Welcome to the PROFILES-Newsletter Issue 06/2014

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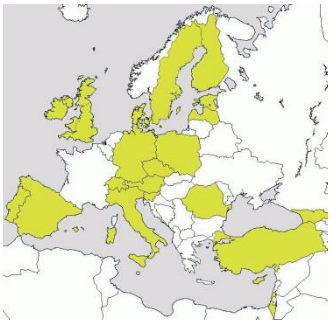

Editorial

Dear readers,

The sixth Newsletter of the PROFILES project focuses on the evaluation of students' gains, where partners investigate the impact of PROFILES teaching modules. Good examples from the Berlin and Czech partners are shown.

Furthermore, the new project partners from Sweden and Denmark, as well as the partners from Switzerland and Italy, give an insight in their PROFILES activities, including their Continuous professional development courses and Network activities, the development of PROFILES modules as well as an evaluation of students' gains.

Finally, this newsletter gives an overview of (future) national and international conferences.

Your PROFILES team

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1 Students' Gains within PROFILES

1.1 Why and How to Evaluate Students' Gains and the Impact of PROFILES on Student Motivation

by Claus Bolte (Freie Universität Berlin, Germany)

Introduction

As PROFILES takes the slogan "Education through Science" seriously, the PROFILES partners are interested in finding out how students benefit if they participate in PROFILES type science lessons. For this reason, within work package 7 (WP7: "Students' Gains"), the partners agreed to investigate the impact of PROFILES type learning environments (the so called "PROFILES modules") in the frame of the PROFILES interventions carried out within the PROFILES CPD programmes in order to find out how PROFILES type of science teaching impacts on students' motivation to learn science.

Therefore, one main question the PROFILES partners want to answer is: How do students assess the motivational learning environment in PROFILES science lessons? The partners try to answer this question by evaluating motivational aspects (variables) such as the students' satisfaction with their science lessons. This aspect is important when evaluating students' benefits as students who are individually more satisfied with their science lessons are more motivated to learn science. If students show a high satisfaction with the science education within the PROFILES implementation, we can conclude that PROFILES modules (see WP4) and the PROFILES teaching and learning approaches, with which teachers got actively involved in the long term PROFILES CPD programmes (see WP5), lead to an increase of students' gains.

There is an enormous number of approaches and studies claiming to focus on students' motivation and the question of how to enhance and assess this, promising meaningful and enlightening insights. However, if you take a closer look at the scientific quality of those contributions and recommendations, the theoretical soundness and their practical usefulness become more and more doubtful (Bolte, Streller & Hofstein, 2013).

Since the beginning of my research career, I dedicated a lot of my efforts to the evaluation of 'students' gains' – or to be more precise with the terminology: 'on the "(self-) assessments by students on how they perceive and assess central aspects (variables) of the "Motivational Learning Environment [MoLE]" in (their) science classes (Bolte, 1995).

To keep a long story short: After more than 20 years of research on how to evaluate students' assessments of their science lessons regarding their perception of the motivational learning atmosphere in their science classes, I have developed an instrument which is theoretically and empirically sound, easy to handle and not time-consuming (Bolte, 1995; Bolte, 2006). Our experiences with conducting the MoLE instrument in different studies convinced the PROFILES partners to use the MoLE instrument for evaluating the impact and success of PROFILES activities on students' gains.

Some remarks on the theoretical background of the MoLE Analyses

For those who are interested in the theoretical basis of the MoLE instrument and the analyses based on data collections by means of the MoLE questionnaires, I would recommend reading the one or other article listed in the references at the end of this contribution.

For those who want to get the needed information, as brief as possible, I would like to answer the question of which theoretically based aspects (variables) the MoLE instrument is focussing.

Based on my experiences, I can state that if a teacher is interested in the motivational atmosphere of his or her classes he or she should focus on how their students perceive and assess the following aspects (or to be more scientifically sophisticated: "scales or dimensions") of the motivational learning environment in their science lessons (Bolte, 1995; 2006); namely:

- satisfaction,
- comprehensibility/requirements,
- subject orientation,
- relevance of the topics,
- students' opportunities to participate,
- class cooperation and
- individual student's willingness to participate.

An empirically tested and sound instruction model may illustrate why these aspects (variables, scales or dimensions) are worth and important to focus on and how a single variable effects the others (see figure 1).

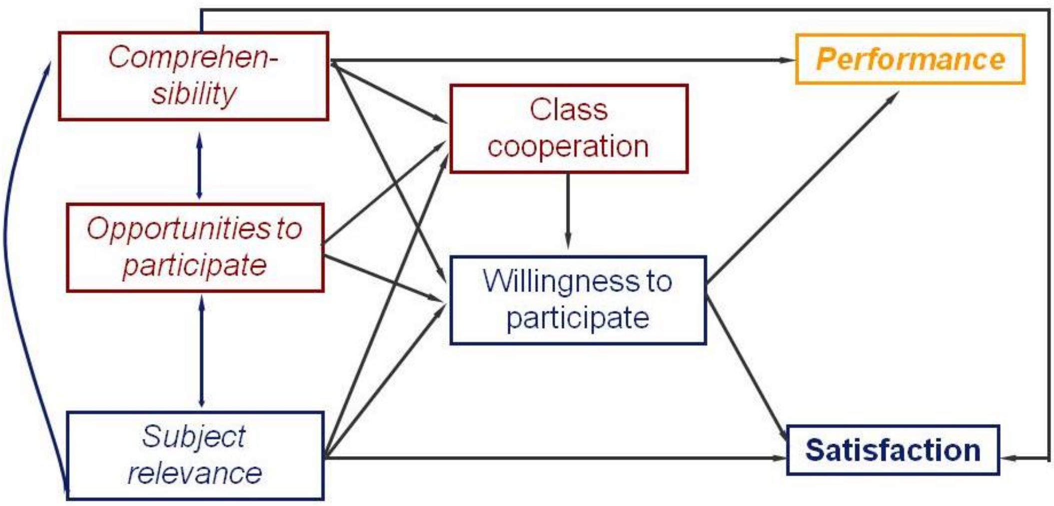

Figure 1: Theoretically based and empirically sound Model regarding the impact of the different MoLE variable on students (intrinsic) motivation to learn science

But how much information does a teacher – interested in his/her students' motivation to learn science – really get, if he/she asks them to comment only on their perceptions of the learning environment of their science lessons? How is this related to what and how the students want to learn? What do they really expect from (school) science education, and/or how do they really want to become scientifically educated?

In order to receive a more sophisticated and scientifically valid answer to these questions, I – as a teacher trying to initiate "Education through Science" – need to know more about what my students expect from their science lessons and from their science education: I need to know how my students wish their science lessons to be. In other words: Smart learning environment researchers recognise this – in an easy term (as smart people do): 'Don't ask your students only how they perceive and assess the lessons (in general) but ask them also how they wish their lesson to be.'

From these considerations, the MoLE instrument was created, on the one hand to focus on motivational aspects of students' learning in general so as to get information about their "reality assessment" ("REAL" version) and, on the other hand, about the students' reflections on how they wish their science lessons to be ("IDEAL" version).

If I know both – my students' wishes (their 'IDEAL' lessons assessments) and the perception of their reality (their 'REAL' lessons assessments), then I can combine 'wish and reality assessments' and calculate IDEAL-minus-REAL values, or as I call it: the "Wish-to-Reality-Differences (WRD)" These wish-to-reality differences offer insights into how the students assess what has been done (more or less) well and in which areas changes are necessary in order to improve the science lessons.

Therefore, from my point of view, it seems plausible and meaningful to use the MoLE instrument and the corresponding approach as the basis of their students' gains analyses and evaluation.

A teacher can gain many more insights than those I just mentioned from MoLE investigations (for example how boys and girls, upper or low high school students, gifted or less gifted children assess science lessons in general (e.g. PROFILES or non-PROFILES lessons), or in which fields of science lessons the students perceive the most important deficiencies (or wish-to-really differences). However, to express all the opportunities the MoLE instrument can provide would be too much information for this PROFILES Newsletter. However, some examples of how the PROFILES partners use the MoLE questionnaires and what insights they receive by analyzing the data they collected are shared in this newsletter.

