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D.4.1. Adaptation of innovative practices in science education (including Annex I "Teaching materials")

Authors of the report: María Pilar Jiménez Aleixandre and Fins Eirexas Santamaría

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The **kidsINNscience** consortium:
Österreichisches Ökologie-Institut (project coordinator), Austria
Freie Universität Berlin, Germany
Universität Zürich, Switzerland
Institut Jozef Stefan, Slovenia
National Institute for Curriculum Development, The Netherlands
Università degli Studi Roma Tre, Italy
London Southbank University, United Kingdom
Universidade de Santiago de Compostela, Spain
Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional, Mexico
Universidade Federal do Rio de Janeiro, Brazil

Contact details:

Project Coordinator: Nadia Prauhart

Work package 4, task 4.1 leader: Professor María Pilar Jiménez-Aleixandre

marilarj.aleixandre@usc.es

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REPORT COORDINATED BY

María Pilar Jiménez-Aleixandre

Fins Eirexas Santamaría

(University of Santiago de Compostela, Spain)

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The adaptation of innovative practices in the frame of the kidsINNscience project

kidsINNscience is the acronym of "kidsINNscience: Innovation in Science **Education – Turning Kids on to Science"**, a collaborative SICA action funded by FP7. kidsINNscience overall objective is to facilitate the innovation of curricula and teaching and learning of science and technology (S&T) in formal and informal settings in order to enhance the interest of young people in S&T.

As evidenced by the science education research literature, science education is constantly being innovated. There are new proposals, teaching sequences and strategies that are being tested, and their results published, for instance in research journals such as *Science Education, Journal of Research in Science Teaching, International Journal of Science Education, Research in Science Education*, or their counterparts in languages other than English: *Enseñanza de las Ciencias* or *Alambique* (Spanish), *Recherche en Didactique des Sciences et des Technologies* (French, until 2009 named *Didaskalia*), *Zeitschrift für Didaktik der Naturwissenschaften* (German), or *NorDiNa: Nordisk Didaktikk i Naturfag* (Scandinavian languages and English). There is also a wealth of publications in science education teacher journals, such as *School Science Review*. However, innovations that may be successful in one country cannot simply be transferred to another country without adaptations to the new context. To secure further development it is essential to find strategies for innovating the teaching and learning of S&T in mainstream schools, as suggested for instance in the Rocard Report, *Science Education now: A Renewed Pedagogy for the Future of Europ*e (European Comission 2007). kidsINNscience is in the process of analysing and comparing strategies for innovating curricula, teaching and learning in S&T in different partner countries. This analysis seeks to facilitate educationalists at different positions in the educational system (from teachers and school leaders to policy makers and administrators) to operate more creatively within the system and to help generate changes toward more active learning systems.

An original feature of the approach of kidsINNscience is its use of an adaptive strategy. The adaptive strategy enables countries to learn together how to develop feasible innovation plans, carry out effective pilots to collect evidence and formulate innovation plans that fit their own conditions. This will make national innovation strategies more successful and more cost effective. This will also convince key change agents to participate.

The basic assumption of kidsINNscience is that innovations work efficient if they are *adapted* to the local circumstances. Accordingly, the main questions that kidsINNscience addresses are:

1. What strategies for teaching and learning in S&T motivate teachers and learners in the participating countries?

2. What *similarities and differences* are there in innovating S&T teaching and learning in the participating countries?

3. What strategies to innovate S&T teaching and learning would *work in my country*, considering its characteristics of S&T teaching and learning?

The analysis of the similarities and differences (question 2) and in particular of the innovative strategies that would work in each country (question 3) is the focus of the *process of adaptation* discussed in this report.

Culture, including educational culture, differs from country to country and even within countries. This is reflected in the various educational systems and policies. Thus a comparative approach that distinguishes between general conditions that apply to all countries and specific conditions that apply to one country or a group of countries or a target group within a country is appropriate. It will enable educators from different countries to learn from each other and facilitate the innovation process of S&T education in the participating countries. In each step of the project intensive involvement of teacher/school networks in all participating countries is a pre-requisite for the success of the whole project. The idea is to create communities of researchers, developers of teaching and learning materials and teachers that work closely together.

The process of field trials of Innovative Practices (IP) in Work Package 4 (WP4), and the *adaptation of IP* within it, takes as a starting point the results of WP3, and in particular the Deliverable 3.1, summarizing the results of a scan for innovative practices in the participating countries. Deliverable 3.1 compiles 81 innovative practices, about eight per country (it can be downloaded at the project web, http://www.kidsinnscience.eu/). A selection of these innovative practices is being made suitable for national circumstances and concrete actions, which requires development of new teaching materials. These *adapted innovative practices* in science education form the basis material of the field trials, a core part of the project. In the field trials the adapted innovations are tested in selected schools and/or training courses in each of the participating countries.

Specific purposes of the adaptation of innovative practices

The report about the adaptation of innovative practices in the kidsINNscience project has the purposes of:

1. Summarizing the choices of Innovative Practices (IP, named ISEP in D3.1) in the ten institutions from ten different countries participating in the kidsINNscience project.

2. Documenting the process through which the adaptations were chosen.

3. Analyzing the criteria guiding the choices.

4. Analyzing the main features of the IP that have been identified by the partners as needing to be transformed.

It has to be noted that, although adaptations were referred to in the designed proposal of the project as a product, they are more adequately characterized as a *developmental process*. The process of adaptation has a *dynamic nature*, involving interactions among the kidsINNscience partners in Universities, the schoolteachers and the curriculum materials. In other words, adaptations cannot be conceived as teaching sequences produced once, in a 'first' step, and then subjected to field trials in a 'second' step, but rather as a developmental process involving several drafts that would reach its 'final' form (in terms of the first field trial) only in the final stages of this field trial.

Therefore, the time needed for the selection of the IPs and the process of adapting the chosen IPs to the particular implementation context in each different country and school was longer than anticipated. This is reflected in the Annex of this report, in the different stages (translations, drafts of adaptations) of the teaching materials, which are still in the process of being transformed in collaboration with the teachers. As noted above, the involvement of teachers and school networks is a feature of the project.

Building teaching materials in cooperation with teachers is much slower than producing them, but it is a requisite in the kidsINNscience project.

A third issue concerns the timeframe, as the period of the year was coincident with summer holidays in most or all European countries, making difficult to meet with teachers, and encountered similar problems in the Latin American partner institutions.

Therefore the focus of the report is on the process and criteria for IP selection, as well as on the features that would be adapted, rather than on the product of the adaptations, which is still being completed at this stage.

The report is organized in eight sections, addressing: the objectives of the adaptations and the theoretical framework guiding it; the core of the innovation, as characterized in kidsINNscience; the two phases of the IPs selection process and how the adaptations were framed within them, including the full selection of all partners, and the current state of the adaptations, ending with a summary of emerging patterns and a discussion about the issues it raises.

Annex I, “Teaching Materials”, is compiled in a separate document.

1. OBJECTIVES OF THE ADAPTATIONS

The general objective and part of the goals of the kidsINNscience project is a cross-country adaptation of innovative practices (IP) in science education. It needs to be noted that the term '*innovative practices*' is equivalent to the term previously used in the proposal, '*innovative methods*'. The term 'method' was deemed as too narrow in order to capture the complexity of teaching and learning practices, and the consortium considered more appropriate to use 'innovative practices' in science education.

