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1.0 Project Summary

Pri-Sci-Net aims to promote inquiry-based learning in science at primary level with children between the ages of 3 to 11 years. The project aims to achieve this by developing 45 IBSE activities which are then translated in 15 languages for teachers to use; setting up a Europe-wide virtual platform to network teachers, professionals and academics in the area of Primary Science Education; providing training and professional support to teachers to help them use Inquiry based learning in Science in schools; and recognising and celebrating successful practice and research on IBSE with young children.

The work by the project partners in achieving the aims set include the delivery of the following outputs:

- 45 science-teaching activities using IBSE for ages 3-11 years in 15 different languages;
- Recognition of Excellence for teachers implementing IBSE successfully at primary;
- Two International conferences;
- Four 20-hour national training courses on IBSE for teachers in 13 countries;
- Three international teacher-training courses;
- Two virtual European network platforms for teachers and researchers in IBSE;
- An online newsletter and a research journal on IBSE in primary science.

2.0 The project Partnership

The project is coordinated by the Malta Council for Science and Technology (MCST). The Malta Council for Science and Technology is a public body responsible for scientific research policy, promoting scientific research, management of the local research funding program and the national contact point organisation for the EU Research and Development Framework Programme (FP). MCST is also responsible for the National Strategy in the field of Research and Innovation. Following its establishment in 1988, the Council was also given the specific mandate of advising government on Science and Technology policy and representing the government in EU fora related to Research and Innovation.

The Pri-Sci-Net Scientific Coordinator

Professor Suzanne Gatt is the coordinator of this project and an affiliated researcher with MCST. She is also a Professor in primary science education at the University of Malta. She has published extensively on children's ideas in science conducting research with children as young as 4-5 years. She also holds other research interests in: promoting scientific careers, public engagement in science; Bologna Process; quality assurance in education; qualification frameworks; employment amongst youth; social cohesion and education; gender mainstreaming; discrimination; youth; and vocational education. Prof. Gatt has been active in the field for the past 15 years and is established with the international arena, particularly in the field of primary science education.

Partnership

The partnership consists of 17 partners from 14 different countries. The partner institutions have extensive experience in the area of primary science education from across Europe.

Partners

HSci	Associacao Hands-On-Science Network	Portugal
KATHO	Katholieke Hogelschool VIVES	Belgium
YJU	Jyvaskylan Yliopisto	Finland
UJEP	Univerzita Jana Evangelisty Purkyne Usti Nad Labem	Czech Republic
UBO	University of Bonn	Germany
UCY	University of Cyprus	Cyprus
BM:UKK	Bundesministerium für Unterricht, Kunst und Kultur	Austria
UOC	University of Crete	Greece
PdF TU	Trnavska Univerzita v Trnave PdF TU	Slovakia
UM	Universidade Do Minho	Portugal
IOE	Institute of Education, University of London	United Kingdom
UOS	University of Southampton	United Kingdom
MUGLA	MUGLA Universitesi	Turkey
UP8	Universite Paris 8 Vincennes Saint-Denis	France
EXOR	EXOR Group Ltd	Malta
EUCORE	EU Core CONSULTING S.RL	Italy

3.0 The project vision for Inquiry-based learning at primary level

The project partners have developed a vision of what they believe that inquiry-based learning in science at primary level should involve. This vision was and continues to be promoted.

PriSciNet Vision of IBSE

Inquiry-based science at primary level is a *teaching and learning framework* with implications about learning science, learning to do science, and learning about science.

In this framework:

Children

- engage actively in the learning process with emphasis on observations and experiences as sources of evidence;
- tackle authentic and problem based learning activities where the correctness of an answer is evaluated only with respect to the available evidence and getting to a correct answer may not be the main priority;
- practice and develop the skills of systematic observation, questioning, planning and recording to obtain evidence;
- participate in collaborative group work, interact in a social context, construct discursive argumentation and communicate with others as the main process of learning;
- develop autonomy and self-regulation through experience

The teacher scaffolds and guides learning by providing a role model of an inquiring learner. The teacher does not function, in the eyes of the children, as the sole bearer of expert knowledge. Instead, the main role of the teacher is to facilitate negotiation of ideas and to highlight criteria for formulating classroom knowledge.

Assessment is mainly formative, providing feedback to the teaching and learning process for all classroom participants.