Outlook

All PROFILES modules (or any other innovative practice approach) can be evaluated using the "Questionnaires for the Assessment of the 'Motivational Learning Environment' (MoLE)", and the PROFILES group of the Freie Universität Berlin recommends this as often as possible and appropriate. Most of the PROFILES partners are already using the MoLE questionnaires and experiencing the benefits and challenges of the MoLE questionnaires. From this they are gathering insights into students' motivation to learn science and/or into how their students' motivation is developing when conducting innovative science teaching and learning approaches such as PROFILES. In this volume of the PROFILES Newsletter, some partners contribute their experiences related to the different questionnaire versions of the MoLE instrument. The partners' reports on their MoLE data analyses offer insights into their empirically-based field analyses.

References

Albertus, M., Bolte, C., & Bertels, N. (2012). Analyzing the Relevance of Science Education from Students' Perspectives regarding Developmental Tasks, Self and Prototype Attitudes and Motivation. In C. Bolte, J. Holbrook & F. Rauch (Eds.*),* *Inquiry-based Science Education in Europe: First Examples and Reflections from the PROFILES Project* (pp. 75–78). Berlin: Alpen-Adria-Universität Klagenfurt.

Bolte, C. (2012). How to analyse and assess students' motivation to learn chemistry. In M. Kapanadze & I. Eilks, (Eds.), *Student Active Learning in Science* (pp. 36–38). Ilia State University Press. Tbilisi (Georgia).

Bolte, C. (2012), & Streller, S. (2012). Evaluating Students Active Learning in Science Courses. *Chemistry in Action! 97,* 13–17.

Bolte, C., & Streller, S. (2011). Evaluating Student Gains in the PROFILES Project. *Proceedings of the European Science Educational Research Association (ESERA),* Lyon, France, September 2011. Retrieved from: http://lsg.ucy.ac.cy/esera/e_book/base/ebook/strand5/ebook-esera2011_BOLTE_1-05.pdf (31.05.2012).

Bolte, C. (2006). As Good as It Gets: The MoLE-Intrument for the Evaluation of Science Instruction. *Paper presented at the Annual Meeting of the National Association for the Research on Science Education (NARST)*, San Francisco, USA, April 2006 (Polyscript).

Bolte, C. (2001). How to Enhance Students´ Motivation and Ability to Communicate in Science Class-Discourse. In H. Behrendt and others (Eds.), *Research in Science Education – Past, Present, and Future* (pp. 277–282). London: Kluwer Academic Publishers.

Bolte, C. (1995). Conception and Application of a Learning Climate Questionnaire based on Motivational Interest Concepts for Chemistry Instruction at German Schools. In D.L. Fisher (Ed.), *The Study of Learning Environments* (pp. 182–192). Vol. 8. Perth, Australia: Curtin University.

Streller, S., & Bolte, C. (2011). A Longitudinal Study on Science Interests. *Proceedings of the European Science Educational Research Association (ESERA)*, Lyon, France, September 2011. Retrieved from: http://lsg.ucy.ac.cy/esera/e_book/base/ebook/strand10/ebook-esera2011_STRELLER-10.pdf (31.05.2012).

1.2 Motivational Content in PROFILES Modules – Experiences by the Czech PROFILES Partners

by Josef Trna & Eva Trnova (Masarykova Univerzita, Czech Republic)

In today's society greater demands are being placed on education systems to produce students who master, not only science skills and knowledge, but especially skills and knowledge which are essential for successful every day and professional life. These crucial skills for modern employees are sometimes referred as "learning for life and work." These include learning to think critically, to analyse and synthesis information, to solve problems in a variety of contexts, to work effectively in teams and self-education (Pellegrino & Hilton, 2012). In order for students to achieve these educational outcomes, teachers need suitable teaching methods. Primarily it is necessary to increase student motivation. Students arrive in class with different degrees of motivation. We consider the motivation of all students towards science and technology learning essential and yet a very heavy task for teachers.

Czech science teachers struggle with low student levels of motivation. According to research conducted under PISA, most Czech students who participated in PISA are bored during lessons. A very common complaint by Czech teachers is "my students are unmotivated!" On the second hand, Czech students often ask such questions as “What's in it for me?” or “Yeah, but what am I gonna use this for?” The students are sceptical of the significance of the material taught to them in the classroom. It seems these questions are looking for relevance but initially do not find the content important for them. The PROFILES modules are a suitable solution to both problems – they are based on issues of everyday life, so they are relevant to student and the familiarity of the relevant issue promotes student motivation.

PROFILES modules are aimed at creating an opportune learning environment, because student cognitive gains are mainly affected by their experiences within school and with a subject in their corresponding field of interest. Therefore, we utilized the Motivational Learning Environments in science classes (MoLE) instrument (Bolte, 2006), as agreed by PROFILES steering committee, to determine the motivational impact of PROFILES modules and translated it into the Czech language. PROFILES teachers applied the MoLE questionnaires in classrooms where PROFILES modules were used. Students answered the questionnaire items twice, at the beginning of the school year before implementation of PROFILES modules and for a second time, after instruction based on modules. After the first round of the PROFILES CPD, we collected 634 responses from a representative sample of students aged 14–15 years, 318 boys and 316 girls from 22 secondary schools.

Given the scope of this paper and interest of Czech teachers, we focus on questions which relate to the relationship of students to content relavance. Students express their views on whether their lessons contain what they need in everyday life and what is important for the development of society. Students determine the level of importance of science using the Classes Scales in the MoLE Real Version (focusing on how the students perceive their actual science lessons) and the MoLE Ideal version (focusing on how the students wish their science lessons to be). Partial results of the questionnaire survey are shown below (see Table 1 and 2).

ACTUAL or REAL lesssons which students attend in the area of science (number of students = 634)								
Question		Scale and percentage of answers						
1	The level of importance to **my everyday life** of the topics I study in science lessons may be described as:	Extremely important	Very important	Important	Fairly important	Somewhat unimportant	Very unimportant	Extremely unimportant
		2	**7**	**23**	36	25	6	1
2	The level of importance **to society** in general of the topics I study in science lessons may be described as:	Extremely important	Very important	Important	Fairly important	Somewhat unimportant	Very unimportant	Extremely unimportant
		5	**17**	**29**	32	15	1	1
IDEAL lesssons which students attend in the area of science (number of students = 634)								
Question		Scale and percentage of answers						
1	For me, science lessons should be useful in **my everyday life**:	Extremely important	Very important	Important	Fairly important	Somewhat unimportant	Very unimportant	Extremely unimportant
		6	**18**	**33**	23	14	5	1
2	For me, science lessons should be relevant **to society** in general:	Extremely important	Very important	Important	Fairly important	Somewhat unimportant	Very unimportant	Extremely unimportant
		12	**17**	**35**	25	8	2	1

Table 1: Questionnaire Survey Results **before** implemantation PROFILES module

ACTUAL or REAL lesssons which students attend in the area of science (number of students = 634)								
	Question	Scale and percentage of answers						
1	The level of importance to **my everyday life** of the topics I study in science lessons may be described as:	Extremely important	Very important	Important	Fairly important	Somewhat unimportant	Very unimportant	Extremely unimportant
		1	**4**	**17**	34	30	11	3
2	The level of importance **to society** in general of the topics I study in science lessons may be described as:	Extremely important	Very important	Important	Fairly important	Somewhat unimportant	Very unimportant	Extremely unimportant
		5	**15**	**25**	30	20	4	1
IDEAL lesssons which students attend in the area of science (number of students = 634)								
	Question	Scale and percentage of answers						
1	For me, science lessons should be useful in **my everyday life**:	Extremely important	Very important	Important	Fairly important	Somewhat unimportant	Very unimportant	Extremely unimportant
		6	**17**	**33**	22	14	6	2
2	For me, science lessons should be relevant **to society** in general:	Extremely important	Very important	Important	Fairly important	Somewhat unimportant	Very unimportant	Extremely unimportant
		12	**15**	**35**	26	9	2	1

Table 2. Questionnaire Survey Results **after** implemantation PROFILES module

Student responses before implementing modules. Related to the real lessons, smaller then a quarter of students (22%) consider science content, to some extent, as important (extremely important + very important + important) for their daily lives and 45% of the students believe it is important to society. On the contrary, 44% of students consider science content to some extent unimportant (somewhat unimportant + very unimportant + extremely unimportant) to their daily lives and about 25% of students as unimportant to society. Approximately a third of students expressed a neutral opinion to both questions. We can say that the students think the science content is important from the perspective of the needs of society, but not for their daily lives.