This objective is related to the work carried out by the consortium in two Work Packages, WP2 and WP3. In WP2, criteria for innovative science education were identified, which could be used to locate innovative practices. In WP3, a set of about eight innovative practices in each country was identified and selected (scan). As a result of this scan, a collection of 81 practices was compiled. This collection is the starting point for the adaptations, and partners needed to proceed through the following steps in the adaptation process:

Step 1. **Selection 1st phase**: To select, out of the 81 IPs compiled in the scan, an initial set of 20 practices meeting the criteria of a) flexibility, and b) potential for adaptation to their particular national context. This step, completed in July 2010, will be discussed in section 4 of this report. The results were compiled and shared within the whole consortium.

Step 2. **Selection 2nd phase**: To narrow the country selection down to five practices, and to identify the features in need of adaptation. This step was carried out taking into account the initial choices of all countries, and the potential for clustering together in adapting IPs. An important feature of this second phase is that it needed to be undertaken in close collaboration with the schoolteachers who will be implementing the adaptations. This step, which had been scheduled for September 30th 2010, proved to be more complex and time-consuming than initially thought, and the deadline needed to be extended. This step is discussed in section 6 of the report.

Step 3. **Adaptation of IPs**: To modify the selected IPs to match the features of the national and school contexts. As noted in the introduction this step is a dynamic process, which will occur in parallel with the implementation (first field trial).

Some conditions should be met in the process of adaptation, in particular related to keeping the **core of each innovation**. In particular, when selecting and adapting IPs, partners should ensure that the IP were related to one or more of kidsINNscience three criteria that, according to Annex I (p 32) will be a special focus of the project:

a) **Gender equity**, promoting girls' engagement in science.

b) **Inquiry** Based Science Learning, or students' participation in scientific practices.

c) **Cultural** diversity.

In summary, the objectives of the adaptation are to contextualize the innovations in terms of strategies and conditions for teaching and learning. The adaptations have as an aim to make possible the innovations, something that often is related to the conditions for teaching and learning.

2. THEORETICAL FRAME: DIDACTICAL TRANSPOSITION

The process of adaptation of innovative practices is framed in a research-based approach. On the one hand, it draws from the results of policy guidelines, theoretically grounded proposals and empirical studies about IBST curricula, discussed in the next section. On the other hand, the analysis of the features of each innovation that should be kept, and of the required changes, is based on the model of *didactical transposition* (Chevallard, 1991). The model of didactical transposition, proposed by the French Mathematics educator Yves Chevallard, characterizes knowledge transformations from the reference knowledge, in other words, the knowledge located in the scientific community, first to the knowledge to be taught, that is, the curriculum and the teaching resources, and second, from these designed instructional sequences to taught knowledge.

As Wozniak, Bosch and Artaud (2007) point out, one of Chevallard's achievements is to associate the analysis of mathematical knowledge (or, may we say, other disciplinary knowledge) to the study of institutional practices in which these elements of knowledge are created, developed, used, taught and learned. Chevallard considers the elements of knowledge as human constructions, whose place and function vary, according to places, societies or times. That is, he tries to take into account the institutional relativity of knowledge. Therefore these elements, in the kidsINNscience case innovative practices, teaching sequences or teaching strategies, are not considered as being immutable, but rather as being related to the conditions within school and outside school.

The model of didactical transposition (Chevallard, 1991) originally analyzes the transformation from what we could call the scientists' knowledge (reference knowledge) to the school knowledge (taught knowledge). In the case of the kidsINNscience project we use it in a restricted sense, as the process of transformation of knowledge from one community, the *original innovative practice* in a given school and country, to another classroom, school and country (or countries), the *adapted innovative practice*.

There are two steps in the process of didactical transposition, as noted by Tiberghien, Vince and Gaidioz (2009), in a detailed account of a development of the theory of didactical transposition to science education published in English:

Step 1: The process from reference knowledge to knowledge to be taught. In kidsINNscience, this corresponds to the process of *adaptation*.

Step 2: The process from knowledge to be taught (in kidsINNscience, the *adapted innovative practice*) to taught knowledge. In kidsINNscience, this corresponds to the *field trials* (which are not the object of this report).

The knowledge to be taught, according to Tiberghien et al. (2009) consists of curricula, textbooks and other resources and the taught knowledge consists of the way a teacher enacts it in a particular class.

3. CORE OF INNOVATION: PROJECT CRITERIA AND DESIGN PRINCIPLES

The process of adaptation of innovative practices draws from the results of policy guidelines, theoretically grounded proposals and empirical studies. In other words, it is a process framed in a research-based approach. In section 2 we have discussed the model of didactical transposition, guiding the adaptation. In this section, we will outline the background, both of the innovative practices and of their adaptations, in terms of policy documents and orientations, theoretically grounded proposals and empirical studies about innovation in science education. First we will discuss the project goals and then the design principles related to them.

3.1 kidsINNscience criteria

In particular we will focus on the kidsINNscience criteria in addressing the problems perceived in science education, as objectives that will enable a progress beyond the state of the art (see kidsINNscience project description, Annex I, page 11). These criteria, which constitute the core of the innovative practices, are:

a) **Inquiry** Based Science Learning, or promote students' participation in scientific practices, and learner's centred approaches.

b) **Gender equity**, promote girls' engagement in science and technology.

c) **Cultural** diversity: focus on the cultural diverse contexts in which science is taught, including classrooms with high diversity for instance in terms of students' background.

Besides being the three criteria of the project, these three make part of the criteria that the kidsINNscience consortium agreed upon, as reflected in Deliverable 2.1. In other words, partners needed to take into account at least one from these dimensions, first when choosing the IP from their own countries for the scan (WP3.1), and second when adapting the IP, in terms of taking care that these dimensions are preserved or added. The kidsINNscience consortium agreed that each adapted IP has to address at least one of these dimensions.

It may be said that there is a consensus worldwide about the relevance of *Inquiry Based Science Teaching* (IBST) and Learning. Inquiry approaches and inquiry-based science teaching are seen as perspectives coherent with constructivism, and figure prominently in the recommendations, on the one hand by policy documents, and on the other by science education researchers. Inquiry approaches figure among the suggestions of documents as the *Recommendations for Key Competences* (European Union, 2006), which have been translated into the steering documents of many European countries, or the recommendations of the Rocard report, *Science Education Now* (European Commission, 2007). Other European documents recommending IBST are not issued by the governing bodies, for instance the report coordinated by Osborne and Dillon (2008), agreed by a committee of European science educators (among them the first author of the present report). In the United States, where there is no mandatory 'National Curriculum', the report *Taking Science to Schools* (National Research Council, 2007) includes IBST among its recommendations. About international documents, the most influential is the PISA framework (OECD, 2006), which uses the term 'enquiry' and places it as an important dimension of scientific literacy. One indication of the relevance accorded to IBST by the European Union is the presence of the topic "dissemination and use of inquiry-based methods on a large scale in Europe" on the call for applications for grants in the 7th Framework program.

