



Welcome to the PROFILES-Newsletter

Issue 01/2011



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Editorial

Welcome to the First Edition of the PROFILES-Newsletter!

The following articles will give an overview of the intention and motivation of the PROFILES-Project. Funded under the European Commission PROFILES offers members of the education community the opportunity to take part in the PROFILES-Network. The project promotes IBSE (Inquiry based science education) through raising the self-efficacy of science teachers in order to take ownership of more effective ways of teaching students, supported by stakeholders. At the moment 21 institutions from 19 countries in- and outside Europe cooperate to make a contribution to better science teaching. The following newsletter presents intentions and the underlying concept of the PROFILES-Project as well as offers an overview of the last events and forthcoming activities.

We hope our readers will enjoy this first edition of the PROFILES newsletter and it motivates colleagues to join the PROFILES-Project.

With kind regards,
The Editors

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1 What is PROFILES?

PROFILES is a European project, funded under the European Commission's FP7 programme, to promote *inquiry-based science education (IBSE)*. The uniqueness of the PROFILES approach is in paying much attention to the raising of the **self-efficacy of science teachers**. The self efficacy is to enable science teachers to gain a level of competence and the confidence to teach students in an educationally meaningful and student motivational manner, as inspired by PROFILES.

PROFILES aims to give teachers a better appreciation of the changing purpose of teaching science in schools and the value of being involved in networking with their peers. PROFILES recognises the learning needs to be relevant, challenging and rewarding for the students and involves students in the development of educational competences across the learning spectrum through an inquiry teaching-learning approach.

The PROFILES request is to support teachers by providing an inspired, longitudinal, professional development programme reflecting a range of stakeholder views and teacher needs. The professional development of science teachers attempts to enable teachers to find ways to enhance student motivation for the learning of science, both in terms of intrinsic motivation (relevance, meaningfulness, importance, as considered by the students) and extrinsic motivation (teacher encouragement, classroom environment and reinforcement of learning). In this way, the PROFILES project attempts to guide teachers to make school science teaching more meaningful in specific cultural settings. For this, the professional development aims at enhancing the role of the science teacher for inquiry-based science education on a philosophical, curriculum implementation and student motivational/attainment level.

The professional development includes *school-based interventions by the teacher* to

promote inquiry learning for the students and also to engage students in creative, scientific problem-solving and socio-scientific decision-making procedures. The intended teaching is undertaken utilizing existing science teaching materials (see examples on www.PARSEL.eu adapted by the teacher to ensure appropriateness).

The PROFILES measures of success, associated with the professional development, are through:

- (a) determining the self efficacy of science teachers in using innovative, student motivational, inquiry based science education approaches, and
- (b) enhancing students' gains (esp. in the field of motivation and attitudes towards science and science learning) through the PROFILES (social) context-led, student centred, (IBSE) inquiry-based-science-education emphasising learning settings.

The dissemination of the PROFILES and other best practice approaches, of evidenced based student gains, and teacher reflections form additional – and central – project targets.

Initially, the PROFILES project partners try to convince teachers to become **'lead' teachers**, focusing on four components (teacher as learner; teacher as teacher; teacher as reflective practitioner, and as an additional step – teacher as leader). An additional step is put forward to allow teachers to consolidate their **'ownership'** of the context-led, PROFILES approach and to gain guidance on incorporating use-inspired research, evaluative methods and stakeholder networking in their teaching. The project also enhances its **dissemination approaches** with 'lead' teachers spearheading the professional development of further teachers at pre- and in-service levels, initiating workshops for key stakeholders nationwide and establishing PROFILES networking.



The PROFILES project focuses at the secondary level so that **'(more) open' inquiry approaches** within IBSE are a major teaching target. For this to be meaningful for students,

the professional development of science teachers pays much attention to **enhancing student motivation** for science learning.

2 Intention of the PROFILES Project

PROFILES aims at making the learning of science, or science subjects, more interesting, relevant and meaningful for secondary school students.

It seems that this is not easy. The science education literature repeatedly comments that the teaching of science or science subjects at the secondary level is not interesting for most students. School science is often described as out-of-touch, boring and irrelevant. Even a hands-on approach, with students working in groups, cannot promote science for most students as their favorite subject.

The PROFILES project tries to address this issue.

The PROFILES philosophy is to 'wrap' the science learning within a setting which is familiar and relevant in the students' eyes.

Thus PROFILES **does not** start the teaching for any topic with the science ideas. The science topic is only introduced when it is seen by students as a need.