Students also expressed their wishes regarding science content in an ideal science lesson. More than half (56%) of students would like the science content related to everyday life and 62% of students said that the science content should be beneficial to society. We could see a significant difference between desire and reality, from the students' perspective. They wanted to study topics related to every day life, or relevant to them. Approximately a quarter of the student answers were neutral to both questions.

Student responses after implementing modules. We can see a significant differences in comparison with the previous findings. There is a shift in student answers towards the perception of the "importance" of topics in all questions, but it is most obvious in the case of real lessons. About 10% of students show a change of mind on the importance of science lesson for their every day life, after an implementation of the PROFILES modules and aproximetly 6% in the case of society. The number of students with neutral opinions is almost the same. It is understandable that the results concerning the ideal lesson differ little.

Our research confirms the international experience that problems of everyday life motivate and inspire students to study science. There is an evident contradiction between what is really taught in Czech schools and what students like to be taught. An absence of content relevance is a common complaint of Czech students about their science lessons and a reason for a lack of desire to continue studying science at university. These findings support other studies carried out in the Czech Republic (MEYSCR, 2008; MEYSCR, 2010). Science educators need to consider this fact when innovating teaching/learning methods. It is necessary to pay attention to this issue during the CPD of Czech teachers. What is seen as relevant by teachers and other adults may not be perceived as relevant by young people. According to interviews with PROFILES teachers, a great benefit of the PROFILES CPD is that they learn to create modules (lessons) based on issues which students consider to be important and interesting to them.

References

Bolte, C. (2008). A Conceptual Framework for the Enhancement of Popularity and Relevance of Science Education for Scientific Literacy, based on Stakeholders' Views by Means of a Curricular Delphi Study in Chemistry. *Science Education International*. *19*(3), 331–350.

Ministry of Education, Youth and Sports CR. (2008). *Důvody nezájmu žáků o přírodovědné a technické obory. Výzkumná zpráva*. Retrieved from MEYSCR web: http://ipn.msmt.cz/data/uploads/portal/Duvody_nezajmu_zaku_o_PTO.pdf (15.01.2012).

Ministry of Education, Youth and Sports CR. (2010). *Talent nad zlato.* Retrieved from MEYSCR web: http://userfiles.nidm.cz/file/KPZ/KA1-vyzkumy/brozura-talentnadzlato-web.pdf (15.01.2012).

Pellegrino, J. W., & Hilton M., L. (2012). *Education for life and work: developing transferable knowledge and skills in the 21st century*. Washington, D.C.: National Academies Press

2 PROFILES Activities by Partners

2.1 PROFILES in Sweden

by Susanne Walan, Torodd Lunde, Cartl-Johan Rundgren & Shu-Nu Chang Rundgren (Karlstad University, Sweden)

In February 2012, the Karlstad University in Sweden joined the PROIFLES project and started its activities within the different work packages. The achievements by the Swedish PROFILES group is shown in the field of Continuous Professional Development (CPD) programmes and the investigation of students' gains related to a PROFILES module on Crime Scene Investigation (CSI).

The Swedish Continuous Professional Development (CPD) programme: An example

CPD programmes allow teachers to participate in a co-constructing process, emphasizing school culture and a teacher's voice as a central component (Harrison, Hofstein, Eylon & Simon, 2008). It also enables possibilities to challenge and negotiate the meaning of the key ideas within tradition and teaching practices. Therefore reflections on the explicit aspects of teaching traditions, in relation to inquiry, are used as a mean to promote negotiation of meaning during the co-constructing process of designing a PROFILES module. A main strategy is to incorporate the elements of

(1) the existing laboratory teaching tradition in Sweden, and
(2) the teachers' group reflections on inquiry-based science teaching mentioned in the Swedish curriculum (Lgr 11), besides offering possibilities to use new equipment and using a PROFILES, three-stage, teaching module as teaching support.

This strategy is to facilitate the teachers' negotiation process between the key ideas of laboratory work existing in the Swedish teaching tradition/teaching practice and of laboratory inquiry-based teaching discussed in the international literature. The CPD programme demonstrates the co-constructing process among the in-service science teachers and the CPD provider.

Within the CPD programme, an approach using a three-stage module (contextualization, de-contextualization/inquiry-based activity and re-contextualization/argumentation) promoted by PROFILES, was shared with 15 in-service, lower secondary teachers within the same school district. The CPD programme lasted for 40 hours in total, distributed over four whole days and two half days, within a school year. The participants were divided into five groups with three teachers in the group discussion section within the CPD. Each group was expected to develop, implement and present their own PROFILES module. During the co-constructing process, the aspects of teaching tradition were made explicitly in the lectures and the teaching material for teachers to reflect upon, besides this new material offered to the teachers.

During the PROFILES CPD programme, the participating teachers were given time and space to reflect on their own teaching tradition and the key ideas shown in the Swedish curriculum concerning inquiry-based science teaching. From our findings, the participating teachers explicitly addressed the differences of seeing inquiry as a learning outcome versus seeing inquiry as a teaching method (Gyllenpalm et al., 2010), although not by every participating teacher though.

The results show that:

(1) the design of our CPD programme, by taking teachers' teaching tradition into account and making it explicit for in-service teachers to reflect and discuss, was feasible;
(2) it takes time in negotiating the traditional and new ideas to achieve harmony.

Sessions (Total 40 hours)	Agenda	Group activity
Session 1 8 hours	Presentation on importance of scientific literacy in science education.	• Teachers divided in groups by themselves • Group reflections • Choose theme for the module
Session 2 8 hours	Pedagogical content knowledge linked to SSI and context-based teaching; Laboratory work in traditional teaching is contrasted to IBST	• Group reflections • Start to create three-steps module
Session 3 8 hours	Pedagogical content knowledge linked to assessment	• Time to continue the planning of three-steps module
Session 4 8 hours	Group activities (only)	• Time to fulfil the planning of three-steps module • Teachers expected to implement module after this session
Session 5 4 hours	Group activities (only)	• Reflections on implementation • Fulfil documentation of the module
Session 6 4 hours	Presentations of modules	• Presenting modules, experiences and reflections on implementation • Sharing documented modules

Table 1: The design of the CPD programme


Pictures 1–2: The PROFILES CPD programme from autumn 2013 to spring 2014.

Our CPD programme is presented as a good model for future and long-term CPD programmes to promote inquiry-based science teaching.

Students' responses to a PROFILES 3-stage teaching module

Within the CPD programme, a PROFILES 3-stage teaching module on Crime Scene Investigation (CSI), based on a real case presented in the local TV news, was developed and students' responses to this module were investigated. Based on the definition and the importance of inquiry- and context-based teaching approaches, students conducted an inquiry process in learning sciences in a meaningful context, which is embedded within a 3-stage module design, seen as:

(1) contextualization (an initial context/scenario),
(2) de-contextualization (scientific inquiry process) and
(3) re-contextualization (socio-scientific decision-making and argumentation).[1]

Students' responses to the CSI module were collected based on the following research questions:

1. Is the CSI module better than students' science lessons in general in their school?
2. Is the CSI module better than students' thoughts of a perfect science lesson?

In the autumn of 2013, a Likert scale questionnaire was given to six classes of 9th graders (N=105) 15-years-old students from two different schools before and after the CSI module. The questionnaire, based on the PROFILES MoLE questionnaire (Bolte, Streller & Hofstein, 2013), was composed of three parts allowing students to compare:

a) their thoughts on a perfect science lesson,
b) the science lessons in their schools in general,
c) the CSI PROFILES module.