Science education researchers have also discussed extensively how to implement IBST in science classrooms. Among recent books examining different approaches to inquiry in the United States, both theoretical and empirical, is the volume edited by Duschl and Grandy (2008), which offers suggestions for its implementation. The design of classroom learning environments supporting argumentation, a particular type of inquiry learning environments, is examined by Jiménez-Aleixandre (2008). It has to be noted that argumentation and use of evidence figure in the kidsINNscience criteria for innovative practices. The Norwegian science educator Doris Jorde (2009), one of the authors of the Rocard report, defines inquiry as the integration of several dimensions, characterizing IBST as tasks that engage students in: a) authentic and problem based learning activities; b) a certain amount of experimental procedures and "hands on" activities, including searching for information; c) self regulated learning sequences emphasizing student autonomy; and d) argumentation and communication with peers. The active role of students, as participants in scientific epistemic practices, is emphasized by the Swedish and French science educators Wickman and Ligozat (2010), in their contribution to a book about scientific literacy.

Therefore, placing IBST and learning as one of the three kidsINNscience criteria is supported by policy guidelines and research studies, in Europe and worldwide. Then we will turn our attention to the remaining two kidsINNscience criteria.

Gender equity, promoting girls' engagement in science and technology, is a concern in Europe as well as worldwide. As discussed in the kidsINNscience proposal, page 8, even if the situation has improved in the last decade, with the gender gap closing in many EU countries in terms of achievement in secondary school, and although in areas as Mathematics girls outperform boys (trends in TIMMS 2007), still there are differences in some dimensions. These differences are found across three interrelated dimensions:

1) Differences in *enrolment* in science & technology careers: particularly in Engineering and Physics, where the proportion of women is still low.

2) Differences in *interests and attitudes*; as evidenced by studies as the project ROSE, *The Relevance of Science Education* (Sjøberg & Schreiner, 2005)

3) Differences in the *academic careers*: even in science subjects where women and men represent similar proportions of students, women's progress along the academic career is slower and few reach higher positions.

Therefore in the kidsINNscience proposal it is suggested that efforts need to be made toward a more inclusive S&T, designing curricula with topics that are equally appealing for both girls and boys. At the same time, ways of scaffolding girls' participation in S&T have to be included in teacher education.

It needs to be noted that the issue of gender differences in science and technology education has shifted since the question was first addressed in the 70's. The first papers and studies focused on how to "change girls" in order to make them more interested in science. This has been termed the "default model". These studies addressed issues such as the differences in attitudes toward science (Kelly, 1981; 1986), the differences in children's experiences, the stereotypic images of science and scientists conveyed by textbooks or the biased behaviour of teachers (Kahle, 1985). The most substantial change has been a new focus on how to change the curriculum, teacher's strategies and even the way science is conceived (Harding, 1991). This has been defined as an inclusive science education model. The kidsINNscience project adopts this inclusive perspective with the goal of engaging girls in science and technology.

Cultural diversity: focus on the cultural diverse contexts in which science is taught. As stated in the kidsINNscience proposal, the project includes criteria addressing cultural minorities in science education. These could be cultural minorities within countries or migrant communities. The project takes into account the cultural specificities and traditions of non-European countries and regions like Brazil and Mexico, which participate in the project. The need for an inclusive science education, paying attention at students' diverse cultural backgrounds, has been acknowledged for instance by Glen Aikenhead (2006). This perspective has been termed cross-cultural science education or intercultural science education.

In the next sections of the report we discuss how these three criteria are reflected in the choices of innovative practices made in both steps of the adaptation process.

3.2 Design Principles

In order to adapt the innovative practices for their implementation in the classroom, a set of design principles need to be considered. Design principles are guidelines expressing the goals for the learning outcomes, the classroom activities and the teaching strategies (Jiménez-Aleixandre, 2008). Although there is a range of design principles that may be adopted by different partners and participating schools, we may outline three design principles, relative to students, teachers and curriculum, which are coherent, on the one hand with the kidsINNscience proposal, and on the other hand with the criteria established by the consortium in task 2.1 (WP2). These design principles are related to the goal of Inquiry Based Science Teaching and Learning, or students' participation in scientific practices.

– **Role of students**: active participation of students in the production of knowledge. It means for instance that students are engaged in modeling, in using evidence (argumentation), in experimentation in the laboratory, or in carrying out projects.

– **Role of teachers**: scaffolding students' active involvement in science. For instance, adopting a dialogic and interactive approach in the classroom.

– **Curriculum and teaching resources**: for instance engaging students in authentic problems, or writing science (reports, critical reading).

4. SELECTION PROCESS: PHASE 1

This section discusses the first phase of the selection process. It begins by introducing the purpose, criteria and procedure of this phase of the selection process. Then the partners' selections are presented, and the emerging patterns discussed taking into account the kidsINNscience goals.

4.1 Purpose and criteria in the first phase of the selection

In order to share with the teachers a manageable number of Innovative Practices (IP), it was decided to proceed through a selection out of the complete pool of the 81 IP or scan compiled by the consortium in WP3, and summarized in the deliverable D3.1. This selection was carried out in two steps, and in this section we discuss the first phase, completed in July 2010 by nine partners (as seen in the selections reproduced below). The final purpose of the adaptations is the dissemination and exchange of innovative practices among countries. A higher number of contributions made the process richer.

Purpose: to select out of the 81 IP a manageable number, initially a set of 20 practices by each partner. These 20 IPs would then be compared across the whole consortium, in order to explore the potential clustering of partners implementing the same IP; and also shared with the teachers in each country, in order to select the five IP that were to be adapted.

Criteria: Besides paying attention to the kidsINNscience dimensions, two criteria were agreed as being relevant for the final purpose of adapting the IP to a different country and educational context. The criteria were agreed after a process of sharing a template (sent out by the USC and modified with inputs from RM3 and UZH) with an initial list of criteria. The final decision about the criteria was reached in the Rome meeting. Although the initial list included criteria such as how long the original IP had been tested in schools, the resources needed, the available information, and the potential for transferability, it was decided to collapse all of them into two criteria:

1) *Flexibility*: defined as the possibility to select between modules, contents, resources, time of experimentation, etc.

2) *Potential for adaptation* to each particular national context: this criterion combined transferability, resources needed and available information.

It is interesting to note that, while flexibility could be assessed as being a feature of each IP, and not context-dependent, the potential for adaptation could be very different for each national context.

Procedure: It was initially thought that partners could evaluate all IP using the two criteria, scoring them on a 4 point scale from higher flexibility / or potential (4) to lower (1), during the Rome meeting in June 2010. In fact partners worked about it, but the process proved to be longer and more complex than anticipated.

Therefore, although the results of these scorings were shared, it was decided that each partner would evaluate the IP and then produce a list of the 20 that received higher scorings. It was understood that partners should select these 20 IP *excluding* the eight from their own country (although in one case, one partner chose to cluster with another, merging two IP, one being their own). These lists, that we will call initial selections, were elaborated and sent in July 2010. The template for this initial selection included, besides two columns for the scoring of both criteria, a third column for a short justification of the reasons leading to the score given to 'potential for adaptation', as seen in the initial selections reproduced in this section.

It was also decided at the meeting in Rome that the process was flexible, and that when reaching the final decision about IP for adaptation, a partner could decide to choose one IP not initially selected in the list.

4.2 Results of the first phase of the selection

The results, or in other words the scoring of the nine partners, were compiled by the USC, and shared within the consortium. Then USC produced a synthesis of the 16 most selected IP. These products are presented below in the following formats:

– Table 1 is the *combined scoring* that was sent to all partners at the end of July 2010.

– Then the *separate choices* of 20 IP with justifications, by each one of the nine partners, are reproduced.

– A list with the *synthesis* of the 16 most frequently selected IP.

