

Inquiry Based Science Education (IBSME) in Serbi

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Scientific literacy for all children - Renewed Pedagogy for the future of each country

Having in mind the science teaching in Serbian schools and the bad results of our students in the PISA test, we had the vision to change the situation in science education and founded our project “*Ruka u testu*” in 2001. Inspired by the experience in other countries like USA with *Hands-on*, France with *La main à la pâte* (www.fondation-lamap.org/en), Sweden with *NTA* (<http://www.nta.kva.se/In-English/>), China with *Learning by doing* (<http://rcls.seu.edu.cn/en/>), recently Great Britain with *XXI Century Science* (<http://www.twentyfirstcenturyscience.org/>), we started and continue to introduce our Hands-on approach via *Ruka u testu* (*La main à la pâte*) (<http://rukautestu.vin.bg.rs>), Serbian program which aiming at renovating science education in elementary and low-secondary schools. It recommends that teachers implement *Inquiry Based Science Education* (IBSME), which aims:

- at renovating science education in elementary schools, allowing exchanges and enhancing the development of good practices: teacher’s training, evaluation, *on-line* projects and dissemination.
- to stimulate and support a Primary School education by experimentation, based on scientific method.

Led by the children in small groups, teacher provides the answers related to the initial hypotheses. This approach involves questioning the pupils about the real world, phenomenon or object.

Children work with our kits



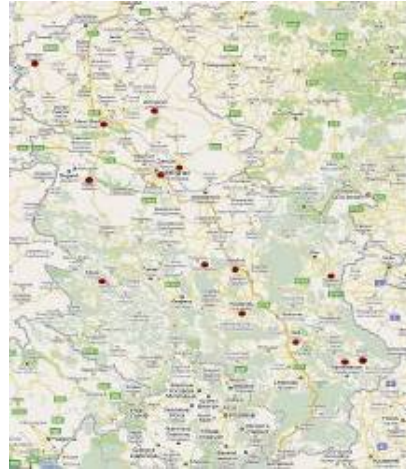
Resources from *Ruka u testu*

- **15** translated Books: *La main à la pâte*; *Seeds of science 1, 2, 3, 4, 5, 6, 7*; *Teaching Science at School*; *Discovering the World at Nursery School*;
- Collaborative and interdisciplinary projects: *On the steps of Eratosthenes*, *European discoveries*, *Living with sun*, *Climate, my planet and me!*





Teachers and students of the Faculty during one workshop



Map of 14 Regional experimental rooms in Serbia

- 5 Pedagogical Kits have been created on water, air, electricity, colours, swim and sink and they have been distributed (100 boxes) in the Fibonacci centers.. This experimental boxes contain 20 experiments and 8 books for work in the classes, for about one hundred primary schools all over the Serbian territory.
- Many appendixes in Serbian Educational weekly journal *Prosvetni pregled* which is distributed in 8.000 examples, and three E-Bulletins with instructions for teachers;
- Exhibitions: *Sciences à l'école: quelle histoire! Nanomonde, Lectures of Marie Curie; Science festivals* in Belgrade, Novi Sad and Podgorica (Monte Negro);
- Website <http://rukautestu.vinca.rs> , the semi-mirror of the French website (www.fondation-lamap.org/en) , in use (in Serbian) form the end of 2008, on which teachers can find many important resources for the work in classes...;
- Eight-hour sessions of professional development, accredited by the Ministry of Education, were organized for more than 3000 teachers, students of faculties and tutors. The participants are trained to implement inquiry-based science education. Just like their pupils in elementary and low secondary schools, they have to find the answers to questions on different topics by using material easily found in their surrounding world or by using our kits. The workshops are held in the schools, in about 30 places all over Serbia. Thereby teachers of preschool and elementary school were trained together with secondary sciences teachers in order to develop teamwork between schools and bridging the gap between the scientific disciplines. We get support by students from the Teachers Faculties who do their practical training in our schools. In addition the Ministry of Education introduced the optional subject in “Hands-on-Discovery of the world” in 2003.

International relations and partners

The project Ruka u testu is the member of EU-FP7-FIBONACCI consortium, as TC1 center for dissemination of IBSME method; The *Greenwave* network includes 50 schools from entire Serbia. By translating the resources of *La main à la pâte* we fostered the communication among French and Serbian scientific-educational community. As we were without any financial support at the beginning of our project, we contacted and presented our project to a number of university professors, to scientists from different institutes and to school teachers. As a result, we got a different form of supports: assistance by translating, scientific advice and shared experience. Furthermore, a partnership with several institutions for different aims was developed. This helped to find acceptance in society and to get support for planning international workshops from the Academy of Sciences and Arts, the Serbian Physics Society and the Serbian Ministry of Education.

Five Southeast European workshops on “*Hands on primary science education*” were organized in Belgrade from 2005 to 2010. Participants who were members of the EU projects, scientists, science educators and education experts, professional advisors and policy makers took the chance to exchange and extend their experience. <http://rukautestu.vin.bg.ac.rs/handson4/>. We found a School publishing house (Zavod za udzbenike) and a weekly educational journal (Prosvetn ipregled) which published all our books for free.

The French Academy of Sciences signed official collaboration for our project with the Serbian Academy and the University of Belgrade. In addition the French Embassy in Serbia supports our activities.

We have also developed, via Serbian Academy of Sciences and Arts, very rich collaboration with IAP (InterAcademyPanel) and ALLEA (ALL European Academies).

Conclusion

Our project is present and known in our educational system but also in the world. We have received international *purKwa prize for the scientific literacy of the children of the planet* (laureates- 2007 Stevan Jokić and Jorge Allende, co-president of IAP). Teachers, parents and children have very good resources for IBSE method. We continue our mission in this field.

Challenges: The main obstacle beside the financial shortage is our society’s inertia against change in education. In our opinion, the main aim of the primary school should include scientific literacy for all children. Still, teachers mainly present science via lecture; children very rarely resolve experimental problems or projects themselves; parents are mostly interested in children’s grades and not competencies and skills. Even the scientific community did not completely realize that school must be oriented to all children, and not only to the more “gifted” ones. Therefore in our opinion a CSME introducing inquiry based education will only be sustainable by the strong support of the Ministry of Education.

Lessons learnt:

- In the beginning you need a small enthusiastic team if you aim to give new impulses for inquiry-based education.
- When setting up a centre, learning from the experience of partner projects is very important
- Establishing a local support network and mobilizing decision makers are key elements of support. They could overcome a lack of financial support in the start-up phase
- But an education project will only be sustainable by the strong support of the Ministry of Education

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Biography: Stevan Jokić *Prof.*, Senior researcher in Vinca Institute of Nuclear Sciences;



PhD in Physics, teacher in high school, professor and Dean on the University of Kragujevac. Like a founder, in 2001, of the Council of “Ruka u testu” has translated 20 books, collaboration with Georges Charpak, Nobel prize, Pierre Lena and Yves Quere, and “La main à la pâte” team. Received with Jorge Allende the prize for the scientific literacy of the children of the planet-*purKwa* – 2007

http://en.wikipedia.org/wiki/%C3%89cole_Nationale_Sup%C3%A9rieure_des_Mines_de_Saint-%C3%89tienne#The_puRkwa_Prize

I will be in Belgrade in December !