The results (see Figure 1) disclosed that the CSI module was seen as significantly better than students' science lessons in school ($p < 0.05$), except question four regarding the link of science to their everyday life. Concerning students' responses to the CSI module and their perfect science lessons in mind, we found that there were not significant differences among the questions, apart from question number five, which was about science in society. Earlier studies (e.g. Gutwil-Wise, 2001; Kennedy, 2013; Parchmann et al., 2006) have shown that students' interests could be increased via inquiry- and context-based science education (IC-BaSE). Our study confirmed these findings. In our study, the CSI module made almost all of the students interested in

[1] Further modules developed by the Swedish PROFILES team can be found on the Swedish PROFILES Homepage:
https://www.itslearning.com/kau/profiles/modules/

science (Question 1 in Figure 1). One surprise was that the students did not see the need for science to be connected to society in their perfect lessons (Question 5 in Figure 1). The reason for this could be that they were still too young to see science in society as important. Newton (1988) claimed that the individual perspective might be more important for younger children, but the societal dimension was more interesting and relevant as the child grews and matures. In addition, students' felt that the perfect science lessons are more everyday-based (Question 4 in Figure 1), but in our CSI module and their science lessons in school, this aspect was not achieved. Reflecting on this result, the content of the CSI module was dealing with a crime scene and which was not part of their everyday life.

A study by Hsu and Roth (2010) found that students, who had the opportunity to participate in an internship with real scientists in a university setting, described their experience as meaningful because of the authentic nature. The results from our study might of course have been influenced by the learning environment being a laboratory, with good equipment and the same kind of investigation as in a real crime-laboratory. Some of the participated students also asked about the jobs related to using a science laboratory during the break of the activity, which also showed that students' attention was caught via the CSI PROFILES module.

In sum, the CSI PROFILES module was shown to be a suitable IC-BaSE teaching module in our study with 105 students' responses. In our experiences working with in-service teachers, they very often mentioned that IC-BaSE teaching was too time consuming or hard to combine both context and inquiry approaches. In our study, we have presented a three hour IC-BaSE PROFILES module showing the possibility of conducting IC-BaSE in a reasonable time scale. Students' feedback was of importance for teachers to know, and the Likert scale questionnaire was also useful to investigate students' pre- and post-feedback on the teaching activity. This study contributed to IC-BaSE and science teachers' teaching practices.

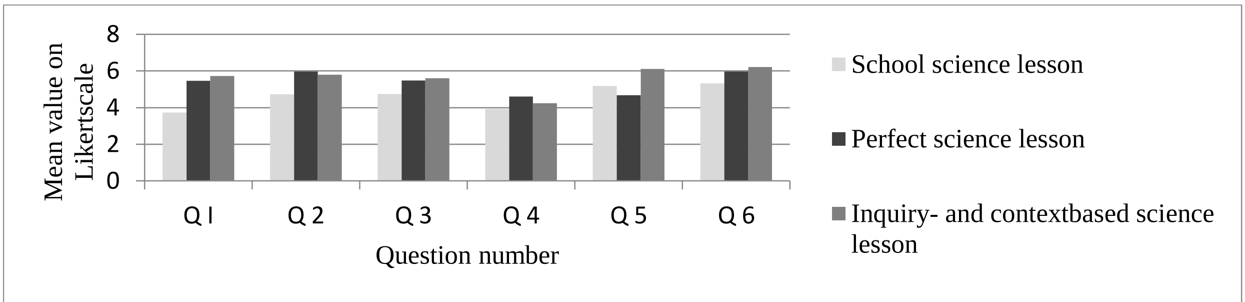

Figure 1: Mean values in questions concerning science lessons at school, a perfect lesson and an IC-based lesson.

References

Bolte, C., Streller, S., & Hofstein, A. (2013). How to motivate students and raise their interest in chemistry education. In I. Eilks & A. Hofstein (Eds.), *Teaching chemistry – a studybook* (pp. 67-95). Rotterdam: Sense Publishers.

Gutwil-Wise, J. (2001). The impact of active and context-based learning in introductory chemistry courses: An early evaluation of the modular approach. *Journal of Chemical Education*, *77*(5), 684–690.

Gyllenpalm, J., Wickman, P. O., & Holmgren, S. O. (2010). Secondary science teachers' selective traditions and examples of inquiry-oriented approaches. *NorDiNa (Nordic Studies in Science Education), 6(*1), 44–60.

Harrison, C., Hofstein, A., Eylon, B., & Simon, S. (2008). Evidence-based professional development of science teachers in two countries. *International Journal of Science Education, 30*(5), 577–591.

Hsu, P-L., & Roth, W-M. (2010). From a sense of stereotypically foreign to belonging in a science community: Ways of experimental descriptions about high school students´ science internship. *Research in Science Education, 40*(3), 291–311.

Kennedy, D. (2013). The role of investigations in promoting inquiry-based science education in Ireland. *Science Education International, 24*(3), 282–305.

Newton, D. P. (1988). *Making science education relevant*. London: Kogan Page.

Parchmann, I., Grasel, C., Baer, A., Nentwig, P., Demuth, R., & Ralle, B. (2006). Chemie im Kontext: A symbiotic implementation of a context-based teaching and learning approach. *International Journal of Science Education, 28*(9), 1041–1062.

2.2 How Are We Doing with PROFILES in Copenhagen?

by Jan Alexis Nielsen, Lærke Bag Jacobsen, Klavs Frisdahl Jacobsen, Claus Jessen Jacobsen & Fie Lykke Hansen (University of Copenhagen, Denmark)

The University of Copenhagen joined the PROFILES project in November 2013. In this article we present the first interim results of our PROFILES Curricular Delphi Study and give an overview of our activities in Continuous Professional Development Courses and the development of a PROFILES network in Denmark.

The PROFILES Curricular Delphi Study

Currently we are in the process of finishing the second round of the Delphi study and we have some preliminary results that are quite interesting. Since more than 50% of the responses are from science teachers, we believe that the results are relevant when related to topics taught in Danish upper secondary schools, even though the sample, with 69 participants (see Figure 1), is still very small.

The top ten categories rated by the stakeholders for the second round of the Delphi study for the ideal teaching in science at Danish upper secondary schools (grade 10–12) shows that five of the ten categories listed as top priority clearly relates to Inquiry-based Science Education (see Fig. 2).

These are:

- Critical approach to scientific information and data,
- Scientific techniques and skills,
- Collecting and handling data,
- Experimentally based science inquiry competence
- Nature of Science

This supports the idea of the need for a stronger focus on the skills and competences related to IBSE (Inquiry-based Science Education).

	Students	Science teachers	Industry/ scientists	Scientific education researchers/ admin.	Total
1st Round					
# Invitees	184 +	274 +	172	64	694
2nd Round					
# Invitees	126	55	17	22	220
# Respondents	12	38	8	11	69
%	10%	69%	47%	50%	31%

Figure 1: Participants of the Danish Delphi study

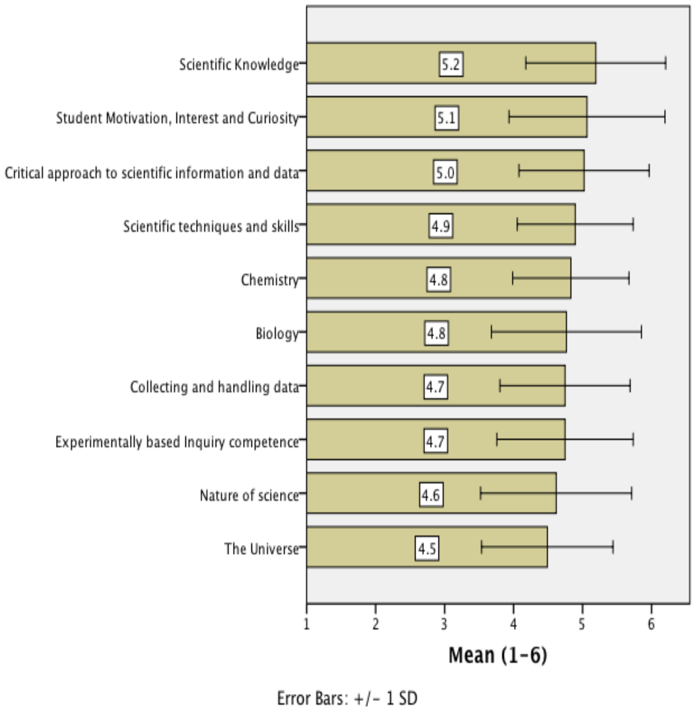

Figure 2: Top ten categories of the 2nd round of the Delphi study for the ideal teaching in science at Danish upper secondary schools

