

TG1 Panel: STEM and Classroom Experiences

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This is a summary of the *TG3 Panel: DGS for mathematics education* that took place at the Symposium on Artificial Intelligence for Mathematics Education (AI4ME), held at CIEM Castro Urdiales, February 28th - March 1st, 2020. Full list of authors: Belén Palop, Zsolt Lavicza, Elena Alvarez, Jean-Baptiste Lagrange, José Manuel Diego Mantecón, and Zaira Ortiz.

Summary

The panel started with the invited talk by Zsolt Lavicza, *STEAM education approaches and technological innovations to foster creativities in schools in a digital era*, and was followed by four short presentations:

1. Jean-Baptiste Lagrange, *Connected working spaces: modelling in the digital age*
2. Elena Alvarez, *Teachers' perspective on some STEAM/AI oriented European Projects*
3. Zaira Ortiz Laso, *STEAM activities with KIKS format*
4. Belén Palop, *STE(A)M Lessons Learned: from STEM4Math to STEAM-CT*

Since the summary of each talk can be seen in the abstracts, let us point out here the main ideas that were shared by the speakers.

What is STE(A)M Education?

Zsolt Lavicza and Belén Palop focused on the different levels of integration of the subjects when we talk about STEAM Education. In the lowest level, we have the most simple connections that are maybe just mentioned by the teacher. Higher up in the integration level, we need to move in the direction of the meaningful and deep ways of thinking in the intersection of several subject like, for example the connections between Physics and Architecture with mathematical modeling explained by Jean-Baptiste Lagrange. Unfortunately, as Belén pointed out,

educators usually have no personal experience as learners in a STEAM setting and not many of them have a profound knowledge on how to bring STEAM Education to their classrooms.

Transdisciplinary levels, where all subjects are intertwined are more difficult to achieve and need further research, as performed in the PhD program lead by Zsolt Lavicza, where the essence of STEAM Education and its connections is been investigated.

Who does STEAM Education?

As presented by Elena Alvarez, teachers still need more help from the automated systems to guarantee that AI is helping them be more efficient. Unfortunately, their perception is still that they need to learn more, work harder or be more motivated to be able to use these tools in the classroom. The new challenges involve thus to provide them with more finished tools that can adapt to the permanent changes in the underlying technology, the small changes in the curriculum, or the lack of financial support, among others.

Not only teachers can implement STEAM Education, as shown by Zaira Ortiz Laso. In it's own core, STEAM Education is connected to active-learning, group-work and problem solving. Zaira's team presented their experience allowing children do peer teaching and learning. Children's engagement in their learning process is boosted through the elaboration of their own online learning materials.

I'd like to thank Pilar Vélez, Steven Van Vaerenbergh and Philippe R. Richard for letting me chair this panel and for the fruitful discussions during the whole symposium.