

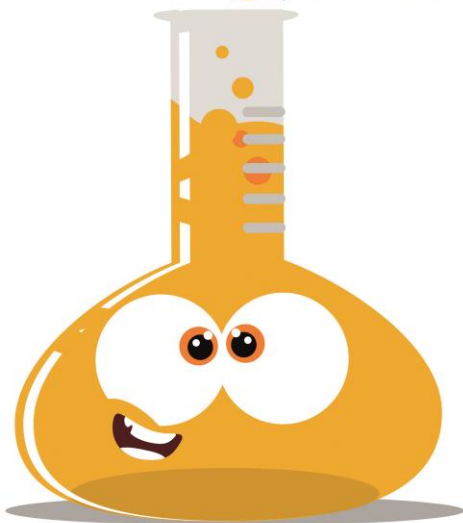
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¡Abre los ojos!

¡No es magia!

¡Es Ciencia!



SCIENCE ON SATURDAYS

out-of-school workshops for
improving STEM education in
primary schools.

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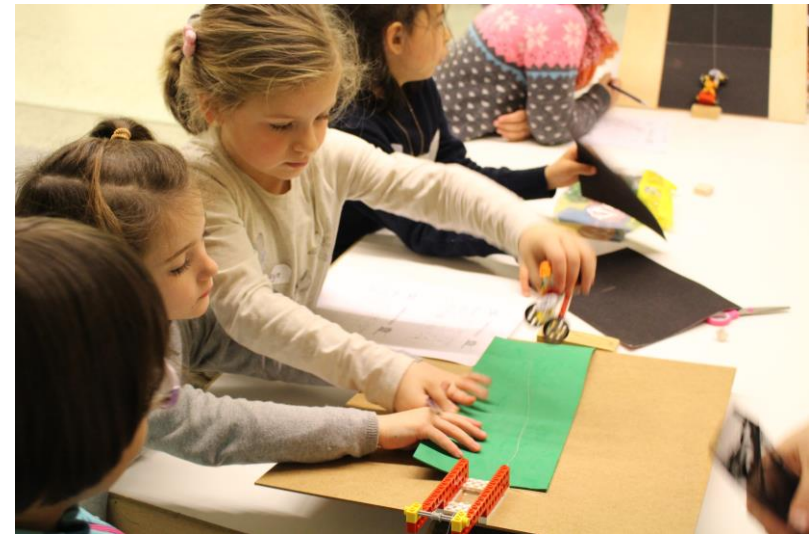


FUNDACIÓN ESPAÑOLA
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For introducing effective STEM education (by means of inquiry teaching) in primary school , a central focus should be in teacher education Elementary teachers:

- very little understanding/experience on inquiry;
- not much confidence in their ability to teach Science
- difficulties to understand how to design STEM activities for kids



At UBU, we have a specific curriculum.
But, although pre-service teachers showed enough theoretical knowledge and motivation, **they could not transfer by themselves this knowledge-of-practice into knowledge-in-practice.** Only with close support, they were able to develop and implement quite good guided inquiries.

The idea: develop short, supervised, didactical experiences in out-of-schools workshops, favouring pre-service teachers' transformation of the knowledge-of-practice into knowledge-in-practice

This strategy could be also useful for creating an “inquiry” culture at schools.



Since 2015-16 : “Science on Saturdays”

- Pre-service teachers work with K-6 pupils in “out of the classroom” activities using the inquiry methodology (voluntary adhesion without any academic reward)
- 8 Saturdays by year (once per month)
- The workshops lasted 2 & 1/2 hours.
- Kids are separated by ages, from 6 to 12, in groups of 15, each with a different STEM problem to be solved using inquiry methodology, in an experimental way.



Pre-service teachers are responsible for the design and implementation of the workshops, with the support of the faculty who participates in the project.