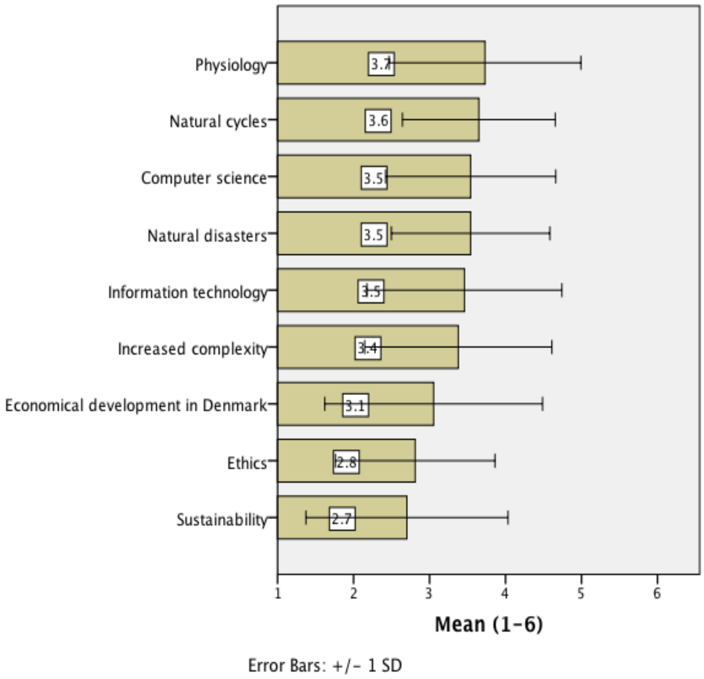

Figure 3: 10 categories rated as least important by the stakeholders of the 2nd round of the Delphi study

Figure 3 shows the bottom ten categories rated by the stakeholders. Again it is interesting to notice that traditional socio-scientific issues as Natural disasters, Increased complexity, Economic development in Denmark, and Ethics and Sustainability are all rated as being among the least important categories for teaching. This puts an even more challenging focus on the Engage-phase of IBSE teaching since just having a socio-scientific focus does not alone ensure that the students engage in the learning process according to the stakeholders.

Continuous Professional Development

We have been conducting three courses for science teachers teaching at the upper secondary level in Danish schools. The first two courses were, because of time constraints, integrated into already planned activities and the focus was not specifically on IBSE. The latest course specifically targeted teaching IBSE for the entire group of science teachers at a Danish upper secondary school.

Network of new science teachers at upper secondary schools

In December 2013, we finalized the first course focussing on IBSE as a teaching method and the creation of a teacher network. 20 teachers from ten different schools participated in this course. As a support for novice science teachers, this course was expected to facilitate their start in the teaching profession and maintain the ideas and visions about the teaching in their subjects. Furthermore, the exchange of experiences supported the transition from being a scientist to becoming a science teacher. Within the frame of four meetings, groups were formed that were expected also to meet, in addition to the official dates. Each meeting was dedicated to a special topic. The intention of the networking was that the groups would continue their meetings after the course.

The teachers assessed an overall need for networks of this type, but at the same time they noted that there is "very little" or "little" time to participate in such a network. This confirmed our belief that new teacher were very busy and did not have the time to participate in further activities. Of course the goal of the network was also to facilitate the everyday life of the participants, but it was probably not happening to any significant extent as yet.

Danish Science Schools

A large number of Danish upper secondary schools are members of the organisation Danish Science Upper Secondary Schools (DASG). The purpose of this organisation is (among other things) to "*develop new teaching and learning methods and new teaching materials on the basis of didactic research and new professional educational ideas … and to support teachers' skills through courses, seminars and conferences.*"[2]

In 2013–2014, this organisation ran a course on Inquiry-based Science Education and Green Technology in which approx. 25 teachers participated. The scope of the course was to visit a range of green technology projects to offer some on-site experience to the teachers attending the course and secondly to develop teaching materials for teachers to use in their classes when teaching green technology subjects using an IBSE approach. The University of Copenhagen was involved in planning and running the IBSE focus in this course.

We conducted interviews with some of the teachers attending the first two courses, focussing on the teachers' experiences with the course and with the implementation of the IBSE approach in their science classes. The findings as shown follow four categories: a) problems, b) challenges, c) advantages and d) keys to success.

[2] http://science-gym.dk/

a) What are the problems seen by the teachers when using the IBSE approach when teaching science in upper secondary?

- Teaching using the IBSE approach reduces science to inquiry. But science is more than just inquiry.
- The IBSE approach is very time consuming and takes time from other ways of teaching.
- In some science topics it is impossible for students to do experiments on. One example is Plate Tectonics.
- For some teachers it is hard to allow the students to take the lead in class and to let them design and carry out experiments not planned and tested by the teacher.

b) What are the challenges when teaching in an IBSE way?

- When using the 6F (the Danish version of the 5E model) the "Fang" (equals Engage) step is hard. Furthermore it is critical to the success of the following phases and does not necessarily engage all students.
- IBSE is hard for the students. It requires a change in the contract between student and teacher regarding the role of the two parties. Who's responsible for what? The students expect the teacher to be responsible for teaching and making sure that the students are learning. It is not enough for the teacher just to facilitate.
- Students need to learn to undertake IBSE. It requires training.
- 6F (or 5E) and IBSE have a dilemma. To be successful IBSE needs to be practiced over and over again. But then again this may be boring for the students to do the same over and over again.

- In the first phases of an IBSE course the teacher will encourage the students to investigate, to come up with an answer and suggest solution to their problems. However at the end of the course the teacher may need to tell the students that their conclusions to their experiments and their answers to their hypothesis are wrong. We – as teacher – are forced to take on another role as "judges". This role differs from the role of guide and consultant in the first phases of the course. A new role that we have refused to fill during the entire course. It changes the role of the teacher.

c) What are the advantages obtained when teaching using the IBSE concept in science teaching?

- Not all students possess the same skills. The IBSE approach allows students to form groups that reflect the skills and the level of ambitions of the students thus allowing for a differentiated teaching environment.
- Based on experience. If the students are actually engaged, they can solve the challenges and successfully do IBSE.
- Also based on experience – there is enough time in science classes to do IBSE.
- One (additional) reason for doing IBSE is that the students will develop additional skills on top of their basic science training. They develop the "meta-skills" side by side with their science knowledge.
- IBSE is not just about making experiments. IBSE is also searching for information in textbooks, in YouTube videos, Ted Talks, graphs, tables etc. It allows for a great level of flexibility.
- IBSE does not mean that teachers are not allowed to teach the students. The difference is that you teach the students when they experience that they have the need for it. And you answer their specific questions. But you do not hand them readymade guidelines for performing the experiments.
- When you manage to engage some students in class this will often "infect" other students to also participate and they involve themselves in performing the tasks required to perform experiments.
- Students are more willing to share their findings from their experiments with others following a more open and self-directed and self-guided course than students normally are following a traditional course.

d) What are the keys to success of IBSE based science teaching from the teachers' point of view ?

- Teaching based on the IBSE approach often requires skills and knowledge on multidisciplinary subjects. Most teachers do not possess this knowledge. This challenge can be supported by setting up fora for teachers to exchange ideas, discuss problems, ask for help etc.
- Make sure that your focus on innovation and entrepreneurship goes hand in hand with your focus on IBSE.
- Obstructions may be one way to steer the students in the right direction or to rethink their experiments or their findings.
- "Traditional" problem and project based learning has the focus mostly on the role of the students. The 6F (or 5E) focusses on the role of the teacher. And the focus is on the teacher's role as a guide throughout the process and hence not letting the students alone with their challenges but setting up a

scenario for the guidance to take place in each step of the model.