Table 1. Combined scores of the Innovative practices about flexibility (Fl) and potential for adaptation (Pot). Scale from 4 (higher) to 1 (lower).

Partner / Innovative Practice	**Austria**	**Mexico**	**Germany**	**Slovenia**	**UK**	**Italy**	**Brazil**	**Spain**	**Switz**	**Hol**	**∑Fl/∑P**	**N**
Criteria for evaluation	**Fl/Pot**	**Fl /Pot**	**Fl /Pot**	**Fl /Pot**	**Fl /Pot**	**Fl /Pot**	**Fl /Pot**	**Fl /Pot**	**Fl /Pot**	**F/P**		
AIE												
Physics and sports				3 /3			3/3		3 / 2		9/8	3
Secrets of culinary art		3 / 3	3 / 3				3/3				9/9	3
Female students´ ideas of chemistry:			3 / 3									1
What is it that bubbles, ... in the kindergarten?				3 / 3	3 / 3						6/6	2
Sunny side up					4 / 2	3/3					7/5	2
Posing the question "WHY"					4 / 3						4/3	1
Renewable Energy			3 / 4						4 / 3		7/7	2
Apple, apple, apple			3 / 4		4 / 4						7/8	2
CINVESTAV												
Science in family	4 / 3			3 / 3	4 / 3	3/3		3/3			17/15	5
Science Workshops for Visually-Impaired	3 / 3			3 / 3				2/3	3 / ?		11/9?	4
Multimodal Explanation on Nervous System									4 / 4		4/4	1
Degree in Medicine							3/3				3/3	1
Sustainable development			3 / 3		4 / 4		4/3				11/10	3
Sustainable Architecture	3 / 2							2/3	3 / 2		8/7	3
Biodiversity:Conservation of the Caribbean Sea							4/4	2/3			6/7	2
Robotics in your school			4 / 3	3 / 3							7/6	2
FUB												
Remotely Controlled Lab						3/3					3/3	1
Mobile education project - Science on Tour												-
Hypersoil					3 / 3	3/3					6/6	2
The simulated rubber									1 / 4		1/4	1

cloth- Curvature of space												
Carbonic acid			3 / 3								3/3	1
Water		3 / 3			3 / 3						6/6	2
The principle of Le Chatelier	1 / 4		3 / 3						1 / 4		5/11	3
IJS												
Enhancing Scientific Literacy					4 / 4		3/2	4/3	4 / 4		15/13	4
The weekly "5 minutes of science news"	4 / 2				4 / 4			4/3	4 / 3		16/12	4
Lectures by Students							3/2				3/2	1
Gender aspect in Science Experiments			4 /3								4/3	1
LSBU												
Innovative ideas from 21st Century Science							4/3		4 / 3		8/6	2
Using the Tough Spot Tray in kindergarten		4/ 4		3 / 3					4 / 4		11/11	3
Drama and Science				3 / 3				4/4			7/7	2
PREP: play, research, explore, practice			3 /4	3 / 3		3/3			4 / 4		13/14	4
Science Across the World		3 / 3				3/3	4/3		4 / 3		14/12	4
Children challenge industry				3 / 3		3/3		3/3			9/9	3
Biodiversity Actions Plans			3 /3				3/3				6/6	2
RM3												
From complex to simple systems, and backwards	3 / 2						4/4				7/6	2
Kids (& parents) in science		4 / 4		3 / 3				4 / 4			11/11	3
A minimum aquarium	1 / 3	4 / 4	4 / 3				3/3		3 / 3		15/16	5
Potatoes don’t grow on trees		3 / 3			3 / 4			3 / 4	4 / 4		13/15	4
Role-plays in science	4 / 2		2 / 3	3 / 3	4 / 4		4/3	4/3			21/18	6

education												
The “parallel globe”	3 / 2	2 / 3	3 /4								8/9	3
Evolution “on display”		4 / 3									4/3	1
Modelling of invisibles structures		4 / 4		3 / 3				3/3			10/10	3
UFRJ												
Health education for young people in the Web	3 / 2	2 / 3						4 / 3			9/8	3
Water in the spotlight					3 / 4						3/4	1
Physics teaching and visual disability									3 / ?		3/?	1
Physical Knowledge Primary Education		4 / 4				3/3					7/7	2
Students’ video production in the physics laboratory	2 / 1	3 / 3				3/3					8/7	3
Literature and science teaching			4 / 3	3 / 3	3 / 3	3/3		4 / 3			17/15	5
Science Blogs	2 / 3	3 / 3		3 / 3		3/3		3/2	4 / 3		18/17	6
Analysing the life cycle of industrialised products	4 / 3		4 / 4		4 / 4	3/3		4 / 3	4 / 3		23/20	6
USC												
Are the silkworms worms?		2 / 2			3 / 3				3 / 3		8/8	3
Introducing the LHC Experiment			2 / 3	3 / 3			3/3		4 / 4		12/13	4
Secondary school students’ inquiry projects		4 / 3				3/3	3/3				10/9	3
Kitchen Chemistry:		4 / 4				3/3					7/7	2
Human transformations in the landscape:							3/3				3/3	1
Invasive species: the danger from outside						3/3	4/4				7/7	2
Physics and toys			4 / 4		4 / 3				4 / 3		12/10	3
Cooking with the sun		3 / 3				3/3			4 / 3		10/9	3
UZH												

explore-it – grasping technology	2 / 2	3 / 2	3 / 3								8/7	3
X-rays –physics and human biology/medicine	1 / 4	4 / 3		3 / 3			4/3	3 / 3			15/16	5
Problem based learning – eye and optics	1 / 3							3/3			4/6	2
The circulatory system	4 / 4		3 / 3	3 / 3		3/3					13/13	4
The mobiLLab	0.25/ 1		3 / 4								3.25/5	2
Asthma and air pollutants	1 / 4			3 / 3	3 / 3	3/3	4/4	3 / 3			17/20	6
Acting instead of talking!					4 / 3		4/4				8/7	2
Dynasty of the Kuglinge –	1 / 3				4 / 3						4/6	2
Oral bioavailability of bioactive substances								3 / 3			3/3	1

Note: IP that were not selected have been deleted from the table

Partners' choices: **Adaptation of kidsINNscience Innovative Practices (IP)** Only scores & justification of 20 practices with potential

Table 2. PARTNER: AIE, AUSTRIA Legend: **Potential** = **Country Potential for adaptation**; **Flexibility** scale 4 to 1

