Editorial
by Christine Knippels, Frans van Dam, PARRISE Coordinators
Utrecht University, Netherlands

Dear readers,

In 11 countries across Europe, the PARRISE partners are about to start their best practices in teacher professional development (TPD). In Malmö, Sweden, 15-17 June, representatives of universities and science centres from the 18 PARRISE partners shared and discussed their plans for TPD. In these teacher training programs, teachers will be taught and have a first-hand experience of how to operationalize the pedagogy of PARRISE, combining inquiry-based learning and socio-scientific issues with citizenship education and responsible research and innovation (RRI).

At the Malmö meeting, the partners benefited a lot from the presence of the External Advisory Board, consisting of world-renowned experts in the field of science education, socio-scientific issues and inquiry-based learning.

After the summer of 2015, partners will implement the TPD programs in their regular TPD courses, thus ensuring that newly developed TPD programs will have been tested for the first time, and the Consortium will reconvene and assess the outcomes. These will, in an iterative way, contribute to the PARRISE approach and the improved TPD programmes will be run for the second time.

PARRISE partners have had many contacts with other project. Firstly, PARRISE builds on successful EU science education projects such as PROFILES and ESTABLISH, profiting from partners that have been members of these consortia. In addition, the PARRISE coordinators and partners have regular contacts with related projects, such as RRI Tools, ENGAGE and IRRESISTIBLE, all projects that concern science education and RRI. In this way, the projects can all share experiences.
Our contemporary world is charged with both promise and uncertainty. Promise in the possibilities for enhanced health, food security, travel and communications offered by the products of science and technology; uncertainty in the scientific, environmental and social risks posed by these products. This is such a feature of these times we live in that these characteristics have been given special names such as The Risk Society or Post-normality.

Meeting these possibilities and risks in a democratic and open society is the challenge set to schooling in preparing young people for their social responsibilities but also to help them enact and deal with problems as young citizens. The ethos behind Research, Responsibility and Innovation (RRI) which underpins SSIBL is to support public involvement in scientific research so that citizens in stimulating research and decision-making can participate in research that advances the public good.

The framework for SSIBL - Socio-Scientific Inquiry-based Learning - has set out to support and operationalise these aims. The framework consists of four ‘pillars’: RRI, Citizenship Education (CE), Socio-Scientific Issues (SSI) and Inquiry Based Science Education (IBSE) which inform pedagogy and help teachers. All these pillars interconnect because RRI can only be realised through politically aware and socially responsible citizens, hence CE, and all operate through prevalent SSIs which draw on scientific evidence and social values. An inquiry-based approach gives young people ownership of issues which are important to them and help them to understand how change takes place.

The framework provides a fresh model which incorporates these pillars, through a range of examples at different age levels, and details of how SSIBL can be taught at all school age levels in the formal and informal sector. A light-touch assessment framework illustrates the characteristics of achievement. A framework for a professional development programme supports teachers in helping to enact SSIBL both within and outside of school curricula in different nations. Based on this framework, the PARRISE partners will, in the year to come, test their development programs for pre- and in-service teachers.

Ralph Levinson is leader of the PARRISE work package that develops and improves the SSIBL framework.

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**Teacher Professional Development (TPD) Courses**

by Shu-Nu Chang-Rundgren
Stockholm University, Sweden

Four institutions, including one focusing on informal learning, are the active participants of this Teacher Professional Development group (WP2):

- Stockholm University
- Stichting Katholieke Universiteit
- Universidad de Jaen
- ENERGY Centre

The group focuses on primary education science and is developing teacher education materials for this target group.

The PARRISE project started in January 2014; by June 2015 (18-month development), the SSIBL seeds are spreading and have started growing in the partners’ countries in Europe. In WP2, we focus on developing primary education teachers’ competence on SSIBL, via SSIBL TPD courses. To date, the four WP2 partner groups (Netherlands, Estonia, Spain and Sweden) have contacted science educators at universities in the subject areas of biology, physics, chemistry and integrated science, science communication researchers as well as pre- and in-service primary school teachers to discuss the SSIBL framework and the further development of the SSIBL TPD courses to implement from autumn 2015 to spring 2016. In the coming months, we look forward to sharing our experiences of our implementation of the SSIBL TPD courses and SSIBL pupil activity modules to enhance primary education teachers’ competence on SSIBL!
Teacher Professional Development (TPD) Courses

**Lower Secondary Education**

Should we be buying Kinder Eggs? How close to a nuclear power plant would you want to live? These are some of the questions our training and practising science teachers have been using in their attempts to implement socio-scientific inquiry-based learning in their science classrooms during this past year. Such activities are part of the pilot phase for our training programme which aims to help lower secondary science teachers teach science based on the SSIBL framework. Over the past year, the 9 partner institutions in our group have worked together exchanging views on the SSIBL framework and how to best implement it in their respective contexts, the challenges that arise in each context and possible solutions. At the last consortium meeting in June 2015, we have had the opportunity to exchange materials and discuss these in depth, allowing us to make further improvements to our professional development plans as we look ahead to the first round of enacting our activities with pre-service and in-service teachers during 2015-16.

