

National case study: Turkey

Analysis on the S-TEAM, SAILS and MASCIL projects

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1. Contextual description

Hacettepe University has recently involved in three FP7 projects: Science Teacher Education Advanced Methods (S-TEAM), Strategies for Assessment in Inquiry Learning in Science (SAILS) and Mathematics and science for life (MaScil). In addition, Hacettepe University has involved in Inquiry for Science, Technology, Engineering and Mathematics Education (INSTEM). In this report, we have summarized these projects and their impact on Turkish science education and policies.

S-TEAM Project: <http://s-teamproject.eu>

S-TEAM is a Seventh Framework Programme Science-in-Society project, funded by the EU, which aims to disseminate inquiry-based science teaching methods (IBST) to the widest possible range of teachers and teacher educators across Europe and associated countries.

The three main objectives of the S-TEAM Project are:

- To improve motivation, learning and pupil attitudes in European science education, resulting in
 - increased scientific literacy and
 - recruitment to science-based careers, by:
- Enabling large numbers of teachers to adopt inquiry-based and other proven methods for more effective science teaching by:
- Supporting teachers by providing training in, and access to, innovative methods and research-based knowledge.

These objectives can be summarised as pupil engagement, teacher empowerment and teacher education. S-TEAM recognises that these objectives cannot be imposed on national systems, which in any case is not part of the EU role, but must be implemented through existing structures, agencies and actors. In order to achieve this, we are conducting national workshops to gather information about IBST implementation in the partner countries.

S-TEAM Partners: Norway

NTNU (Coordinator)

University of Oslo

Cyprus

European University – Cyprus

Czech Republic

University of South Bohemia

Denmark

University of Copenhagen

Aarhus Universitet

Estonia

University of Tallinn

Finland

Abo Akademi University

Helsinki University

University of Jyväskylä

France

Université Pierre Mendès-France

Centre National de la Recherche Scientifique

Université Rennes 2 – Haute Bretagne

Germany

Technische Universität München

Leibniz Institute for Science Education at the University of Kiel (IPN)

Israel

Technion – Israel Institute of Technology

Lithuania

Kaunas University of Technology

Vilnius Pedagogical University

Norway

Norwegian University of Science and Technology (coordinator)

University of Oslo

Spain

Universidade de Santiago de Compostela

Sweden

Mälardalen University

Karlstad University

Turkey

Hacettepe University

Gazi University

United Kingdom

University of Bristol

University of Leeds

University of Strathclyde

SAILS Project: <http://sails-project.eu>

The aim of this project is to support teachers in adopting an inquiry approach in teaching science at second level (students aged 12-18 years) across Europe. This will be achieved by utilising existing resources and models for teacher education in IBSE, both pre-service and in-service. In addition to SAILS partners adopting IBSE curricula and implementing teacher education in their countries, the SAILS project will develop appropriate strategies and frameworks for the assessment of IBSE skills and competences and prepare teachers not only to be able to teach through IBSE, but also to be confident and competent in the assessment of their students' learning. Through this unified approach of implementing all the necessary components for transforming classroom practice, i.e. teacher education, curriculum and assessment around an IBSE

pedagogy, a sustainable model for IBSE will be achieved. SAILS will provide teacher education workshops in IBSE across the twelve participating countries and promote a self-sustaining model encouraging teachers to share experiences and practice of inquiry approaches to teaching, learning and assessment by building a community of practice.

SAILS Partners

| | |
|---|----------------|
| Dublin City University (DCU) | Ireland |
| Audiovisual Technologies, Informatics & Telecommunications (ATiT) | Belgium |
| INTEL Research and Innovation Ireland Limited | Ireland |
| Gottfried Wilhelm Leibniz Universität Hannover (LUH) | Germany |
| Hacettepe University (HUT) | Turkey |
| Instituto de Educação da Universidade de Lisboa (IEUL) | Portugal |
| Jagiellonian University (JU) | Poland |
| King's College London (KCL) | United Kingdom |
| Kristianstad University | Sweden |
| Malmö University (MaH) | Sweden |
| University of Piraeus Research Centre (UPRC) | Greece |
| University of Southern Denmark (SDU) | Denmark |
| University of Szeged (US) | Hungary |
| Univerzita Pavla Jozefa Safárika v Kosiciach (UPJS) | Slovakia |

Mascil Project: <http://mascil-project.eu>

Mascil is aimed at promoting a widespread use of inquiry-based science teaching (IBST) in primary and secondary schools. In addition, we will connect mathematics and science education to the world of work: Both inquiry-based science teaching and the connection to the world of work will make mathematics and science more meaningful to students. When doing inquiry-based tasks, students work like scientists and by doing so, they acquire competencies they need for their future professional and personal lives as active citizens.

In a classroom where inquiry-based learning occurs, students take an active role. They pose questions, explore situations, solve problems, find their path to solutions and communicate their reflection. Inquiry-based learning (IBL) can have many faces, dependent on context, target group and learning aims. However, IBL learning approaches all have the shared characteristics of aiming to promote students' curiosity, engagement and learning in-depth.