IP Name	Flexibility	Potential x adapt	**Justification of Potential for adaptation scores / (of flexibility if needed)**
Cinvestav: Science in family	4	3	Experiment topics may be changed; no special resources needed except committed teachers; school with high engagement of adults;
Cinvestav: Science Workshops for visually-impaired children	3	3	if models may be adopted directly (without cooperation of university) than high flexibility
Cinvestav: Sustainable architecture	3	2	Time consuming; trans-disciplinarity with architecture may be a problem (possible blocked units)
FUB: "The principle of Le Chatelier"	1	4	No modules can be exchanged; as education circumstances in Austria are similar, no adaption problems are expected
IJS: The weekly "5 minutes of science news"	4	2	Adaptation-potential low if three teachers are required; time and age-classes are flexible and thematic flexibility depends on teachers flexibility
RM3: From complex to simple	3	2	Potential of adaptation depends on ability of schools; parting from the existing situation teacher can decide on thematic restrictions and chose focus – therefore quiet flexible; low flexibility in time
RM3: A minimum aquarium	1	3	Potential of adaption (costs, who takes care)
RM3: Role-plays in science education	4	2	Adaptation depends totally on flexibility and of knowledge of teacher; possibility to take actual controversies into account – leads to high flexibility;
RM3: The parallel globe	3	2	It is not clear if there are instructions for the implementation; adaption: where to get the globe from?
UFRJ: Health education for young people in the web	3	2	High flexibility in topics and duration; challenges: availability of an expert, web-radio, work with web-radio;
UFRJ: Students' video production in the physics laboratory	2	1	No regular science-lab work in Austria; inn-p needs very committed teacher; video-capturing – school with equipment and experience is needed; time consuming (in duration: inn-p could be blocked in units); only on content-level high flexibility;
UFRJ: Science blogs	2	3	Very open on content-level; ICT know-how necessary (necessary to find a school with technical resources and technical personal); further points: connection to curriculum is not given for sure, therefore time might be a challenge; if focus is given by the teacher (according to the curriculum) and he/she uses this inn-p in parts of the curriculum where it is promising than inn-p is effective and makes sense to adapt it;
UFRJ: Analysing the life cycle of industrialized products	4	3	Content high flexible; no special resources needed; from our point of view: it should be realized with older pupils;
UZH: Dynasty of the Kuglinge	1	3	Teachers' knowledge about evolution must be given - then high level of potential of adaption
UZH: Air to breathe: Asthma and Air pollutants	1	4	work on and with texts → very adaptable; availability of needed resources high
UZH: Explore it	2	2	Pre-requisite: Lab well equipped must be available (e.g. in teacher training institute or university); who will train the teachers? on content level flexible because it can be chosen between the experiments; not cost intensive for school
UZH: X-rays	1	4	Clear and strict guidance of realization, therefore low flexibility
UZH: Problem-based learning: Eye and optics	1	3	Committed teacher who needs special methods- and some knowledge-skills
UZH: The circulatory system	4	4	High flexibility because of possibility of choosing activities, and therefore flexible in time
UZH: The mobiLLab	1/4	1	From Point of view of implementation in Austria: Low flexibility because of costs and resources, From schools point of view high flexibility Many problems expected because of costs. Who takes the responsibility?

Table 3. PARTNER: CINVESTAV, MEXICO Legend: **Potential** = **Potential for adaptation**; **Flexibility**, scale 4 to 1

IP Name	Flexibility	Potential for adaptation	**Justification of Potential for adaptation scores / (of flexibility if needed)**
AIE_3_ Secrets of culinary art	3	3	Very clear relation to everyday students' life/ Have to be adapted to the curricula in secondary schools in Mexico.
LSBU_3_Using the Tough Spot Tray in kindergarten	4	4	The teachers have to develop IBL methodology/ There is a book with variety of activities to select.
RM3. Kids (and parents) in science	4	4	It is possible to introduce several topics/ The teachers need a lot of support for researches to implement the methodology.
RM3_3_ A minimum aquarium	4	4	The Innovation promotes argumentation process/Innovation can be easily adapted to all grades.
RM3_4_Potatoes don't grow on trees	3	3	The Innovation promotes the argumentation process/ Innovation can't be made on any time of the year because of the weather.
RM3_6_The "parallel globe":	2	3	Innovation can be adapted to all grades. Innovation requires that schools provide internet access to students so they can interact with students from other countries.
RM3_7_ Evolution "on display":	4	3	Innovation can be made as "temporal exposition" in some museums.
RM3_8_ Modelling of invisibles structures	4	4	The research group of Mexico know the methodological approach/ The teachers need methodological support.
UFRJ_1_ Health education for young people in the Web	2	3	It requires a specific schedule for the radio program and that schools allow internet access to students so they can listen, analyze and discuss during the program.
UFRJ_4_Physical Knowledge Primary Education	4	4	The teachers need training to develop the methodology/ The kits are very simple and can be easy modified,

(Table 3 cont.)

IP Name	Flexibility	Potential for adaptation	**Justification of Potential for adaptation scores / (of flexibility if needed)**
UFRJ_5_ Students' video production in the physics laboratory	3	3	The students are the producers of the videos/ Schools need computers and digital camcorder to produce and edit videos.
UFRJ_7_ Science Blogs	3	3	Very related to youth culture/ Innovation requires that schools allow internet access to students so they can listen, analyze and discuss so all students have opportunity to participate
USC_1_Are the silkworms worms?	2	2	Innovation promotes IBL/ Innovation can't be applied on any time of the year because of the weather.
USC_3_Secondary school students' inquiry projects	4	3	Innovation promotes IBL/ Teachers need a lot of support to develop the methodology.
USC_4_Kitchen Chemistry:	4	4	Gender perspective / Even though innovation is flexible, some schools doesn't have laboratory.
USC_8_Cooking with the sun	3	3	Renewable energy is cross-curricular topic/ Innovation requires internet access.
UZH_1_ Explore-it – grasping technology	3	2	Innovation requires "explore it" kits which are not accessible for all schools.
UZH_2_X-rays –physics and human biology/medicine	4	3	Application of "integrated science" / its flexibility allow us to apply it in more schools.
LSBU_6_Science Across the world	3	3	Connection with other countries/ Innovation requires that schools provide internet access to students so they can interact with students from other countries
FUB_7_"Water"- research on the wet element	3	3	Water is a very important topic for Mexico/ The teachers need a lot of support to develop the methodology.

Table 4. PARTNER: FUB, GERMANY Legend: **Potential** = **Potential for adaptation**; **Flexibility**, scale 4 to 1

IP Name	Flexibility	Potential for adaptation	**Justification of Potential for adaptation scores / (of flexibility if needed)**
Apple, apple, apple	3	4	High country interest
Sustainable development	3	3	Translation problems, feasible?
Mobile education project - „Science on Tour“	3	3	Synergy effects with « The mobiLLab »
The mobiLLab	3	4	Synergy effects with « Science on Tour »
Role-plays in science education	2	3	Translation problems, willing teachers available?
Physics and toys	4	4	Boys only?, high country interest
The circulatory system	3	3	Translation problems, feasible?
explore-it – grasping technology	3	3	High country interest
Biodiversity Actions Plans	3	3	High country interest
Gender aspect in Science Experiments	4	3	High country interest
Renewable Energy	3	4	High country interest
Secrets of culinary art	3	3	High potential for adaptation
Female students´ ideas of chemistry:	3	3	High potential for comparative approaches and evaluation
Robotics in your school	4	3	High potential for interdisciplinary approaches
Literature and science teaching	4	3	High country interest
Analysing the life cycle of industrialised products	4	4	High potential for involvement of teachers in local/national adaptation of the innovative practice
Introducing the LHC Experiment	2	3	Need for up-to-date experiments, not only “replaying” historical experiments
The “parallel globe”:	3	4	High potential for adaptation
PREP: play, research, explore, practice	3	4	Re-activation of good SE practice (used in Germany back in 1970/1980)
A minimum aquarium	4	3	High potential for adaptation

Table 5. PARTNER: IJS, SLOVENIA Legend: **Potential** = **Potential for adaptation**; **Flexibility**, scale for 4 to 1