**Upper Secondary Education**

This PARRISE group aims at developing and implementing teachers' professional development programs, in light of the educational SSIBL framework, in *upper secondary education* (age 16-18). First, at each country, a national network was established, consisting of teachers, teacher educators, science communicators and science education researchers, with relevant expertise and experience in fields related to the educational framework. Within these local networks, the means of adaptation and adjustment of the SSIBL framework to local settings were discussed. Then, students and teachers education resources based on the educational framework were identified, updated and customised. These resources were coherently incorporated into national teachers' professional development courses, which are expected to enable science teachers to adapt and implement the educational framework to their own teaching style, local science curricula and culture. Altogether, WP4 partners designed and developed 11 courses, which are planned to be implemented during the academic year 2015-16. Yet, a limited number of WP4 partners have already started to implement courses in pre-service and in-service local settings. Furthermore, three WP4 partners have collaborated (also with other work packages members) to analyse the extent to which each of the SSIBL pillars are incorporated in formal national biology education curricula, and the associated constraints. Findings have implications about national reform efforts and educational policy to support the development of responsible citizenship, and will be presented at the ESERA 2015 conference in Helsinki.
The 3rd PARRISE Consortium meeting was hosted by Malmoe University, in Sweden, between June 15-17, 2015. The meeting was well attended by representatives from each of the 18 PARRISE institutions and all members of the External Advisory Board. Amidst a very vibrant atmosphere, the PARRISE members participated in small group meetings, exchanged ideas in the plenary and presented examples of their burgeoning Teacher Professional Development programmes. Members of the External Advisory Board attended the 3-day meetings and presented their feedback to the consortium at the end of the programme. We hope that the following images capture the intensity, interactivity and productivity of the meeting!
PARRISE news from Utrecht University

by Paulien Postma and Christine Knippels, Utrecht University, Netherlands

In spring 2015 Utrecht University presented the PARRISE project and ideas about SSIBL (socio-scientific inquiry based learning) to a new cohort of 14 upper secondary pre-service teachers (PSTs).

We devised a pilot teacher training program of two sessions, with colleagues in our team at Utrecht University. In the first session PSTs were acquainted with main characteristics of the SSIBL approach and examples of socio-scientific issues (SSIs). This was followed up by a classroom conversation on how to introduce SSIs in the biology classroom and use them to initiate inquiry. In addition, PSTs – working in groups of three students - developed their own SSIBL lesson plan, which took up approximately 4 hours of independent work. PSTs presented their work in the second session.

The pre-service teachers came up with interesting SSI themes! Examples are the food-waste issue and nature preservation programs. The educational goal was to let pupils (age 15-18) inquire into the topic by means of field-research (interviews, ecological field work) and literature research.

In addition, pupils were stimulated to express and shape their opinion concerning the SSI by making a special attention PSTs gave to support the pupils in taking action based on their SSIBL research.

A questionnaire was designed to ask PSTs about their ideas and thoughts about the SSIBL approach as introduced in the teacher training program. According to the pre-service teachers SSIBL is of added value for students’ scientific citizenship education, which they find an important learning goal in the biology curriculum. 10 out of 14 PSTs indicated they want to incorporate SSIBL lessons in their biology lesson program. To make a better connection between SSI and inquiry based learning (IBL), PSTs indicate they need more insight in the IBL approach.

Utrecht University will take this feedback into account and refine its teacher training program for autumn 2015.

Science in and for Society workshop at the University of Southampton

by Andri Christodoulou & Marcus Grace, University of Southampton, UK

On June 26th, 2015 we had the opportunity to run a workshop with a group of 10 pre-service teachers focusing on Science in and for Society. During the workshop this group of pre-service teachers, who are nearing the completion of their formal training programme at the Southampton Education School, had the opportunity to consider how science and society are interlinked and how they could portray these links in their science teaching in a way that not only promotes conceptual understanding but also citizenship education. One of the activities our pre-service teachers engaged in focused on re-formulating typical investigation questions such as ‘Do all plants grow better in greenhouses’ into inquiry questions that are interesting, relevant and placed in authentic contexts for their pupils. We also modelled how science in and for society could be enacted in science classrooms by using the context of climate change.

Pre-service teachers first engaged in activities exploring the level of controversy that exists around global warming and climate change by trying to answer the questions (a) Is climate change really happening? and (b) if climate change is happening, then who is causing it? Then, teachers engaged in a sorting evidence activity, where they had to critically review a set of evidence statements for and against the statements ‘climate change is happening naturally’ and ‘climate change is man-made’. Pre-service teachers reflected on these issues personally but also considered how their pupils would approach this topic and what they could anticipate in their science classrooms.

They also discussed how to make such topics relevant and personal for their pupils and the importance of designing activities that allow pupils not only to consider and learn about such socio-scientific issues but also how to empower them to take action. It was promising to see the enthusiasm and engagement that our pre-service teachers showed for teaching science using a socio-scientific inquiry based learning approach and we aim to develop these activities and resources further as we are about to begin our first round of implementation of our teacher professional development programme at Southampton in September 2015.
National dissemination of support material for teachers in Sweden

by Christina Ottander & Katarina Ottander, Umeå University, Sweden

There is an initiative in Sweden to increase young peoples' interest in science and technology and the Swedish government has put aside funding for different types of projects. Examples of some projects are the organization of workshops for teachers and the development of support material for teachers to be published on a government run web-site.