In PROFILES, a major factor is ensuring student intrinsic motivation. This is not the motivation which comes because the teacher uses only a motivational teaching approach. More than this, the motivation is initiated by students who want to know more and thus stems from the student themselves. Simply put, PROFILES initiates the learning of a topic in a way which is inherently interesting for students. And this

interest is promoted by presenting the learning as **relevant** to students themselves.

The PROFILES consortium members are convinced - if students recognise that the learning is relevant to them and it is introduced in an interesting manner, then the science learning, when it is included with the teaching, is expected to be perceived as useful, seen as important and giving the science learning more meaning.

The PROFILES approach

Start the teaching from an appropriate scenario. Ensure the scenario is interesting for students. Do this by taking a scenario from a familiar situation that will enable the science to be introduced at a later stage. All PROFILES teaching modules begin with a scenario.

We recommend to try out a teaching module and adapt the module for your situation and to maximise student interest. After considering the scenario with your students, move from the situation to the science question(s) to be studied. When acquired, the science will enable students to better understand the socio-scientific scenario and





enable students to better interact with the situation. Relevance from the familiar then linking the science to this is the key. It is the opposite to the typical textbook approach of science first, application of the science second.

Teachers can introduce the science when it has been given a clear purpose. That purpose is to enable a better understanding of the scenario and thus allowing students to construct meaning in a motivational manner through exploring the scenario.

Is this approach unique? PROFILES cannot claim that. But it is the PROFILES way trying to make science learning more relevant, more interesting and hence more meaningful for students and at last more successful.

A range of teaching modules can be found on the website: www.parsel.eu

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4 Report on Meetings and the 1st Workshop

Kick Off Meeting in Berlin

In December 2010 the whole PROFILES-Team got together for the first kick-off-meeting. After a welcome note from the President of the FU Berlin, Prof. Alt and the Minister of Education, Science and Research, eight work-packages in total were presented and last questions concerning management and finance were answered. We will take a closer look at each of the work packages in the following editions of the newsletter and give deeper insight into the work of learning environments, students gains as well as dissemination and networking. At the meeting the first issues and mile-stones of the Profiles-Project were presented and discussed. The further proceeding regarding the workshops

and the teacher training were determined as well. Even though the weather complicated the arrival of some project-partners, it was a very warm kick-off-meeting in a snow-covered Berlin. We are grateful to the team of the Freie University of Berlin, who organized the first kick-off-meeting professionally and created a very friendly and welcoming atmosphere.

Workshop in Tallinn

In May 2011, special PROFILES workshops, held in Tallinn (Estonia). The workshops run by the PROFILES partner of Weizmann Institute, aimed at preparing colleagues to become "continuous professional development (CPD) providers". Partners and teacher trainer from



all project countries as well as from other countries were invited to take part.

The workshop concentrated on ensuring that the participants understood the purpose of the PROFILES CPD provision, especially promoting Inquiry-based learning through student-centred teaching and learning, stressing relevance to students' everyday life and identifying approaches to effective student learning through problem solving and decision-making activities.

Avi Hofstein and Rachel Mamlok-Naaman were joined by Ron Blonder, Tami Levy Nahum and Dvora Katchevich, in helping all participants to emphasize the key-components of the PARSEL-Type teaching materials when running their own CPD programmes for PROFILES teachers. Besides profound presentations by the Weizmann team, participants were given opportunities to reflect and discuss about selected PROFILES modules on site and to re-develop modules for the situation in their specific school science system.

Beside the PROFILES workshops on how to qualify CPD providers to teach and train teachers regarding the PROFILES intentions Claus Bolte, the Coordinator of the PROFILES project and leader of the work package "Students gains" from the Freie Universitaet

Berlin (Germany) offered a workshop on "students (intrinsic) motivation and students interests in science". The main emphasis of his workshop was put on the clarification of basic terms concerning motivation and interest theories, the discussion of a theoretical sound instruction model regarding motivational processes and the question of how to evaluate "Students Gains" in the frame of the planed PROFILES intervention in science classes practice. Different instruments were introduced to the participants of this workshop (such as the "StoP"-Questionnaire (to analyses the Self-to-Prototype-Matching of students), the "IQ2" (a questionnaire to investigate students' (and teachers') "inquiry qualifications", the Developmental Task instrument (to figure out in which ways science lessons are dealing with selected "developmental task of students" which should/could be addressed and worked on in science lessons) and the so called "MoLE"-Instrument (an instrument with three different questionnaire versions to analyze the students assessment concerning their preferences and perceptions of the motivational learning environment in their science classes).



