity for mathematics learning and how the creative processes of student and teacher are supported by the tools provided by MC2.

The workshop will be facilitated by members of the project by employing several artefacts that have been produced by the COIs as examples that show the various stages of development of cBooks and the associated discussions around them.

3. Outline

Below is an outline of the 90 minutes of the workshop:
[20 minutes]
- Short overview of MC2 aims, objectives and processes
- Presentation of DME (student view and authoring view)
- Presentation of various widgets

[30 minutes]
- Participants will tweak short activities in DME (or design their own)
- Use the shared discussion space to provide feedback on the designs

[20 minutes]
- Brainstorm on potentially interesting data users (teachers, students) would have access to

[20 minutes]
- Reflect with other participants on
    - the potential of MC2 project and its tools
    - social creativity
    - creative mathematical thinking

4. Expected outcome

Familiarization with the MC2 system and project, analysis and reflection on creative mathematical thinking, discussion on the potential of the system and its authoring components.

References

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