4.0 The project Publications

The project has involved the development of a number of publications. These were mainly two: 45 Inquiry-based activities for ages 3-5 years, 6-8 years and for 9 -11 years; and an open-access online Journal – Inquiry in Primary Science Journal (IPSE).

4.1 The 45 Inquiry-based learning activities

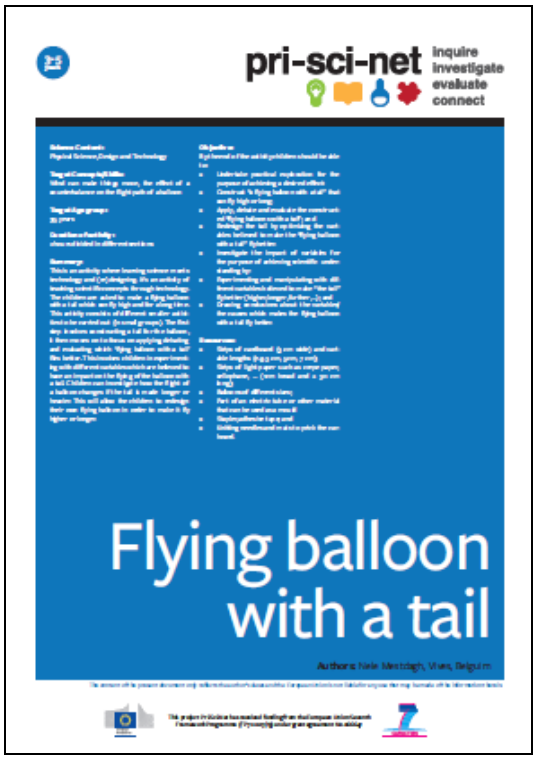
The project partnership has worked together to identify, test and publish 45 IBSE activities which primary teachers can download and apply in the classroom. This is one of the project outputs which will remain after the project cycle. These activities have been translated in 15 different languages and will continue to be available. These activities were developed in various areas of science and provides teachers opportunities for teachers to explore different aspects of the natural world.

The activities for children 3-5 years old

The list of topics for children aged 3 – 5 years ranged from exploring plants, sky, soil, water. Other activities presend children with the opportunity of exploring physical phenomena such as making bubbles, producing different colours, oscillations and floating.

Table 1 : List of activities for 3-5 years

Planting seeds	**What is a plant**
Do plants grow in the dark ?	**Soapbubbles**
Playing with shadows	**What is colour?**
Soil	**Strong Walls**
Sky	**Water**
Snails	**Swing game**
Magnets	**let's float**
Flying Balloon	



Many of these activities start with simple stories aiming at attracting the children's attention and providing a context which helps the children understand what the scientific inquiry refers to. It also follows an early years pedagogical approach of informal learning.

The activities for children 6-8 years old

The actvities for students aged 6 – 8 years are a little more structured. The inquiry activities a more structured as they are designed for older children. Activities include scientific aspects from a biological, chemical and physical perspective.

Table 2 : List of activities for 6-8 years

Air as matter	**Body covering and insulation powers**
Plants' response to changes in orientation	**Materials / Change of state**
Animal responses to light and humidity	**Biodiverity / discorvering what animals life in**
Sounds	**The world around us: shadows, day/night**
Seed Spinners: exploring air resistance	**Botany: swelling pressure of seeds**
Magnetic Power	**Ants**
Exercises for health	**Seeds germination**
Senses and their interaction	

The activities for children 9-11 years old

The activities for the older students target chemical aspects such as acids and bases found in everyday things around us. There are also two activities which include the use of robotics and sensors, a new and emergent area in science.

Table 2 : List of activities for 6-8 years

Winter comes to campus = Chromatography
Practical exercise from statistics for young scientists
Pigment research
Acidic, Neutral or basic?
Measurements
Acidic-Neutral-basic: find your indicator from nature
How much weight can paper hold
Underwater vulcano
the snail that prefers cabbage or lettuce
Water, icebergs and boats
the secret of the human body
Air, more than nothing - characteristics of air
Who is able to build the best boat?
Human Body and Robot Body
Animal and animat

The activities translated in the different languages can be accessed on the following website: http://priscinetwork.wordpress.com/

4.2 The Inquiry In Primary Science (IPSE) Journal

The second publication refers to the setting up of the open access online Journal - Inquiry in Primary Science (IPSE) Journal. During the project cycle, two publications were produced. These two publications include invited papers such as from Wynne Harlen; research papers presented by both established as well as young researchers. There is also a section for inquiry notes which include contributions by teachers and educators about inquiry activities which can be adopted by other teachers. Every edition of the Journal also has a book review. The Journal can be accessed on www.prisci.net/IPSE

IPSE

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5.0 The National Training Courses

In this last round of training it makes sense to provide an overview of the total amount of training carried out, both in terms of teachers trained as well as the number of hours of training which the Pri-Sci-Net partners oranganised. It must be said that a number of partners, following the first training sessions, were approached and asked by primary teachers and/or schools to provide more training opportunities. It is with pride to state that a number of partners have invested in providing more training than they were obliged.