Tallinn at its best sight; venue of European capital of Culture 2011 and the 1st PROFILES-workshop



Consortium Meeting in Tartu

Following the workshop, PROFILES held its 2nd consortium meeting in Tartu. This reflected on progress made in preparing for the PROFILES CPD activities and PROFILES intervention (including its evaluation) planned for the 2011-2012 school year, examined progress on round one of the PROFILES Curricula Delphi Study on Stakeholder Views concerning Science Education (see later in the newsletter) and considered the way forward for introducing PROFILES networking and other dissemination plans. Furthermore, the consortium developed its timeline until the next meeting in February 2012. Questions and queries were discussed and decisions made. A very big thank you was offered to Miia Rannikmäe and her team, who organized the Tallinn workshop and Tartu meeting with professionalism and charm.



Consortium Meeting in Tartu

Report on the Core Meeting in Israel



Persons left to right:

Claus Bolte (FUB),

Jack Halbrook (ICASE),

Miia Rannikmäe (UTARTU),

Rachel Mamlok-Naaman (WEIZMANN),

Avi Hofstein (WEIZMANN),

Franz Rauch (UNI-KLU).

Prior to the May workshop, core-members (Claus Bolte, Miia Rannikmäe, Avi Hofstein, Rachel Mamlok-Naaman, Franz Rauch and Jack Holbrook) met from 16th to 18th of March in Israel to plan and discuss the PROFILES professional development programme for CPD providers and strategies for the professional development of teachers related to the four PROFILES components (teacher as learner, teacher as teacher, teacher as reflective practitioner and teacher as leader) in the PROFILES 2-step CPD approach (step 1 during year one— developing self efficacy; step 2 - year 2 onwards – developing ownership of the PROFILES philosophy and approach).



5 Report on the First Round of the Delphi-Study

A key component of the PROFILES project is to collect a range of stakeholder views on the purpose and value of science education. Each partner participated in the "PROFILES Curricula Delphi Study on Science Education". By July the first round of a three-stage-process was completed. Around 100 experts per partner/institution participated in this first round survey.

This first round of the survey sought responses to preferable conditions concerning situations and motives for developing better science education. The experts were asked about their suggestions and visions in terms of topics, methods, competences or qualifications of which students should be capable.

Many thanks to all participants for the co-operation and all the inspiring suggestions collected. The qualitative data collected in this first round, once analyzed, will provide the basis for FUB as the leader of the work package 3: "Stakeholders Involvement" to develop instruments for the next, quantitative round, which will be started in the Autumn of 2011.

Findings and insights from the first round of the PROFILES Curricula Delphi Study on Science Education will be presented in the next Vol. of the PROFILES Newsletter. Theresa Schulte (t.schulte@fu-berlin.de) from the FUB-Team in Germany coordinates the activities concerning the Delphi-Study. She deals with requests and gives feedback on the results of the study.

6 Development of Teaching Modules and Preparation of CPD Materials

Once teachers have been selected for the one year PROFILES CPD programme, the PROFILES partners together with teacher groups, set about selecting, reviewing and adapting teaching modules (using already existing materials and modules, such as those from the PARSEL project). Depending on curriculum and interests, teachers were guided to choose from a wide range of modules which were developed in former projects, or to develop their own 'PARSEL type PROFILES modules.' All PARSEL modules were freely accessible on the website www.parsel.eu. However, in many cases, the introduced modules and materials need translation to the national language before they can be used in practice.

Inquiry key components of modules for PROFILES are:

- Initiated from a (social or another student familiar) situation, which is relevant in the eyes of students (as a group).

- Discover the science behind or in the situation introduced within the scenario class discourse.
- Promoting science learning through inquiry-based science education (IBSE) – the various forms of investigation triggered by a scientific question(s) from the scenario.
- Consolidating the science learning by applying the science gained to the scenario.
- Then reflecting on the scenario again so as to engage students in socio-scientific and other decision-making processes and complete the science learning in a social or in the everyday life frame.

Operated as 3-stage continuous flow model – stage 1 leading to stage 2 which in turn leads to stage 3, we have:

Stage 1:

The (social) scenario (for example a societal issue involving a scientific component) is introduced and discussed. Then students are guided to recognise that there is a gap in their



scientific understanding and they are further guided to express this as a scientific question or as scientific questions, suitable for subsequent investigation.

Stage 2:

The inquiry-based investigation (the gaining of evidence can be literature based, empirically undertaken or a mixture of both) leading to scientific problem solving. This is the major stage both in terms of teaching time and in meeting a context-based or content-based curriculum.

Stage 3:

The key stage for consolidating the science learning so as to apply this to the initial scenario and use the gained science to undertake discussion and argumentation and to make a socio-scientific or private-life decision.