- If the students are not engaged, the IBSE setup will die. The Engage phase is essential.

The IBSE course at the Odsherred upper secondary school

In May 2014, we held the first course specifically focused on IBSE and invited all science teachers at the Odsherred upper secondary school. The learning objectives of the three-day course were:

"After this course you will ...

1. *... have knowledge and experience in Inquiry-based Science Education*
2. *... have experience of implementing IBSE with your students*
3. *... implement a language among the participating teachers on the main pedagogical / didactic terms when working with IBSE"*

The outline for the course included the following topics:

- Example of IBSE in practice: Physics
- Example of IBSE in practice: Mathematics
- Development of material for IBSE based courses in groups
- Microteaching
- Evaluation and feedback

The final unit of the course takes place in September 2014, after teachers implement the IBSE teaching approach in their classes. We gather the feedback and discuss the experiences with the participating teachers.

In August 2014 two more courses are planned similar to the described course. To accompany these courses we are writing a compendium to support the participating teachers and to support their role as leading teachers in guiding other teachers.

2.3 How Many Drops of Water Fit onto One Coin? An Evaluated Example of Inquiry-based Learning in Switzerland

by Manuel Haselhofer & Peter Labudde (School for Teacher Education, University of Applied Sciences and Arts Northwestern Switzerland)

Within the context of the PROFILES project, far more than 800 students in German-speaking Switzerland were questioned regarding inquiry-based learning, both before and after going through various teaching units. The following paper presents the practice and evaluation of one exemplary PROFILES unit, which was developed within the PROFILES framework at the School for Teacher Education, University of Applied Sciences and Arts Northwestern Switzerland – Basel, and tested in a school setting. In this case, the students researched the question of "How many drops of water fit onto one coin?" See http://blogs.fhnw.ch/profiles/unterrichtseinheiten.

Figure 1: Drops of water on a coin

Concept

During the implementation of the 45 min. teaching unit *Drops of Water* (Höttecke, 2010, p. 8), it is considered important, in line with inquiry-based learning, that the students are provided with sufficient scope for their own (research) questions and the inquiry-based examination related to them. Hence, the PROFILES module at hand, *Drops of Water,* is not only about the subject-specific learning content but also about characterizing scientific methods of examination and reflecting upon them.

Based on the presentation of a problem, the students are to comprehend the concept of determination of mean value and the idea of mean variation with the help of typical scientific methods and to critically test the gained insights. In groups of two or three, the students examine how many drops of water fit onto a coin. They create an examination plan which is then discussed in class before the experiments with drops of water and they specify the research question during the research process.

In the natural sciences, experiments are conducted in a methodologically controlled way, which means that the independent variables are kept constant and only the dependent variable is varied. The following independent variables are to be kept as constant as possible: number of measurements as statistical value, the drops' height of fall, side of coin, age of coin, grade of wear and soiling of the coin, size of drops or shaking of hands. The variable of interest is the number of drops which fit onto a coin.

Subsequently, the results are presented and reflected upon by the respective groups of students. For this, the different values for the amount of drops on a coin can be demonstrated in a diagram. Exceptional results (e.g. only few drops) can be identified and ignored under specification of the exact circumstances (e.g. very shaky hands).

As a conclusion, the teacher qualitatively illustrates the statistical values "mean value" and "mean variation" by means of diagrams. The role of the teachers, who have to support the students in their inquiry-based learning as moderators, experts, guides, initiators and mentors (Höttecke, 2010, p. 7) has to be taken into account in the process.

Evaluation

After the teaching unit *Drops of Water*, the students in the 7th and 8th grade were asked to give their opinion by means of a paper and pencil test with 14 items to be evaluated on a 7 point Likert Scale. The best possible evaluation of an item was set at 1, the worst was set at 7. The respondents (n=324) showed a predominantly positive evaluation of the teaching unit regarding the items illustrated in table 1. Less positively evaluated items have to be discussed against

Items	mean value MW	standard deviation SD
having fun	2.2174	1.3264
feeling comfortable	1.9412	1.1741
Comprehensibility	2.0405	1.3445
sufficient time	2.2483	1.3871
usefulness of knowledge	4.2950	1.7427
importance of knowledge	4.5047	1.7286
taking suggestions into account	1.9969	1.1551
asking questions	1.6740	1.0670
Participation	2.3766	1.5641
efforts in class	2.5648	1.4138
Endeavour	3.0650	1.8071
Involvement	2.8944	1.4430
getting to know scientific professions	4.6285	2.0787
knowledge of scientific work	4.0619	2.0175

Table 1: Results of teaching unit *Drops of Water (1 highest rating, 7 lowest rating)*

the backdrop of the framework conditions and the prerequisites of the psychology of learning. One approach to explain the poorly evaluated of information regarding *work of scientists* and *scientific professions* can be attributed to the tight time constraints (45-minute teaching unit). At this point, it has to be questioned in how far these two items can be harmonized with the conceptual design of lessons. At some other point, the students are questioned regarding the *usefulness* and *importance* of the knowledge they have just gained. Studies show that metacognition, which is tested in these two items, is generally not acquired until the end of secondary level one (Baumert & Köller, 1996). The items *usefulness* and *importance* also show the widest standard deviations, which suggests a heterogeneous range of opinions.

The teaching unit *Drops of Water* achieved high results in the areas *interest* in the teaching unit and *comprehensibility* of subject matter. The areas of *feeling comfortable* during the teaching unit and the possibility of *asking questions* during class and *making suggestions* were also highly rated. Additionally, the generally well-evaluated item of assessing one's *participation* points to the students' high interest in the teaching unit. In a synopsis of results, it may certainly be assumed that the students gained a lot from the realization of this teaching unit.

References

Höttecke, D. (2010). Forschend-entdeckender Physikunterricht. Ein Überblick zu Hintergründen, Chancen und Umsetzungsmöglichkeiten entsprechender Unterrichtskonzeptionen. *Naturwissenschaften im Unterricht Physik 21,* 6–7.

Baumert, J., & Köller, O. (1996). Lernstrategien und schulische Leistungen. In J. Möller & O. Köller (Eds.), *Emotionen, Kognitionen und Schulleistung* (pp. 137–154). Weinheim: Beltz.

2.4 Involving Italian Schools in PROFILES

by Liberato Cardellini (Università Politecnica delle Marche, Italy)

Introduction

Student motivation has been found to play an important role in their learning strategies, critical thinking, problem solving, conceptual change and learning. Significant studies had been conducted on the motivation concept (Dweck & Leggett, 1988; Ryan & Deci, 2000a). Brophy (2004, p. 249) defined motivation to learn as "*a student's tendency to find academic activities meaningful and worthwhile and to try to get the intended learning benefits from them*." The tendency to seek new challenges, to use and extend their skills, and to explore new areas as well as to learn is a component of our nature. "*The construct of intrinsic motivation describes this natural inclination toward assimilation, mastery, spontaneous interest, and exploration that is so essential to*

Figure 1: Some cities with schools that have used the MoLE questionnaire in Italy

cognitive and social development and that represents a principal source of enjoyment and vitality throughout life." (Deci & Ryan, 2000a, p. 70). Richard Ryan and Edward Deci (2000b, p. 55) distinguish between different types of motivation: intrinsic and extrinsic motivation. "*intrinsic motivation, which refers to doing something because it is inherently interesting or enjoyable, and extrinsic motivation, which refers to doing something because it leads to a separable outcome*."

Mihaly Csikszentmihalyi introduced the concept of flow to explain motivation. The conditions of flow include: *"Perceived challenges, or opportunities for action, that stretch (neither overmatching nor underutilizing) existing skills; a sense that one is engaging challenges at a level appropriate to one's capacities*." and "*Clear proximal goals and immediate feedback about the progress that is being made*." (Nakamura & Csikszentmihalyi, 2002, p. 90)

The MoLE questionnaire

The MoLE (Motivational Learning Environment) questionnaire (Bolte, 2006) is a paper and pencil questionnaire that attempts to measure students' motivation. Developed through 14 questions, the questionnaire considered seven important dimensions for student involvement. The seven different variables are: comprehension of the subject/requirements; the content of the subject; opportunities to participate; personal satisfaction; subject relevance; class cooperation, and effort required and individual willingness to participate (Bolte et al., 2013, p. 75).