The partners from Umeå Universitet were first invited to give a presentation of results from projects, including PARRISE, that involve working with socio-scientific issues and using the SSIBL approach of teaching. After the presentation, we received an invitation from the National Agency for Education, the central administrative authority for the Swedish public school based on the SSIBL framework, incorporating the dimensions of scientific and transdisciplinary knowledge, inquiry skills, values, and democratic deliberation.

The subject “Science Studies” is given to first year, upper secondary school students, who are not pursuing a career where science is a major component. The subject focuses on citizenship education in science and is, by nature, interdisciplinary, with a foundation in biology, physics, earth sciences, and chemistry. Science Studies covers health, energy, and sustainable development, which are areas of study with important issues on a personal, societal and global level. During autumn 2015 we will develop material

Presentation of PARRISE in Austria

by Franz Rauch, University of Klagenfurt, Austria

PARRISE was presented at the ENSI conference on 9 January 2015 in Vienna to about 13 science teachers and teacher educators by Franz Rauch. He explained what PARRISE stands for and the objectives of the project. ENSI is an international teacher-network, which addresses international research development activities in the field of environmental education and school development (www.ensi.org).

At the IMST-day, on 20 March 2015 at Vienna Franz Rauch provided a general introduction to the PARRISE-project and SSIBL framework by PowerPoint presentation. Two-hundred teachers and teacher educators attended the Imst-day. For more information, see www.imst.ac.at/imst-tag2015.

IMST is a large project and network in Austria with the goal to improve the quality of teaching and learning in the sciences, in mathematics and technology as well as German language.

Franz Rauch and Mira Delle introduced PARRISE at the IMST- Networking Meeting, which took part from 16-17 April, 2015 in Salzburg. About 30 science teachers and researchers participated in the event.

At the meeting of regional teams of the Austrian network ECOLOG (Ecologization of Schools – Education for Sustainability and School Development), which took part from 18-20 May 2015, the local PARRISE brochure was distributed and the PARRISE project was mentioned in the OEKOLOG report. At the meeting around 30 people were present (www.oekolog.at).

Did you know?

PARRISE partners have webpages with local information in their national language. Visit the partner pages on the project website to find out more.

Subscribe to the newsletter and keep updated on all PARRISE news by going to the news page.
PARRISE project at the Association for Science Education (ASE) London Conference

by Ruth Amos, UCL IOE, UK

On Saturday 6th June 2015, 47 science teacher educators, primary and secondary school teachers gathered at UCL IOE for the annual ASE London summer conference. The PARRISE project teamed up with not-for-profit organisation AirSensa to give a workshop on the importance of socio-scientific inquiry-based learning (SSIBL) in the context of tackling air pollution. We explored supporting and managing students asking authentic, open inquiry questions in science by asking ‘what’s in an electromagnet?’ First, teachers engaged in the classic inquiry aimed at designing a strong(er) electromagnet from simple electrical components. We then discussed the ‘hidden’ issues such as where the materials for the electromagnet came from, who was involved in their manufacture, etc. and then linked to electricity generation in coal-burning power stations and high levels of pollution in cities. AirSensa elicited the teachers’ beliefs about the nature of air pollution using ‘risk’ activities, which highlighted the considerable hazards of airborne pollutants to health.

The SSIBL activity will grow into a large citizen science project in the capital. AirSensa are commissioning the construction of 10,000 ‘X-Box’ sized pollution monitoring units with support from local businesses, which measure levels of NOx, CO2, CO, dust and particulates. Schools can have a unit on the side of their building for free. Students decide where to locate the unit and then have access to daily local data on levels of air pollution in their school. Students can then take action by suggesting ways to reduce pollution around their school, which will provide benefits for London as a whole. Already students are becoming alert to what is going on: parents dropping their children off to school are being asked to switch off their car engines rather than letting them idle, some students have decided to walk or cycle to school instead... change is happening! Through the project, students can engage with the impacts of science and technology in society and make begin to make a difference. Ultimately, students with respiratory conditions such as asthma will use the data to decide which side of the road to walk down on a particular day... powerful personal decision-making in action. Deliver Change are launching the AirSensa project at the Wellcome Trust, London on Monday, June 29th.

The 11th Conference of the European Science Education Research Association (ESERA2015) will take place in Helsinki, Finland between August 31 to September 4, 2014. The conference is an important European institution, providing science educators and science education researchers with the opportunity to present their work and learn from science education efforts around Europe. PARRISE will be present at the conference through participation in the European projects poster session, which is intended to serve as a communication platform for information exchange and networking.

PARRISE is organizing two symposia at ESERA 2015.
PARRISE - Promoting Attainment of Responsible Research & Innovation in Science Education

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The next PARRISE newsletter will be circulated in December 2015.

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SEVENTH FRAMEWORK PROGRAMME
SiS-2013-2.2.1-1
Grant agreement: 612438