IP Name	Flexibility	Potential for adaptation	**Justification of Potential for adaptation scores**
1. Physics and sports AIE	3	3	ABCDE
2. What is it that bubbles ... in the kindergarten? AIE	3	3	ABCDE
3. Science in family CINVESTAV	3	3	ABCDE
4. Science Workshops for Visually-Impaired Children CINVESTAV	3	3	ABCDE
5. Robotics in your school CINVESTAV	3	3	ABCDE
6. „Carbonic acid" – FUB	3	3	ABCDE
7. „The principle of Le Chatelier" - FUB	3	3	ABCDE
8. Using the Tough Spot Tray in kindergarten LSBU	3	3	ABCDE
9. Innovative ideas on Drama and Science LSBU	3	3	ABCDE
10.PREP: play, research, explore, practice LSBU	3	3	ABCDE
11.CCI - Children Challenge Industry LSBU	3	3	ABCDE
12.Kids (and parents) in science RM3	3	3	ABCDE
13.Role-plays in science education RM3	3	3	ABCDE
14.Modelling of invisibles structures RM3	3	3	ABCDE
15.Literature and science teaching UFRJ	3	3	ABCDE
16.Science Blogs UFRJ	3	3	ABCDE
17.Introducing the LHC Experiment USC	3	3	ABCDE
18. X-rays –physics and human biology/medicine UZH	3	3	ABCDE
19. The circulatory system UZH	3	3	ABCDE
20. Air to breathe – asthma and air pollutants UZH	3	3	ABCDE

IJS Note: All scores Potential and scores Flexibility were estimated to 3; that means some more than "few problems" expected and medium flexibility.
A principle of precaution was used. Really, practices with lower scores would not be selected.

Justification labels for adaptation scores:

A Could be incorporated into curriculum hours
B Means (resources) seems available without great problems
C Medium volume for translation (not too much)
D Innovative and/or interesting in Slovenia
E Uses teachers` flexibility in conducting lessons

In justifications upper views were used. Really, these were used already for practices selection .
A, B, C, D, E justifications vary for each practice, but these variations could not be estimated precisely enough.
So we use a common set for all practices.

Table 6. PARTNER: LSBU, ENGLAND, Legend: **Potential** = **Potential for adaptation**; **Flexibility**, scale for 4 to 1

IP Name	Flexibility	Potential for adaptation	**Justification of Potential for adaptation scores / (of flexibility if needed)**
AIE_5_Science Education in Pre-Primary	3	3	Would fit into English Foundation Stage areas of learning and smaller sections could be implemented. Translation is needed from German and copyright needs to be clarified.
AIE_6_Sunny Side Up	4	2	Plenty of translation needed from German – interesting content and approach to teaching and learning, through pupils raising questions and links with parents
AIE_8_Posing the question WHY	4	3	Student-centred project, with Socratic method and variable content and time scale. Need some translation from German.
AIE_10_Apple	4	4	Good ideas for primary schools researching a topic-based approach, with plenty of cross-curricular ideas, in geography, Literature, art, music, etc. Some limited translation .
Cinestav_1_Science in Family	4	3	Links between home and school study of science, with parents involved in the learning and flexibility in the content of the Activities carried out in home and at school. Some translation from Spanish needed.
Cinestav_5_sustainable development	4	4	General interest in Education for Sustainability in English schools. Extensive use of discussion and argumentation among student groups. Practical hands-on activities related to sustainability.
IJS_4_Literacy	4	4	The materials in English on the proBase website would easily be adapted for us in English primary or lower secondary schools. The emphasis on vocabulary and science is relevant in English schools.
IJS_5_5minutes of science news	4	4	The project needs only brief amount of time over a longer period, but is flexible since it relies on newspapers in the locality which have some scientific interest – these are relatively common in some newspapers.
UFRJ_2_Water in the spotlight	3	4	The topic of water is an important one for every country and this project deals with it in a practical way, with hands-on activities and the potential for data communication with other schools.
UFRJ_6_science and literature	3	3	An innovative idea, to use a play to introduce science concepts. Would need to find some literature in English that would be suitable to use as a focus.

(Table 6 cont.)

UFRJ_8_lifecycle	4	4	Easy enough to adapt for industrial materials common in England. Would be supported through websites produced by industry companies, such as
RM3_4_Potatoes don't grow on trees	3	4	Would need a garden area in which to grow the potatoes. Interesting for younger children, especially the inclusion of cooking the potatoes in a variety of ways. Added value if schools can communicate with each other about the recipes and cultural aspects of foods.
RM3_5_Role Play	4	4	Drama and role play are interesting ideas for helping students to understand how science and society can be connected.
USC_1_Silkworms	3	3	It has to be about silkworm s and they can be difficult to obtain and raise successfully. But the methods are easily adapted to English schools, where younger children often do study minibeasts in the classroom.
USC_7_Physics and Toys	4	3	Any toy can be chosen, as long as there are some physics opportunities in its manufacture. However, all the materials are in Spanish so translation is needed.
UZH_6_Asthma and air pollution	3	3	Linking science with Education for Sustainability is a good idea, but translation is needed, from German or Italian.
UZH_8_Evolution game	4	3	The notion of a game to make evolution more concrete and less abstract is interesting, as long as the science itself is not diluted. Some translation costs involved, as materials are in German.
UZH_7_Acting instead of talking	4	3	Wide range of topics makes this relatively flexible, but the translation from German or French makes it less adaptable. Linking EfS with Science relates to real life and global situations.
FUB_3_Hypersoil	3	3	Interesting idea to focus science teaching on soil, an easily obtained material in many locations. A UK based web site on soil education might be a useful alternative to the German site in this project http://www.thekidsgarden.co.uk/TeachingKidsAboutSoil.html
FUB_5_Water	3	3	Some good ideas about working with water as a theme, but could be adapted to use without the specified web site, otherwise would need continual translation – hence reduced adaptability.

Table 7. PARTNER: RM3, ITALY, Legend: **Potential** = **Potential for adaptation**; **Flexibility**, scale for 4 to 1

AUSTRIA	Sunny side up
BRASIL	Physical Knowledge Activities for Primary Education
BRASIL	Literature and science teaching
BRASIL	Science Blogs
BRASIL	Analysing the life cycle of industrialised products
BRASIL	Students' video production in the physics laboratory
GERMANY	"Hypersoil" – Development of a hypermedia learning and working environment in primary schools
GERMANY	Remotely Controlled Laboratory – Example: Discovery of the atomic nucleus with the Rutherford scattering experiment
MEXICO	Science in family
NETHERLANDS	Design a plan for the most CO2 friendly journey around the world and WIN!
NETHERLANDS	Nature, Life & Technology. Advanced science, maths & technology in upper secondary
SPAIN	Invasive species: the danger from outside
SPAIN	Cooking with the sun
SPAIN	Secondary school students' inquiry projects
SPAIN	Kitchen Chemistry: a teaching sequence for introducing scientific knowledge of women
SWITZERLAND	Walkabout through the body in 80 pulsations: the circulatory system
SWITZERLAND	Air to breathe – asthma and air pollutants
UNITED KINGDOM	CCI - Children Challenge Industry
UNITED KINGDOM	PREP: play, research, explore, practice
UNITED KINGDOM	Science Across the World

Note: RM3 was at this time completing the D3.1 report and had no chance of scoring each IP

Table 8. PARTNER: UFJR, BRAZIL, Legend: **Potential = Potential for adaptation**; **Flexibility**, scale for 4 to 1