After the PROFILES consortium meeting in Porto (October 2013), an intervention in Italy was planned to collect at least 1.000 responses to the MoLE questionnaire, in different types of schools and different ages of students. The schools involved are shown in the map (Figure 1).

The total number of questionnaire collected is 2.344: 1.913 in the first round (from 91 classroom) and 431 at the end of the school year (22 classroom involved). At the end of the school year in many cases it was not possible to repeat the administration of the questionnaires, because the teachers were engaged in tests in class and interrogations. The schools involved are: elementary (4 classroom; 80 students), middle school (9 classroom; 187 students), and secondary schools (78 classroom; 1.646 students). Different secondary schools are involved: vocational schools (11 classroom; 170 students), high schools (Liceo Scientifico, 42 classroom; 1.015 students), technical schools (25 classroom; 461 students). The distribution of school subjects is shown in Figure 2.

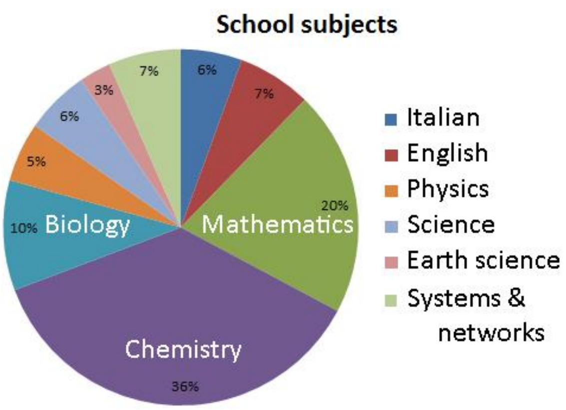

Figure 2: Chemistry, Mathematics, Biology, and English are the subjects with the highest number of questionnaires (N = 2.344)

Comments and conclusions

Motivation is difficult to measure, because "*to be motivated means to be moved to do something.*" (Ryan & Deci, 2000b, p. 54) To measure an objective behaviour with a subjective questionnaire does not always yield reliable results. We can ask how the MoLE questionnaire measure the behavior towards learning. Among these students are included highly motivated students in the study of school subjects and commitments connected with the school, students who are motivated by their teachers, and students absolutely not motivated at all. Let us consider two classes of highly motivated students involved in meaningful learning and engagement, as shown in Picture 1–3.

In the class of high school, the question: For me my English class is a lot of fun this rated 2.52, while in the vocational class the question: For me my chemistry class is a lot of fun was rated 2.06 (range 1–7, 1 the maximum). In a class of non-motivated students, the teacher of chemistry (an expert in the philosophy of the PROFILES project) has tried in every way to involve and interest students: proposed inquiry-based activities, laboratory activities that in similar classes had aroused much interest; even reading the newspaper: no sign of interest at all. In this vocational class the question: For me my chemistry class is a lot of fun was rated 3.86.
According to the results of the MoLE questionnaire, in the interest of the students there is a difference, but it does not reflect the huge difference in behavior toward engagement of students in school. Surveys are useful and even necessary to provide numerical data to evaluate the impact of our teaching and to get directions to improve it. But the measure of aptitude and motivation is hard and questionnaires are just better than nothing, or as correctly stated Bolte (2006) they are "*As Good as It Gets*."

References

Bolte, C. (2006). As Good as It Gets: The MoLE-Instrument for the Evaluation of Science Instruction. *Proceedings of the Annual Meeting of the National Association for the Research on Science Education (NARST)*, San Francisco, USA, April 2006.

Bolte, C., Streller, S., & Hofstein, A. (2013). How to motivate students and rise their interest in chemistry education. In I. Eilks & A. Hofstein (Eds.), *Teaching chemistry – a studybook* (pp. 67–85). Rotterdam, Sense Publishers.

Brophy, J. (2004). *Motivating students to learn*, Mahwah, NJ: Lawrence Erlbaum.

Dweck, C.S., & Leggett, E. L. (1988). A Social-Cognitive Approach to Motivation and Personality, *Psychological Review*, *95*(2), 256–273.

Ryan, R. M., & Deci, E. L., (2000a). Self-Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well-Being, *American Psychologist*, *55*(1), 68–78.

Ryan, R. M., & Deci, E. L. (2000b). Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions, *Contemporary Educational Psychology 25*(1), 54–67.

Nakamura, J., & Csikszentmihalyi, M. (2002). The Concept of Flow. In C. R. Snyder & S. J. Lopez (Eds.), *Handbook of positive psychology*. (pp. 89–105). New York: Oxford University Press.


Picture 1: Students in a vocational school making paper with recycled paper © Lorenza Battistini


Picture 2: In the prestigious theater Ventidio Basso © Alberto Luciani


Picture 3: Students involved in the rock opera Historock © Alberto Luciani

3 Report on Conferences and Meetings

3.1 National PROFILES Conference in Georgia

by Marika Kapanadze (Ilia State University, Georgia)

On 31st May 2014, a National PROFILES Conference took place at the Ilia State University in Tbilisi, Georgia. About 100 participants expressed an interest to participate. Among the participants were not only the project teachers, but also teachers and school administrators from different parts of Georgia, as well as students and experts in education. The deputy Minister of Education and Science in Georgia, Mrs. Lia Gigauri, was present in the conference and stressed the importance of the development of Inquiry-based Science Education in Georgia. PROFILES teachers presented 6 new lesson modules. Furthermore, two parallel interactive poster sessions were held with posters presenting the implementation of PROFILES in Georgia. Presentations and posters stimulated further discussions between the participants. All presentations and posters are available under the following link: http://profiles-georgia.iliauni.edu.ge/index.php/en/teachers’-national-conference-tbilisi,-may-31,-2014.

Picture 1–3: Participants of the National PROFILES Conference in Georgia

3.2 Representation of PROFILES Cyprus at SCIENTIX

by Chrystalla Lymbouridou (Ayios Stylianos Primary School, Lakatamia, Cyprus) & Demetra Hadjihambi (Geroskipou Lyceum, Pafos, Cyprus)

What is SCIENTIX?

SCIENTIX is an European programme that runs under the auspices of the European Schoolnet, the network of the Ministries of Education of 30 European countries. The programme is focused on the field of STEM (Science – Technology – Engineering – Mathematics) education and it aims to provide a home for all present and past European projects in this field. The main purpose of SCIENTIX is to disseminate the findings as well as the knowledge produced through the relevant European projects, through a set of different activities. PROFILES (shown in the left upper hand-side corner of Figure 1) is one of the projects represented on the SCIENTIX website.

Figure 1: European STEM projects hosted on the SCIENTIX platform

Educational material

SCIENTIX facilitates the archiving, use, evaluation and improvement of educational material produced at a European level. Since 2009, SCIENTIX has gathered a great corpus of educational material produced during a number of European educational projects funded by the European Union under the 6th and 7th Framework Programme for research and technological development, lifelong learning, and various national initiatives. The aim of SCIENTIX is to continue to grow, but also to improve the research and evaluation methods of the hosting educational material. It also enhances the dissemination and thus, the use of this educational material at European level, providing opportunities for translating the educational material, when is requested by at least three teachers.

Teachers


Figure 2. Cyprus teacher

Apart from its website, SCIENTIX provides a portal aiming to facilitate the development of a community of teachers through its online and offline services. The portal is available in six languages: English, French, German, Spanish, Italian and Polish. In the portal, a Moodle platform also provides free on-line courses, which may be enriched by the national agents participating in SCIENTIX. Teachers also have the opportunity to participate in workshops and conferences, which are organized by SCIENTIX, or in projects that have joined the SCIENTIX umbrella. Finally, teachers have the opportunity to take part in competitions related to learning environments, which have been designed in the frame of STEM European projects, hosted by SCIENTIX.

