Welcome to the PROFILES-Newsletter Issue 02/2012

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Editorial

Dear readers,

The PROFILES-project is celebrating its first anniversary. For this reason, we take this opportunity to look back at the successful work of the last year and recognise the commitment of our many partners to the PROFILES cause.

After the workshop in Estonia (May 2011) partners set about enacting PROFILES courses and programmes in all PROFILES-countries. Teaching modules were selected, refined, translated in many cases and made ready for classroom implementation. In order to promote the greatest possible interchange of modules and CPD suggestions the English version of materials are to be made available online on the main PROFILES website with local versions uploaded to the local websites.

A major focus of this issue is the direction and significance of the CPD (continuous professional development) within PROFILES. Our partners from Cyprus and Romania show how professional development can be enhanced and meet with teacher approval in our digital age. Also in this issue, a short report is included on the first of three cycles of the PROFILES Delphi study carried out in partner countries and gives some insights into the valuable data collected. These results reflect the high degree of interconnectedness within the countries, and among the partners themselves.

Your PROFILES-team

1 Continuous Professional Development (CPD) within PROFILES

by Jack Holbrook (ICASE)

A very crucial point in the PROFILES project is the implementation of a continuous professional development (CPD) for teacher participating in trying out PROFILES modules and using these to promote Inquiry Based Science Education (IBSE). It is the project's stated aim to influence the teaching of teacher participants within the project to promote more meaningful and interesting science teaching in a sustainable way.

Last May PROFILES held its first CPD workshop in all participating countries. In the following, we give a short review of the PROFILES CPD approach and how it is being suggested to be implemented within the PROFILES project.

A major CPD target within PROFILES is to enable teachers to appreciate the PROFILES approach to science education, at grade levels 6 and above based on the PROFILES philosophy. Within PROFILES this is referred to as promoting self-efficacy to implement IBSE in a manner which addresses the need for relevance, students liking school science, active student involvement and the development of student competencies. The goal is to enhance students´ scientific literacy.

PROFILES tries to guide the CPD providers to focus on the inclusion of three intended emphases during their programme with PROFILES teachers so as to raise the self efficacy of the teachers, namely:

- *relevance* of the topic taught (in the eyes of students) and how relevance can be attained from the students' view;
- *student constructivistic learning active involvement;*
- *enhancement of scientific literacy by means of* an education through science focus.

The PROFILES approach has been developed based on **a 3-stage model**. The model is based on the recognition that there is a need to initiate the learning from a *familiar and student relevant situation*. But even that, by itself, is *not sufficient*. It is also seen as important that students **identify** with the initial situation and feel that it is within **their sphere of action**. In this initial approach (in PROFILES using a scenario), teachers stimulate students through the relevance of the learning situation, issue or concern. In the second stage the triggered students' self-motivation encourages students to be involved in the IBSE learning processes. Finally, in the third stage, the student's build on their science learning to transfer their learning to the relevant socio-scientific situation encountered in the scenario and to develop reasoned justification for decisions made.

Summarizing, the idea is that the **relevance** is triggered by the PROFILES modules' title, which is further amplified by means of a scenario. For this the title relates to the students´ world, using familiar words (unknown, non-general scientific words are absent). Students are actively involved in exploring the scenario which is intended to promote curiosity, intrigue as well as seen as meaningful by students. The science learning needed to sustained considerations of the scenario

is through guiding students to undertake inquiry-based science education in a manner which promotes a meaningful and acceptable scientific challenge to students (whether a structured, guided or open form of IBSE are utilized).

The following articles show mechanisms to approach the CPD. In particular, the partners from Cyprus and Romania relate to the use of online tools to support teacher CPD.