IP Name	Flexibility	Potential for Adaptation	Justification of scores	
			Interest (see codification)	General comments
AIE - Physics and Sports	3 F: b, c	3 P.A.: b	I: a, c, d	F: Applicable only to secondary school; needs special expensive equipment P.A. Still meaningful even if simplified (e.g.if measurements of forces and power or error theory is cut off).
AIE – Secrets of culinary art	3 F: b, c	3 P.A.: a, b	I: b, d	F. Highly adaptable for wide age range students; Deals with curricular topic. P.A. Ignores cultural, economical and affective aspects of nutrition.
CINVESTAV – Degree in Medicine	3 F: a, b, c	3 P.A.: b, c	I: a, b, c, d	F: Requires medical doctor as part of the team. P.A. Depends on copyright owner's authorisation; Still meaningful even if simplified (e.g. if dissection activities are eliminated).
CINVESTAV – Sustainable development	4 F: a, b, c	3 P.A.: b, c	I: a, b, c, d	P.A. Depends on copyright owner's authorisation.
CINVESTAV – Biodiversity	4 F: a, b, c	4 P.A.: a, b, c	I: a, b, c, d	F: Diversity of ecosystems available; Local relevance of topic. P.A. Activities are well described.
JSI – Enhancing scientific literacy	3 F: a, b, c	2 P.A.: a, b	I: a, d	F: Highly adaptable for wide age range students and science topics; P.A. Propose reading activities of science texts; application of the innovation is not well defined.
JSI – Lectures by students	3 F: c	2 P.A.: b	I: d	F.: Not suitable for both primary and secondary school students.
LSBU –21st Century Science	4 F: a, b	3 P.A.: b, c	I: a, b, c, d	F Can be applied to different school levels; Explores different abilities. P.A. Could be difficult to be implemented in large class size.
LSBU – Science across the world	4 F: a, b, c	3 P.A.: a, b, c	I: a, b, c, d	F. Covers a wide range of science related topics; P.A. Teachers would have to write to project's contact person in Spanish.
LSBU – Biodiversity action plans	3 F: b, c	3 P.A.: b, c	I: a, b, c, d	F. More suitable for secondary school students; P.A. Lack of availability of BAP-type documents in Brazil.
RM3 – From complex to simple systems	4 F: a, b, c	4 P.A.: a, b, c	I: a, b, c, d	F.: Suitable for both primary and secondary school students and for different topics of curriculum. P.A.: Interdisciplinary approach, potential to bring about socially relevant issues.

RM3 – A minimum aquarium	3 F: b, c	3 P.A.: b, c	I: a, b, c, d	F: Not fully adaptable for different school levels. P.A. Must consider costs to build aquarium; Expands on similar activity fairly well known and used by Brazilian teachers.
RM3 – Role plays in Science Education	4 F: a, b, c	3 P.A.: a, b, c	I: a, b, c, d	F.: May be developed in different topics; depends on motivation of students and teachers. P.A: Interdisciplinary approach, potential to bring about socially relevant issues.
USC – Introducing the LHC experiment	3 F: b	3 P.A.: b, c	I: a, b, c, d	F: Only suitable for upper secondary students; Teacher must be able to read English. P.A. Addresses lack of educational resources for the teaching of Contemporary Science; Might have to be done as extra-class activity or project work since these contents are not part of the syllabus.
USC – Secondary school students' inquiry projects	3 F: a, b, c	3 P.A.: a, b, c	I: a, b ,d	P.A.: Demands a great deal of teacher and student autonomy and motivation.
USC – Human transformations in the landscape	3 F: a, c	3 P.A. c	I: b, c, d	P.A. In Brazil, Earth science contents are usually dealt with in Geography (not Science) lessons.
USC – Invasive species: the danger from outside	4 F: a, b, c	4 P.A.: a, b, c	I: a, b, c, d	F: Based upon solid theoretical framework than can be applied to develop similar activities in other subject areas. P.A: Local relevance of topic (invasive species); availability of texts in Spanish/Galician.
UZH – X-rays- Physics and human Biology/Medicine	4 F: a, b, c	3 P.A.: b	I: a, b, c, d	F. Highly adaptable for wide age range students; establishes desirable links between two cross-curricular topics (Health and Physics). P.A: Still meaningful even if simplified; needs special equipment.
UZH – Air to breathe – asthma air pollutents	4 F: a, b, c	4 P.A.: a,b	I: a, b, c, d	F: Highly adaptable for wide age range students; Establishes desirable links between two cross-curricular topics (Health and environment). P.A.: ICT expertise needed.
UZH Act instead of talking!	4 F: a, b, c	4 P.A: a, b	I: a, b, c, d	F: Potential to involve school as a whole, not just single teachers.

Codification:
Flexibility (F)
(a) can be adapted for different school levels, subject matter, number of teachers, class size;
(b) can be extended or shortened;
(c) can be linked to syllabuses or done as an extra-class activity

Interest (I)
(a) addresses specific problems identified in the country;
(b) links with science education research
(c) foster interactions between teachers from different disciplines
(d) promotes links between school and other institutions in society

Potential for adaptation (PA)
(a) does not require significant efforts or costs in terms of personnel, training, equipment, partnerships;
(b) is viable to be implemented considering partner schools
(c) descriptions of innovation are available in English, Spanish or Italian

Table 9. PARTNER: USC, SPAIN, Legend: **Potential** = **Potential for adaptation**; **Flexibility**, scale for 4 to 1

IP Name	Flexibility	Potential for adaptation	**Justification of Potential & flexibility scores**
CINVESTAV Science in Family	3	3	Needs family collaboration and teacher disposition
CINVESTAV Science for visually-impaired	2	3	Existence of similar programs in Spain
CINVESTAV Sustainable Architecture	2	3	Requires museum permission and collaboration with architects
CINVESTAV Biodiversity	2	3	Possibility of adaptation to local endangered species
IJS Scientific Literacy	4	3	Lack of methodological orientations
IJS 5 minutes of sc. news	4	3	No teaching materials
LBSU Drama and science	4	4	Needs teachers' deep disciplinary knowledge
LBSU Challenge industry	3	3	Industries collaboration; expert support
RM3 Kids ans parents	3	4	Avaliability of kindergarten teachers
RM3 Potatoes on trees	3	4	Garden & Gardener
RM3 Role plays	4	3	Teacher training and disposition
RM3 Invisible structures	3	3	Teacher disposition and training; teaching sequence poorly described
UFRJ Web radio	4	3	Requires a radio/TV
UFJR Literature and science	4	3	Teacher training; teaching sequence poorly described
UFRJ Science blogs	3	3	Ict materials; teacher training; only scientific papers available
UFJR life cycle of products	4	3	Teachers' disposition
UZH X-rays	3	3	Privacy questions related to real X-ray plates
UZH Eye and optics	3	3	Requires interdisciplinary collaboration
UZH Air to breathe	3	3	Teaching unit and basic concepts (relation pollution-asthma) are complex and not clear
UZH Oral bioavailability	3	3	Expert students; teacher training

Table 10. PARTNER: UZH, SWITZERLAND, Legend: **Potential** = **Potential for adaptation**; **Flexibility**, scale for 4 to 1