In order to implement inquiry-based teaching and to connect mathematics and science education to the world of work, mascil follows a holistic approach by carrying

out a variety of activities, including the development of materials and running professional development courses. Our professional development courses for pre- and in-service teachers start in 2014 and will be supported by teachers from vocational education and representatives from industry. Teachers taking part in our training courses will experience inquiry-based teaching methods and be able to integrate these into their school practice through iterative cycles of implementation followed by reflection.

The participants will also develop tasks in vocational contexts, leading to a European repository of inquiry-based tasks, which can be found here: [classroom material](#). Our platform for teachers makes it possible for teachers to profit from the international perspective of mascil.

To ensure a widespread participation, we will start out either with a small number of teachers who in turn become multipliers of mascil and offer courses to further teachers, or we will - depending on the national context - use e-learning. To promote mascil and make the project known on a wide-spread basis, we will also involve parents, students, school authorities and policy makers with the help of conferences, workshops, publications and round tables. National and European advisory panels are to bring together stakeholders to advise partners throughout the project, whilst policy makers will be reached by workshops and policy papers.

Mascil Partners

University of Education Freiburg, Germany (Coordinator)

Universiteit Utrecht, Netherlands

Universidad de Jaen, Spain

Hogskolen I Sor-Trondelag, Norway

Hacettepe Universitesi, Turkey

Universitatea Babeş Bolyai, Romania

Univerzita Hradec Kralove, Czech Republic

Divulgacion Dinamica SL, Spain

Universität Innsbruck, Austria

Vilniaus Universitetas, Lithuania

The University of Nottingham, Great Britain

National and Kapodistrian University of Athens, Greece

Foundation for Research and Technology Hellas, Greece

Johann Wolfgang von Goethe Universität Frankfurt, Germany

EDEX-Educational Excellence Corporation Limited, Cyprus

Institute of Mathematics and Informatics at the Bulgarian Academy of Science, Bulgaria

Institut für Pädagogik der Naturwissenschaften und Mathematik an der Universität Kiel, Germany

Hacettepe University (HU)

Hacettepe University (HU) is one of the largest universities in Turkey with around 30,000 students and 3,500 academic staff. The university has participated in several EU projects. The university has 13 faculties, 9 schools, 1 conservatory, 13 institutes, and 35 research centres. The Faculty of Education has been carrying out educational and instructional activities. The faculty is able to meet the challenge of contemporary education through its highly qualified academic staff who are open to changes and development and who also benefit from international experience and cooperation. The Faculty of Education has 16 programmes under five departments (Computer Education and Instructional Technology, Educational Sciences, Secondary Science and Mathematics Education, Foreign Language Education and Elementary Education) with around 3,600 undergraduate and 550 postgraduate students.

Impact of these projects to our institution

By involving EU projects (e.g. S-TEAM, SAILS, MASCIL, INSTEM), at Hacettepe University we established an interdisciplinary research laboratory called Hacettepe Science, Technology, Engineering and Mathematics Lab (H-STEM Lab) (URL: <http://www.hstem.hacettepe.edu.tr>). H-STEM Lab has been carried our teacher training workshops on inquiry based science education. From 2009 onwards more than 600 in-service and more than 500 pre-service teachers have attended workshops on IBSE. In addition, our graduate students and junior scholars have had a change to participate in EU projects. Such an environment enabled the researchers and teachers to create a community of practice and community of research. News about our contribution to society has been reported in several newspapers and popular magazine (e.g. <http://bit.ly/1s5kNnp>; <http://bit.ly/1yJ84ar>; <http://bit.ly/1wUqzt4>

Impact of these projects to Turkey in general

In Turkey, there are some EU funded projects related to IBSE. Just recently the number of these projects is increasing and these project effect teachers' perceptions of Teacher Professional Development (TPD) programs and they ask the Ministry of Education to have these kinds of TPD programs in their agenda. Some of the workshops that we carried out within our EU projects were appeared in local newspapers (e.g. <http://bit.ly/1s5kNnp> ; <http://bit.ly/1G7ZLHo>).

In Turkey, the science and mathematics curricula were changed in 2005 and modified very recently in 2013. The curricula were developed by the Scientific and Technological Research Council of Turkey (TUBITAK) and Ministry of Education.

EU funded IBSE project recommendations are mainly tried to be linked into national policy developments. In the new science and mathematics curricula, inquiry or elements of inquiry are mentioned, to different degree. Emphasis has been put on

student centeredness, increased student activity, scientific literacy, and science process skills together with inquiry in the new curriculum. That might be seen as an impact of EU funded projects on IBSE. The most important features of the new curricula are that they aim to promote the use of inquiry-based education and use of alternative assessment strategies. IBSE is included in the curriculum framework of science and mathematics education to some extent. What this means in practice is not explicitly specified in the curricula. The curricula use alternative assessment tools, and also formative assessment along with other kinds of assessments. Nevertheless, as expressed by the participants, teachers are under pressure because parents ask teachers to use other kinds of assessment tools that are more aligned with the exams the student will take. Therefore teachers prefer to use summative assessment rather than other assessment tools. One of the shortcomings of the science and mathematics curricula might be not having a teacher's guidebook.

Teachers have not given enough resources how to implement the activities. Teachers are left alone or for some they give freedom to use their creativity while teaching science and mathematics.

National and international projects that aim to promote IBSE offer best practices of TPD, however the numbers of these activities are limited.