The table overleaf provides a summary of the total number of teachers trained and the number of hours of training done by the project partnership. It can be seen that the number of teachers is high and have reached a total of **2019 teachers**. It can also be noted that the number of hours spent in training has been very high and amounted to **1510.5 hours** over the whole consortium. This amount of effort is significant.

It can be concluded that more than the promised training identified in Annex 1 has been implemented. This has reflected the dedication with which the partners have worked in order to promote inquiry-based learning in science at primary level across all Europe.

TABLE: Summary of number of teachers trained and number of training hours provided

Partner	Training 1		Training 2		Training 3		Training 4		Training 5		Training 6		Training 7		Training 8		Training 9		Training 10		Training 11		Training 12	
	No.	Hrs	No.	Hrs	No.	Hrs	No.	Hrs	No.	Hrs	No.	Hrs	No.	Hrs	No.	Hrs	No.	Hrs	No.	Hrs	No.	Hrs	No.	Hrs
MCST	21	20	28	20	40	20	26	20	12	20	10	20	20	3	25	3	36	2	66	2	50	2	65	2
HSci	30	25	31	25	34	20	32	40	26	25	33	40	26	40										
VIVES	17	20	14	20	19	20	20	20	11	3	20	3	36	25										
JYU	8	20	8	20	4	20	9	3.5	7	20	13	20	8	20	9	20	8	20	5	20				
UBO	9	20	14	20	7	20	14	20																
UCY	15	20	12	20	10	20	12	20																
UJEP	40	20	35	20	28	20	20	20																
BM:UKK	61	20	61	20	61	20	61	20																
UOC	16	20	30	20	34	20	36	20																
PdFTU	7	20	9	20	41	20	19	20	4	20	8	20	8	20	14	20	8	20	10	20				
IOE&UOS	23	20	21	20	15	20	20	20	8	1	30	1	12	1										
MUGLA	29	20	31	20	26	20	26	20	16	4	86	8	48	4	13	4	31	4						
UP8	16	20	16	20	12	20	9	20																
TOTAL	282	265	310	260	331	260	304	253.5	84	93	200	92	158	77	61	47	37	95	84	49	50	2		

Some Photos of national training courses

Malta

Training in Portugal

Training in Finland

Training in Germany

Training in Czech Republic

Training in Greece

Training in Turkey

Training in Belgium

Training in Austria

Training in France

6.0 The International Training Courses

There were three international training courses organised by the project: one in the Czech Republic in January 2013; one in Crete in July 2013; and one in Austria in February 2014. During these three training courses, teachers from the locality as well as from the different partner countries were supported financially to attend.

6.1 1st International Training Course in the Czech Republic

The 1st International training course was held in Ústí nad Labem, Czech Republic, from the 28th January to the 1st February 2013. 25 teachers from 8 different countries participated in the training course.

The international training course was aiming to attract primary teachers who were interested to learn more about teaching science in the upper grades of the elementary school. The training course tackled inquiry-based learning in science education (IBSE) and elaborated on various types of teaching and learning approaches that could be utilised in the classroom environment. Furthermore, the course offered specific subject content training in several areas of the primary education curriculum. Participants were also guided to join the Pri-Sci-Net virtual platform for IBSE in primary science and use that to share their work with other teachers.

The course included lectures about IBSE and the Pri-Sci-Net Project. Also the teachers attended workshops in which they had the opportunity to participate (assuming the role of students) in inquiry-based activities, organized by the science educators involved in the project. Finally teachers were asked to design their own IBSE activities and upload them on the Pri-Sci-Net platform.

6.2 2nd International Training Course in Crete

The 2nd International training course was held in Crete, Greece, from the 1st of July to the 5th of July 2013. 35 teachers from 9 different countries participated in the training course.