SCIENTIX Dissemination

SCIENTIX has created a network of contact points in EU countries to ensure its dissemination at the national level of each country involved. The emergent network of SCIENTIX covers 30 European countries and includes, among others, Ministries of Education, science centres, universities or training centres. In Cyprus, the responsible national centre for SCIENTIX is the University of Cyprus, while Dr. Demetra Hadjichambi (Biology Education teacher) and Dr. Chrystalla Lymbouridou (Primary Science Education Teacher) have been appointed as SCIENTIX Ambassadors in Cyprus; both of them have participated in the PROFILES European project in Cyprus for three consecutive years.

Meetings of the Cyprus SCIENTIX Ambassadors


Figure 3. Meeting of the SCIENTIX representatives

Dr. Demetra Hadjichambi participated in the first meeting of the SCIENTIX representatives, which took place in Brussels from 29th to 31th November 2013. In addition, Dr. Chrystalla Lymbouridou participated in the second meeting of the SCIENTIX representatives, which took place in Brussels from 14th to 16th February 2014and both participated in the 1st Teachers Spring Workshop in Ljubljana from 23rd to 25th March, 2014. During these meetings, besides explaining their role as ambassadors, Demetra and Chrystalla had the opportunity to learn more about other projects that ran under the European Schoolnet, like "GoLab," "Future Classroom Lab" and "Open Discovery Space." At the same time, these meetings were very helpful in terms of joining a community of teachers with similar interests, such as teaching science in relation to society, or the integration of new technologies into science education. This opportunity was available for each science education teacher, as teachers had the opportunity to participate in the European community of SCIENTIX, which is focused on STEM (Science – Technology – Engineering – Mathematics) education.

SCIENTIX and the PROFILES project

Currently, the PROFILES project is one of the European projects hosted on the SCIENTIX platform. Even though, a great number of socio-scientific, inquiry-based modules have been developed during the PROFILES European project, this educational material has not yet been uploaded on SCIENTIX. In this context, inquiry-based learning environments developed and implemented by the science teachers in Cyprus, or in the rest of the PROFILES partner countries, can be translated and uploaded onto the SCIENTIX platform. This can contribute to the promotion of the PROFILES project as well as to the dissemination of the educational material produced both at a national as well at a European level.

For more information and to be involved with SCIENTIX:

- Visit the website of Scientix: www.scientix.eu
- Register to receive the SCIENTIX newsletter
- Contact the SCIENTIX Ambassadors in your country
- Participate in one of the SCIENTIX conferences, for which partial funding is provided by the European Commission (http://www.scientix.eu/web/guest/conference).

The next SCIENTIX conference will take place from 24th to 26th October 2014.

3.3 Further Conferences and Contributions of PROFILES Partners

NARST Pittsburgh, USA

The annual international conference of NARST (National Association for Research in Science Teaching) took place from 30th March to 2nd April 2014 in Pittsburgh, USA. The PROFILES partners from Israel presented their recent outcomes from the project. Further information can be found via the following link: http://www.narst.org/annualconference/futureconf.cfm

SCITEED 2014, Fethiye, Turkey

From 24th to 27th April 2014, the International Congress and Exhibition on Current Trends on Science and Technology Education took place in Fethiye – Muğla, Turkey. SCITEED aimed to bring together educational scientists, administers, councillors, education experts, teachers, graduate students, civil society organization and representatives to share and to discuss theoretical and practical knowledge in the scientific environment. The PROFILES partners from Romania and Israel gave an insight in learning by cooperation and models of professional development. Further information can be found via the following link: http://www.sciteed.org/

Nordic Research Symposium on Science Education (NFSUN), Helsinki, Finland

From 4th to 6th June 2014, the Nordic Research Symposium on Science Education (NFSUN) took place at the University of Helsinki. The topic "Inquiry-based Science Education in Technology-Rich Environments" was discussed among the approx. 200 participants including researchers, as well as teachers from all levels of education. The symposium functioned as a meeting point and a platform for establishing networks within science education research. PROFILES partners from Finland and Sweden presented the project and their experiences with the Continuous Professional Development courses as well as students' feedback on PROFILES modules.
Further information can be found via the following link: http://www.helsinki.fi/luma/nfsun2014/

Picture 1-3: Swedish PROFILES presenters of the NFSUN Conference 2014

Symposium on Chemistry and Science Education, Bremen, Germany

The 22nd Symposium on Chemistry and Science Education, entitled "Science Education Research and Education for Sustainable Development" was held from 19th to 21st June 2014 at the University of Bremen. PROFILES partners from Austria, Bremen, Denmark, Georgia, Israel and Sweden shared their expertise in relation to the focus of this symposium with the approx. 100 participants from 27 countries. Further information can be found via the following link: http://www.idn.uni-bremen.de/chemiedidaktik/symp2014/index.html

Picture 1-3: Participants of the Symposium on Chemistry and Science Education and presentation of the PROFILES partners from Bremen © Ingo Eilks

4 Future Events

Second International PROFILES Conference, Berlin, Germany

The PROFILES Consortium would like to invite all interested colleagues to the "Second PROFILES International Conference on enhancing IBSE and Scientific Literacy in Europe." This Conference will take place in Berlin from 25th to 27th August 2014. Outcomes and results of the PROFILES project, as well as of other project, will be presented to stakeholders and to other invited guests from schools and other educational practices. Colleagues from other FP7 projects and/or from other projects related to the Conference's topic are especially invited to share their experiences. And all are invited to submit a brief proposal for the foreseen "Science Education Fair" at the PROFILES conference. Further information regarding the current status of the Second PROFILES Conference is available via http://www.profiles-project.eu/.

IOSTE Symposium, Kuching, Malaysia

The 16th IOSTE (International Organization for Science and Technology Education) International Symposia will be held from 21st to 27th September 2014 in Kuching, Malaysia. The Czech PROFILES partners are planning to present the project.
Further information can be found via the following link: http://www.iosteborneo.com/

SCIENTIX Conference, Brussels, Belgium

The 2nd SCIENTIX Conference will take place from 24th to 26th October 2014 in Brussels, Belgium. With the expected participation of around 550 teachers, policymakers, researchers and project managers, it will be one of the major networking events in STEM education in Europe. The deadline to submit proposal for presentations, stands, hands-on workshops or round table is 31st July 2014. Further information can be found via the following link: http://www.scientix.eu/web/guest/conference

International Science Conference LUMEN, Targoviste, Romania

From 21st to 22nd of November 2014, the LUMEN International Conference "Transdisciplinarity and Communicative Action" will take place in Targoviste, Romania. The conference focuses on educational sciences, including the following topics: Research in education, Educational policies, Ethics, Professional development, Lifelong learning, Environmental education. Further information can be found via the following link: http://conferinta.info/

NARST Conference, Chicago, USA

The annual international NARST (National Association for Research in Science Teaching) Conference will take place from 11th to 14th April 2015 in Chicago, USA. The deadline for the submission of proposals is 15th August 2014. Further information can be found via the following link: https://www.narst.org/annualconference/2015conference.cfm

EARLI Conference, Limassol, Cyprus

The 16th biennial EARLI (European Association for Research on Learning and Instruction) Conference for Research on Learning and Instruction will take place from 25th to 29th August 2015 in Limassol, Cyprus. The theme of the EARLI 2015 conference is "Towards a Reflective Society: Synergies between Learning, Teaching and Research". The EARLI 2015 theme addresses the emphasis of the conference on research-based learning and instruction, while highlighting the crucial role of the systematic investigation of learning and teaching as a mechanism for promoting innovative and creative thinking and sustaining long-term societal growth. The deadline for the submission of proposals is 29th October 2014. Further information can be found via the following link: http://www.earli.org/conferences/EARLI_Biennial_Conferences/Future_Biennial_Conferences

ESERA Conference, Helsinki, Finland

The ESERA (European Science Education Research Association) 2015 International Conference will be held in Helsinki from 31st August to 4th September. The PROFILES partners from Czech Republic will present the outcomes of the project. Further information can be found via the following link: http://www.esera.org/announcements/esera-announcements/esera-bi-annual-conference-to-be-held-in/

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.

SEVENTH FRAMEWORK PROGRAMME – 5.2.2.1 – SiS-2010-2.2.1
Supporting and coordinating actions on innovative methods in science education: teacher training on inquiry based teaching methods on a large scale in Europe
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