2   Using online tools for effective CPD with teachers

2.1   Experiences of the Cypriot PROFILES Partner

by Eleni A. Kyza (Cyprus University of Technology, Cyprus)

One of the core issues of the PROFILES pan-European network has been supporting the participating teachers' professional development on matters that relate most to PROFILES: understanding, adopting and appropriating inquiry-based learning and teaching. Each PROFILES partner has sought to address this issue employing a model of continuous professional development (CPD). From the beginning of the endeavor, the team at the Cyprus University of Technology (CUT) decided that technology should have a mainstream presence in our CPD effort. For this reason, a variety of technological tools were adopted.

The CUT team met early on to discuss the challenges that could arise to facilitate communication and collaboration between teachers, between teachers and researchers, and amongst researchers. Based on prior experiences, the team selected tools that could afford richer experiences of communication and collaboration and which could extend the face-to-face meetings. All Cyprus-based PROFILES teachers were voluntarily participating in the program; most, if not all, of them leading busy lives, trying to balance competing demands from their work, including other professional engagements, and their personal lives. As a result, the team wished to take special care to maximize participation by providing the capability for active involvement at a distance. Thus, the online support for continuous professional development provided the backdrop against which the local PROFILES team works.

Face-to-face meetings are still scheduled, either for the whole PROFILES group (all disciplines), or for specific disciplinary groups (especially for example, the Chemistry team). For these meetings, a member of the CUT PROFILES team is present during each meeting, keeping minutes, facilitating the discussion, identifying needs and summarizing the decisions after the meeting, thus acting as a liaison between the researchers and the teachers.

Beyond the face-to-face meetings, CUT introduced a combination of synchronous and asynchronous communication tools to support constant access to information and increase teachers' capacity to participate in the design effort scheduled by each disciplinary team.

The combination consists of Moodle, the WEBEX web conferencing system and the web-based STOCHASMOS learning and teaching platform. Using the Moodle web-based platform, participants have the opportunity to share resources and use a virtual space, while the WEBEX

system allows synchronous video meetings. In addition, STOCHASMOS can support the development of inquiry modules. This combination provides a more facile communication of ideas and can support teacher reflection.

Supporting teachers in adopting novel approaches to teaching is a challenging task; selecting appropriate tools, in addition to other types of support, is one step towards achieving our goal. As our experience shows, there is a lot of facilitating work that needs to take place in order to ignite and sustain productive communication and professional growth. The case of the Cyprus University of Technology is one such example. With the experience we are gaining, we look forward to improving our repertoire of professional development support strategies, firmly believing that technology has an important role to play in all our efforts.

References:

- http://cis.cut.ac.cy/moodle
- http://www.webex.com
- http://www.stochasmos.org

The CISCO Webex web conferencing system

The CISCO Webex web conferencing system (screenshot 1)

2.2 Experiences, recommendations and activities the Partners from Romania made within PROFILES

by Mihai Bîzoi, Ana-Maria Suduc & Gabriel Gorghiu
(Valahia University Targoviste, Romania)

Many international educational projects propose activities which involve the use of collaborative platforms. There are different types of e-platforms that usually present several facilities: messages exchange using e-mail, multi-user chat or forum, calendar, to-do lists, file sharing and versioning, and personal notes.

During past educational Projects coordinated by Valahia University Targoviste, two collaborative platforms have been used for communication and collaborative work [1]:

1. **BSCW - Basic Support for Collaborative Work** (afterwards renamed *Be Smart Cooperate Worldwide*)
2. **phpGroupWare** - a fully featured web based messaging, collaboration and enterprise management platform.

Both platforms allow a range of applications which help to meet the requirements of teacher trainings [2, 3] and hence for PROFILES CPD approaches.

For the PROFILES project, and especially for professional development needs, a local PROFILES website of the Romanian partner (http://profiles.ssai.valahia.ro/) is under continuously development based on the *Elgg* platform (http://elgg.org/). *Elgg* is a social networking framework customized especially to meet the needs of science teachers involved in the PROFILES training program and also to provide an electronic environment for teachers and schools networking. It provides the necessary functionality to allow users to run their own social networking site, whether publicly or internally on a networked Intranet. In order to facilitate synchronous collaboration between science teachers and science teacher educators, a videoconference system was integrated into the PROFILES platform. – *Open Meetings* (http://www.openmeetings.de/), a free system which allows, besides audio and video communication, to share documents on a white-board, to share screen or record meetings. The PROFILES platform provides important information related to the PROFILES training program accredited at the national level. At this time, information available includes: aim and objective of the training programme, description of the two courses of the programme and four science training modules translated and adapted, in accordance to the requirements of the national curricula.