The second international training was mostly intended to address inquiry-based learning in science education (IBSE) with younger primary students, aged 3 to 7. The training commenced with a general introduction to the Pri-Sci-Net Project, followed by a discussion on the meaning of IBSE in the context of primary level education. Next, there was a presentation of the IBSE activities that were developed by the project partners for ages 3 to 7. Finally, participants were given the opportunity to experience some of those activities but also to engage in the process of adapting such activities or even designing their own activities. Emphasis was given to the Pri-Sci-Net teacher platform and its potential to serve as medium that could facilitate interactions and the exchange of ideas and teaching materials among teachers interested in IBSE.

6.3 3rd International Training Course in Austria

The 3rd International Training Course was held in Salzburg, Austria from the 17th of February to the 20th of February 2014. 30 teachers from 12 different European countries participated in the training course.

The training course opened with a welcome speech by the Austrian Ministry of Education. Then, the Pri-Sci-Net project coordinator, Prof. Suzanne Gatt, welcomed the participants and shared the vision of the project for inquiry-based learning in primary education. The training course involved a series of workshops and presentations about IBSE contributed by project partners. Among the training activities, there was a workshop on colours from Muğla (Turkey) and a workshop on change of state, focusing on water and ice from the University of Southampton (UK). There was also a workshop on how to organise a science fair, a workshop on the nature of science and a world café. Some of these training activities took place in the local science museum in Salzburg.

7.0 The Project conferences

7.1 The first conference in Nicosia, Cyprus 5-7 September 2013

There were two international conferences organisedas part of the project. The first was organised in Nicosia, Cyprus as past of the ESERA (European Science Educators Association) conference. This was the first time ever that a project funded by a European Commission was organised within ESERA which brings together all the science educators from all over the world together.

This conference has provided the opportunity for teachers to share their work and their achievements with children with other fellow teachers as well as science education researchers. It was also possible for the teachers to listen to researcher's work. It was interesting to see how teachers struggled to follow what the researchers were talking about and it took them some time to link their practice to theory. The photos below show moments of this conference.

Worksheet (sample questions)

Step 1: Engagement

7.2 The second Conference in Valletta, Malta 16-18 July 2014

The 2nd and the Final International Conference of the PRISCINET Project was held in Valetta, the capital of Malta, between the 16th and 18th of July, in the historical Building of the Old University. Approximately 100 delegates from different countries of Europe attended the conference and engaged in: a) discussions on the implementation of inquiry based science learning education (IBSE) in primary and pre-primary schools, b) hands-on workshops that can be replicated in the classroom, c) sharing of experiences and best-practices, d) discussion on the amalgamation of informal and formal learning.

The end of the conference essentially marked the completion of the PRISCINET project with the hope and the expectation that what has been achieved during the project could make a significant contribution to the training of teachers with respect of IBSE.

The conference included two keynote lectures by experts in the field. The first lecture by Prof. Constantinos P. Constantinou (President of the European Association for Research on Learning and Instruction – EARLI) was entitled "Do children have any need for science learning? What does existing research tell us?" and the second keynote speech entitled "The Challenge - Keeping IBSE active" was given by Prof. Lady Sue Dale Tunnicliffe (Institute of Education, University of London).

An innovation of the conference was the opportunity provided to emerging researchers to present their work as keynote speakers.

Also the delegates attended workshops in which they had the opportunity to participate (assuming the role of students) in inquiry-based activities, organized by partners involved in the project. Furthermore during the conference many teachers had the opportunity to present specific IBSE activities they designed and share their experiences with their implementation in the classroom.

In addition, the conference hosted a ceremony for awarding selected educators and young researchers with Certificates of Excellence. This was intended as a means of recognition of those teachers who are working to change the way that science is carried out in their classroom. This number of teachers will hopefully keep on growing with the aim to make it possible to really enhance actual teaching practice in science.

As the coordinator of the project, I would like to express my gratitude to all the partners, but also to all the teachers who have been involved in the project, for their support and their significant contribution that rendered PRISCINET a successful project.

8.0 Conclusion

While the project has come to an end, its legacy will live on. The IBSE activities will be available online and the parnters will continue to promote them. The Journal will continue to exist. We are now in the process of registering it and then to list it on various databases in order to promote its circulation.

Hopefully, the vision of inquiry are primary level promoted by the project will live on the classrooms of those teachers who have been trained and involved in the project in some way. They will be the best ambassadors and the carers to those seeds of inquiry sown by Pri-Sci-Net.