➤ **In each workshop, there are 2 to 4 pre-service teachers.**

➤ **The components of each team vary every Saturday, trying to join "experts" with more "inexperienced" students: a person with a wide range of strategies to entertain and motivate younger children can be paired with another with a deeper knowledge about science and inquiry and with a third without (apparently) any special skills.**



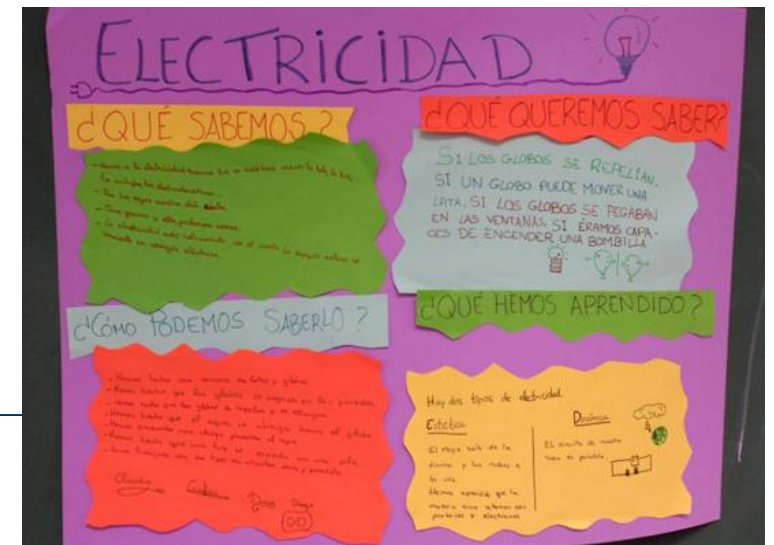
Preparing for each workshop includes:

- **Team meeting and design of activities.**
- **Revision of the activities**, after a discussion with faculty members.
- **Implementation of the workshop.**
- **Reflection** : after the workshop, pre-service teachers reflect upon which activities had worked and which hadn't; whether they had handled well the classroom or not...etc. In short, they questioned the execution on their part and that of their companions. This phase stimulates feedback .
- **The sessions are of intense work, with a before (design) and an after (a reflection), where the theory-practice relationship is present all the time**



Varied scientific themes are addressed in the workshops, but all follow a common structure.

- **Initial activity:** "What do scientists do?", useful to introduce inquiry to children. The degree of complexity of the explanation varied depending on the age of children.
- **Next activity:** the STEM problem, related with the children's daily experience or to a technological challenge, always involving primary school science concepts.
- **Core activity:** children's proposal of hypotheses to solve the challenge, and its experimental test.
- **Final activity:** conclusions and the poster





Results

Huge participation

2015-2016: 680 children from 7 schools and 32 pre-service teachers

2016-2017: 1070 children, from 25 schools, 34 pre-service teachers

2017-2018: 990 children, from 28 schools, 44 pre-service teachers

(Burgos has 19000 children between 6-11 y.o)

The evaluation of this programme since 2015-2016 shows:

- Although without previous practical experience with inquiry teaching, **all pre-service teachers declare that they believe that children understand and work better** with this methodology.
- Several **included**, after this experience, **inquiry teaching STEM units in their school practices and declare to try inquiry teaching in the future**
- Pre-service declared that they really enjoyed the process of designing and preparing everything.
- The experience has been rewarding and positive, far exceeding their expectations, evaluating the project **9.25/10**.
- In average, 3 or 4 Saturdays seem to be needed to feel comfortable with the inquiry methodology and STEM approaches.



Next steps:

- Go on with Science on Saturdays
- Create a Virtual Community of Practice for teachers to support STEM implementation
- Specific on-line post-graduation STEAM degree (first edition: 2017-2018) for those aiming to improve their skills.




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> Modalidad semipresencial

STEAM

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Ciencia, Tecnología, Ingeniería, Arte, Matemáticas



enseñanza **STEAM**
con programación y robótica educativas



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THANK YOU