References:

- [1] Bîzoi, M., Suduc, A. M., Gorghiu, G., Gorghiu, L. M. (2009). Rates on Collaborative Platforms Activity in Multinational Educational Projects. *Proceedings of the 9th WSEAS International Conference on Distance Learning & Web Engineering (DIWEB '09)*, 60-64.
- [2] Bîzoi, M., Gorghiu, G., Suduc, A. M., Alexandru, A. (2006). Computer Supported Cooperative Work - An Example for Implementing a Web-based Platform Application. *Studies in Informatics and Control*, 15(1), 71-78.
- [3] Bîzoi, M., Suduc, A. M., Filip, F. G. (2009). *Proceedings of the 17th International Conference on Control Systems and Computer Science(CSCS-17)*, vol. 2, 349-352.

3 Interview: Prof. Avi Hofstein of the Weizmann Institute talks about the *PROFILES CPD practice* and challenges to develop *teachers´ ownership*

by Angelika Hödl (University of Klagenfurt, Austria) & Avi Hofstein (Weizmann Institute, Israel)

Professor (emeritus) Avi Hofstein was the head of the chemistry group at the Department of Science Teaching at the Weizmann Institute of Science in Israel and head of department of science teaching. His scientific activities focus on all aspects of the curricular process in the context of chemistry education programs as well as in the program "Science for All". He was involved in several EU projects and in a bi-national project with King's College London regarding the development and implementation of a CPD program for science teachers.

Avi, curriculum development in various countries has experienced a great change from the 1960s and 1970s' until now. What do you think are the main reasons for this?

While in the 1960s' the conceptual approach was the key issue I believe that in the beginning of the 21st century the teacher is the focus and clearly what we try to do in the PROFILES project. Most of the science programs these days were perceived by the students as irrelevant. In addition, most of the science curricula were developed by central curriculum development agencies such as universities and curriculum development institutions. In general, teachers were not involved in the curricular process. In the mid 1990s' science educators and professional development providers came to understand that one of the most important goals regarding effective implementation of science curricula is involving teachers as equal partners in the curricular process (bottom-up).

What are the relevant findings from this change? The most relevant result is the change of paradigm. The button-up approach – opposite to the top-down approach – helps the teachers to adopt the modules to their own needs, their schools, and their students, and developed their own professional identity. The possibility to influence the curricular process turns out to be strongly motivating.

As a leading member of the PROFILES project and as a pioneer in terms of science education from the Weizmann Institute you promote teachers´ ownership as a key task in teacher professional development. Could you explain what do you mean exactly by that term?

We assume that involving teachers as equal partners ensures development of ownership on behalf of the teachers and thus it is suggested will help in making the teacher a more effective classroom practitioner. I believe that this active involvement is the most promising way to ensure the effective implementation of new teaching and learning innovations in the sciences.

You advise that a goal is to equip teachers with relevant content and pedagogical knowledge. How should this be done? The most important thought is to make teachers aware of their role as a learner and as a practitioner in the classroom. And how this is to be done is clearly demonstrated by the PROFILES project in practice.

At the Weizmann Institute together with your team you developed a 3 step model in order to develop teachers´ ownership in the context of a long term CPD-program (continuous professional development). What is the initial step and, what central?

The teacher in the role as a practitioner is the initial step in which ownership starts to be developed – namely in the teacher´s mind. In addition, this step is the foundation for further development of leadership oriented characteristics and behaviors.

How is the approach of teachers´ ownership embedded into the PROFILES project?

