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Teenagers as scientist – Learning by doing or doing without learning?

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The PISA (2006-2007) Assessment Framework asks for“.... the development of a general understanding of important concepts and explanatory framework of science, of the methods by which science derives evidence to support claims for its knowledge and of the strength and limitations of science in the real world....”.
To meet these requirements pupils are eventually asked to engage in “working like scientists learning activities” at school or while visiting informal learning institutions. But what does it mean in a real life situation?
An ambitious project call named “Sparkling Science” was launched by the Austrian Federal Ministry of Science and Research in 2008, asking scientists to run their research in tight co-operation with local teachers and pupils. Although this would be enough of a challenge anyway, the ultimate goals of these projects are to achieve publishable scientific results in the particular field.
The project design appears to be promising. Pupils and teachers are invited to gain first hand experience as part of a research team investigating current research questions. Pupils experience science research first hand, explore laboratories and research sites, gather data, discuss findings, draw conclusions and finally publish them. They set off on an exciting two years journey through a real scientific project. Teachers have the unique opportunity to get insight into a research project and work closely together with scientists. In addition teachers and pupils have the opportunity to gain first hand knowledge about a particular topic and are invited to discuss science matters on the uppermost level.
Sparkling Science promoting agents have high expectations. Their website (www.sparklingscience.at) says: “Forming research teams that involve scientists and children simulates the research process and has a high impact on skill building for both partners”. In the contrary hardly anything do we actually know about how effective these learning environments really are.
For the last decades a large body of science education research has predominantly taken place in laboratories and formal educational settings. Significant “blind spots” in the current literature appear when it comes to focusing on “the nature of learning in outdoor education” as well as “learning in research-education partnerships”.
The Institute of Ecology at the University of Innsbruck, Austria was awarded the project: Top-Klima-Science: Hydrologic Balance and Global Change: Future Prospect for Mountain Areas in the Face of Changes in Land Use and Climate.
The University of Innsbruck and the European Academy Bolzano are coordinating their efforts with their partner school HLFS Kematen in Tyrol. Two classes with nearly 60 students age 15 -18 years are involved in all areas of the project. The research project as such is accompanied by an ongoing evaluation of the process, which is carried out by science education researchers from the Science Education Centre at the University to Innsbruck, Austria. Iterative testing of teaching and learning strategies to improve them as they are developed is going along with a front, middle and end evaluation to find out what expectations, fears and motivations pupils, teachers and researchers have before joining in and how these develop in course of the two years working relationship. Evaluators also watch closely on how pupil develop their conceptual understanding of the topic they are investigating and whether their attitude towards science and science research changes in course of working as “real scientists. This talk will present preliminary results from work in progress and will discuss pros and cons of “doing real research” as a long term strategy for science in tomorrow’s classrooms.