From August 2011, the PROFILES partners also initiate the development of CPD materials, together with the CPD providers, for putting the forthcoming continuous CDP programme into operation. This is in preparation for guiding teachers in the four components mentioned above: teacher as learner (mainly gaining additional interdisciplinary science knowledge related to a module); teacher as teacher (the extensive variety of teacher views and teaching skills that make up the PROFILES philosophy and approach); the teacher as reflective practitioner (reflecting on the classroom intervention and discussing this with other PROFILES teachers using collective reflection) and in preparation for the second PROFILES CPD year for those aiming to become a lead teachers (teacher as leader).

7 Teacher Needs Instrument

A major aspect of PROFILES is **teacher professional support** in the CPD programme, initially over one year. Each partner involves approximately 25 to 30 teachers trying out the ideas of PROFILES. To guide the CPD providers,

PROFILES partners are offered a “teachers-needs” questionnaire. You will find the questionnaire at: <http://ius.uni-klu.ac.at/misc/profiles/files/teacherneedinstrument.pdf>

8 MoLE-Instrument for Students

A key aspect and aim of PROFILES is to enhance students’ (intrinsic) motivation to learn science. To determine the impact of PROFILES on the motivation of students during the invention programme, a student special instrument – the so called “MoLE-Questionnaires” is to be administered by each partner as a pre- and post- (after each module) questionnaire. The MoLE-Questionnaires in their different versions

(such as the REAL-Version to assess the students perceptions in general, the IDEAL-Version to analyze the students expectations how they wish their science lessons should be or the TODAY-Version to evaluate a the perception of a specific lesson (the “lesson of today”) is being developed by the leader of work package 3 (“Students Gains”) and will be administered by each partner after translation.



9 Strategies and Examples for Networking and Dissemination

PROFILES envisages the setting up of teacher networks (and interacting with other networks) to both maximise the dissemination and to make teachers more aware of the PROFILES project and the goals it is setting out to achieve.

In the last ten years, educational systems worldwide have reflected on networks. Structural changes in the administration and undertaking a policy of decentralization are among two reasons for this development. In this way, single schools are encouraged to take on more responsibility and develop or foster "intermediate" structures as appropriate.

One of the main intentions of PROFILES is the setting up of networks by each partner at the local, as well as regional level. By interlinking the local to the regional and the regional networks between partners, a major goal of the network is the dissemination of exemplary, motivational, inquiry-based science teaching approaches. As the Austrian Competence Centers has developed a range of instruments and measures to make innovative science teaching more acceptable, future PROFILES newsletters, will introduce best-practice-examples in each edition. These examples refer to already proven practice and can be recommended as successful strategies.

9.1 Strategies of Networking – The example of a "Science Day" in Austria

An example of this strategy is the initiation of a "Science Day" in the Austrian province of Salzburg in which activities of students, teachers and schools are on display. The "Science Day" initiative is open to children from kindergarten up to students in high school. Recognized scientist and experts are invited to run workshops about their actual research or topics in which they are involved. Through carefully managed, age-appropriate and exciting activities, students gain an insight into science, its relevance and importance in many career directions. For further

information see: <http://www.nawi-netzwerk.salzburg.at>

Beside striving towards the strengthening of students' motivation, the 'science day' initiates networks between teachers and schools. For example 'shared' science days provide opportunities for teachers (and students) to interact in the science teaching offered by PROFILES. Additionally such cooperative events become more attractive to, and can strengthen cooperation between, science education at school, external institutions, associations and Universities.





10 Timelines and Meetings

PROFILES

Consortium Meeting, Ein Gedi, Israel

The next consortium meeting for all PROFILES partners takes place from 12th to 17th February, 2012. The PROFILES partner in Israel (the Weizmann Institute of Science) has already made accommodation arrangements. Thank you to the Weizmann team in advance for securing this wonderful venue and for organizing travel arrangements to the venue from the airport.



ESERA Conference, Lyon, France

The next (11th) ESERA-conference will be held in Lyon from 5th to 9th September 2011. The overall theme of ESERA 11 is "Science learning and citizenship". The conference would be an appropriate place to discuss issues and questions concerning all different aspect of education and teaching science. In the conference, the PROFILES Work package leader team will run a symposium on various aspects of PROFILES. We would appreciate to meet a lot of you there.

PROFILES

International Stakeholder conference, Berlin, Germany

The PROFILES International Stakeholder conference will be held from 22th to 26th September 2012 in Berlin, Germany. Main themes of the conference will be stakeholder views of IBSE and good practice examples. You will find more information about this event in the next issue of the PROFILES newsletter.

The PROFILES Newsletters as well as other publications and PROFILES materials can be downloaded at the PROFILES website: <http://www.profiles-project.eu/Dissemination/index.html>, as well as at the homepages of the PROFILES Consortium members who provide information about the PROFILES Project in the local language of the PROFILES partners.