First of all we involve teachers in CPD oriented workshops. Ideally the workshop provides a platform for reflection (and feedback) for the teachers. The feedback is provided by the other teachers as well as by the professional development providers (leading teachers).In addition to the ability to reflect on their practice, we have observed and identified

other variables that indicate development of a sense of ownership. They can range from identifying socio-scientific issues with local background to positive feedback from students or a certain level of identity with the program taught.

Concerning the implementation of the teachers´ ownership as a key competence, what you do think is the chief difficulty?

The real challenge is to achieve the basic change in the people´s mind. Even very experienced professional development providers have to do a lot of persuading. But if you achieve this, the result is worth the effort.

Thank you for the interview.

4 Findings and Insights from the First Round of the PROFILES Curricular Delphi Study on Science Education

by Theresa Schulte & Claus Bolte (Freie Universität Berlin, Germany)

Between March and July, 2011, the first round of the PROFILES Curricular Delphi Study on Science Education was carried out by 19 different PROFILES partners in their respective countries. Around 100 stakeholders per partner/institution and all in all, a total of 2302 stakeholders (status January 2012) participated in the first round. The stakeholder samples of the PROFILES Curricular Delphi Study on Science Education consist of 4 different groups that were directly or indirectly involved with science and science education respectively. As agreed by the PROFILES consortium, the following 4 main groups were involved as participants:

1. Students with science subjects
2. Pre- and in-service science teachers
3. Science educators/researchers/didactics
4. Scientists and others

The first round offered the participants the possibility to express their ideas about aspects of contemporary and pedagogically desired science education in three open questions regarding motives, situations and contexts (Q1) as well as fields and methods (Q2) and qualifications (Q3).

The participants' statements made in the first round were processed through qualitative and quantitative analyses. In the course of the qualitative analyses, final classification systems for the analysis of the respective participants' statements were established, ranging from category systems with 26 to 165 categories. In the course of the quantitative analyses, the category frequencies in the respective classification systems were determined regarding both the total sample and the different sample groups.

The quantitative analyses showed, in all cases, distinctions between the opinions of different sample groups. A differentiated view on the category frequencies of the different sample groups showed that the sample groups feature different foci and thus deviate in several cases from each other regarding the relative frequency of mention in the different categories. This suggested different accentuations and emphases. However, in all the data regarding the qualitative and quantitative analyses of the first round, provided by the PROFILES partners up to now, a tendency towards current-interest related aspects and aspects related to every-day life could be identified.

It is too early to report on the differences in the category frequencies among the different sample groups, particularly with respect to how far the categories mentioned as particularly rare and frequent, actually reflect what was considered as important or not important, and/or how far these findings are potentially influenced by the extent in which these aspects are realized in educational practice.

In the course of the second round of the PROFILES Curricular Delphi Study on Science Education, we will investigate in what way and to what extent the opinions of the different groups might converge.

5   Report on meetings, presentations and conferences

5.1   Consortium meeting in Ein Gedi

From 12th to 17th of February 2012, all PROFILES partners participated in the third Consortium-meeting in Israel. All partners presented the state of develops in their country and gave an update about their outlook for 2012. During the meeting the partners had the opportunity to exchange experiences and ideas as well as discuss the applications of further scientific instruments.

The project team from the Weizmann-Institute did a great job in organizing the meeting and made a significant contribution to the success of this PROFILES Consortium meeting. We thank them for their efforts.

Finally we can welcome a new member to the PROFILES consortium. For the partner country Sweden, the steering committee agreed to approve Karlstad University with Prof. Shu-Nu Chang Rundgren and her co-operation partner Prof. Carl-Johan Rundgren from the University of Stockholm invited to the consortium meeting. In the name of the whole PROFILES Consortium we wish the Karlstad team a very successful and rewarding start.

5.2   Meeting of the PROFILES work package leaders in Vienna

In December 2011, the PROFILES work package leaders came together in the city of Vienna. From 16th to 18th of December 2011 specific PROFILES experiences were reported and discussed. One of the main topics was the preparation for the "Consortium meeting" in Israel and the achievement of further project objectives.

5.3   ESERA-Conference, Lyon, France

The work package leaders from the PROFILES project ran a symposium at the ESERA Conference in Lyon, September 2011. The mission and intentions of the project were conveyed to an International audience of science educators and researchers. ESERA 2011 was attended by 1500 participants from all over the world and is considered as one of the most important conferences in terms of knowledge exchange among researchers in science education and innovative teaching. A summary of the presentations in the symposium are available on the PROFILES website: www.profiles-project.eu

5.4   1st Iberia journey – Portugal and Spain consortium partners together to consider PROFILES challenges

The "1st Iberia Journey: Inquiry Learning" took place on 1st October, 2011 at the Education and Social Work Faculty of the University of Valladolid, in Spain(Fig. 1).

Besides the Portuguese and Spanish PROFILES consortium partners, this first journey had the humble presence of a group of 15 teachers. After a general presentation on the PROFILES project, discussions

and reflections about Investigation on Education, Teachers Formation, PARSEL and PROFILES style modules application and *Inquiry-Based Science Education* (IBSE) were held.

This journey ended with a very prolific debate where aspects, potentialities and constrains related to PROFILES - an European project with Iberia challenges – were discussed.

In 2012 it is planned to hold the 2nd Iberia journey at the Faculty of Sciences, University of Porto, in Portugal.

6   PROFILES-Modules – Example: Which soap is best?

We are very familiar with soap but have you ever considered how to determine which soap is best? Yet housewives face such decisions everyday in seeking the soap to buy from the supermarket shelves. Certainly the soap must clear well (the scientific component), but what about other factors, such as advertising? In devising an investigation to determining the cleaning action of different soaps in a student-led, inquiry based approach (the PROFILES inclusion of IBSE), is it worthy to go further and incorporate the teaching of argumentation skill through students reflecting on the variety of social factors impacting on choice? And in so doing is it worthy to enable students to attempt to reach a well reasoned, consensus decision on the factors that do play a role in determining the soap to buy. Furthermore, at the same time, can students be called upon to reflect on the emphasis played in determining best choice by the scientific properties of the soap itself?
For more information see: http://www.icaseonline.net/profiles/modules.htm

7   Future Events involving PROFILES

7.1   International stakeholder conference

The International Stakeholder Conference will take place from 24th – 26th September 2012 in Berlin as per the PROFILES schedule. This conference will consist of: plenary presentations, poster sessions

and opportunities to interact and discuss. The deadline for the call for papers or presentations has been set for the 15th March with actual submissions to appear in the conference book for 1st of June 2012. Further information can be found on the International PROFILES webpage: www.profiles-project.eu

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7.2 ICCE and ECRICE conference

This year the 22nd International Conference on Chemistry Education will take place from 15th to 20th July 2012 in Rome, Italy. The main topics on the Conference include communicating chemistry, didactics of third level chemistry, ICT and multimedia in teaching chemistry, didactics of second level chemistry, laboratory work in teaching chemistry. In addition, the changing role of Chemistry in Society, the way this science is perceived and the influence of social, scientific, cultural and didactic aspects and other emerging disciplines will be discussed. PROFILES plans to run a symposium during the conference to further disseminate the project, its ideas, CPD approaches and objectives to chemistry educators worldwide. Further information is available on: http://www.iccecrice2012.org/en/index.php

7.3 GDCP conference

The GDCP conference takes place in Hannover, Germany from 17th to 20th September 2012. The annual conference makes a contribution to inquiry based learning. The deadline for contributions and papers is the 22th of April 2012. PROFILES consortium partner will attend the GDCP Conference to introduce the project and experiences gained by doing PROFILES to the – mostly – German speaking colleagues.
For further information see: http://www.gdcp.eu/index.php/tagungen/jahrestagung