	IP Name		Flexibility	Potential for Adaptation*	**Justification of Potential for adaptation scores / (of flexibility if needed)**
1	AIE 1	physics and sports	3	2	Depending on compatibility physics and physical education schedule and curriculum; project weeks/minors ("Ergänzungsfach") rather than regular classes; collaboration of teachers needed
2	AIE 7	renewable energy	4	3	Interesting topic with possibilities for local (Swiss) context; some areas teach "integrated sciences" at Lower Secondary level; demanding for teachers: flexibility and organisation; national policy to implement ESD in school
3	CIN 2	science workshops for visually-impaired children	3	?	Depending on frame at schools for visually impaired pupils
4	CIN 3	multimodal explanation on nervous system in childhood education	4	4	Swiss Kindergarten teachers have a lot of freedom in the choice of the topics addressed and the schedule
5	CIN 6	sustainable Architecture	3	2	No school subject but possible for project work (architecture), group size could be a problem; national policy to implement ESD in school
6	FUB 5	the simulated rubber cloth	1	4	Very short duration, ICT-infrastructure usually available (Remark: how appealing will this be for girls and young women?)
7	FUB 8	the principle of Le Chatelier	1	4	Short duration, lab equipment and group work facilities usually available
8	IJS 2	enhancing scientific literacy	4	4	Upper Secondary: preparation for Self Directed Learning (SDL) for final thesis and at university is a focus of improvement
9	IJS 3	the weekly "5 minutes of science news"	4	3	Coordination biology, physics, chemistry needed
10	LSBU 1	innovative ideas from 21st century science	4	3	Teacher training in discussion and talk-based teaching needed
11	LSBU 3	using the tough spot	4	4	Swiss Kindergarten teachers have a lot of freedom in the choice of the topics addressed and the schedule
12	LSBU 5	PREP: play, research, explore, practice	4	4	Easy implementation in already existing lesson plans, little effort for preparation

(Table 10 continues in the next page)

13	LSBU 6 science across the world	4	3	Depending on topic, level and exchanging partner; coordination of partners needed
14	RM 3 a minimum aquarium	3	3	Some areas teach "integrated sciences" at Lower Secondary level; responsibility for the equipment (also during holidays); aquarium for field trial available
15	RM 4 potatoes don't grow on trees	4	4	Swiss Kindergarten teachers have a lot of freedom in the choice of the topics addressed and the schedule; the topic depends on the season
16	UFRJ 3 physics teaching and visual disability	3	?	Depending on frame at schools for visually impaired pupils
17	UFRJ 7 science blog	4	3	Teacher expertise ICT/blogs needed; ICT-infrastructure usually available
18	UFRJ 8 analysing the life cycle of industrialised products	4	3	Some areas teach "integrated sciences" at Lower Secondary level; demanding for teachers: flexibility and organisation; national policy to implement ESD in school
19	USC 1 are the silkworms worms?	3	3	Responsibility for the animals (also during holidays); availability of silkworms in Switzerland?; the topic depends on the season;
20	USC 2 introducing the LHC experiment	4	4	Local (Swiss) context; visits to CERN possible depending on location of school
21	USC 7 physic and toys	4	3	Teacher training needed, teacher motivation essential
22	USC 8 cooking with the sun	4	3	Some areas teach "integrated sciences" at Lower Secondary level; demanding for teachers: flexibility and organisation; national policy to implement ESD in school

Notes from UZH: *without aspect of translation
All scores based on description KIDSINNSCIENCE, not on actual teaching and learning material. The congruity of the innovative practice's topic with the curriculum has not been checked in all the cases.

Preselection criteria UZH

- inclusion, cultural diversity
- gender: everyday contexts, collaborative work, out-of-school learning
- in general: - active role of pupils/students, if possible participation (IBSE)
  - holistic (multidisciplinary, ESD)
- practices for different school levels

List of the 16 most selected IP (Initial selection)

Selected by 6 partners (4 IP)

– Analysing the life cycle of industrialised products - UFJR

– Role-plays in science education – RM3

– Air to breathe – asthma and air pollutants - UZH

– Science Blogs - UFJR

Selected by 5 partners (4 IP)

– Science in Family (CINVESTAV)

– A minimum aquarium – RM3

– Literature and Science Teaching - UFJR

– X-rays –physics and human biology/medicine - UZH

Selected by 4 partners (8 IP)

– Science Workshops for Visually Impaired Children - (CINVESTAV)

– Enhancing Scientific Literacy - IJS

– The weekly 5 minutes of science news - IJS

– PREP: play, research, explore, practice - LSBU

– Science Across the World - LSBU

– Potatoes don't grow on trees – RM3

– Introducing the LHC Experiment – USC

– The circulatory system - UZH

There were also another 17 IP selected by 3 partners.

4. 3 Discussion: Goals and patterns in the initial selection

A first analysis of the consortium initial selection, as reflected in table 1, in terms of breadth, interaction among partners and focus, yields the following results:

Breadth: the initial selection shows that a substantial proportion from the 81 IP were selected by one or more partners. In fact, there were only 12 practices that were not chosen, and have been deleted from table 1.

Interaction among partners: the scope of the choices of the different partners, as reflected both in table 1, and in the partners' selections, shows a great deal of interactions. All partners had some of their IP selected. Even among the 16 more frequently selected IP, there are seven partners and countries represented. It is interesting to note that the contributions from the Latin American partners, UFJR and CINVESTAV, were well received by the European partners, as reflected both in table 1, and in the list above. Three from the 16 more selected practices (two of them chosen by 6 partners) come from UFJR and two from CINVESTAV. Three partners, UFJR, RM3 and UZH have each three IP in that list.

Focus: There is also a variety of focus among the initial selections. There are IP from all educational levels, from Kindergarten to Primary and Secondary school. There are also IP from all the science fields, Biology, Chemistry, Geology and Physics, as well as from Environmental Sciences. There are also a high number of IP addressing Socio-Scientific Issues (SSI), or in other words, set in a Science – Technology – Society perspective.

A particular focus of the analysis is how the three KIDSINNSCIENCE goals are reflected in the consortium choices. Both the general summary of selections, reflected in table 1, and the list of the 16 more selected practices, show that the three goals figure prominently in the selected IP.

Inquiry Based Science Teaching and Learning: most of the selected IP are framed in an IBST perspective, or may be adapted according to it: they require active participation of students, as well as scaffolding from teachers.

Gender equity: This is not a frequent feature of IPs, even in the initial scan of innovative practices. Three IP explicitly address it, from AIE, IJS and USC, and one from RM3 addresses the mothers' participation in Science. All of them were selected by some partners.

Diversity: In the complete set of 81 IPs, there were practices addressing cultural diversity (for instance Sustainable Architecture or Biodiversity from CINVESTAV, Potatoes don't grow on trees from RM3) and also others addressing different types of diversity, as for instance two practices for visually impaired children (CINVESTAV and UFJR). All of these practices were selected.

As a concluding comment, it can be observed that the justifications provided by the different partners range from a detailed analysis of each practice, with specific justifications of the scoring and choices, to a cursory justification of one sentence, or even the same justifications for all the selected practices.

5. FRAMING THE ADAPTATIONS: INITIAL GUIDELINES

Once the number of adaptations was narrowed to a number of 20 in each country, and the results of the initial selection were shared with all partners, the second phase of the selection began, closely intertwined with the adaptation of the IP. In this section we summarize the initial guidelines suggested by the USC in the Rome meeting in June, and then formulated in a document shared with partners in September.

The theoretical frame of didactical transposition supporting the adaptation process, as well as the core features of innovative practices in terms of KIDSINNSCIENCE main goals and IBST-L design principles have been discussed in sections 2 and 3. We will not detail them again, although it is worth noticing that in the Rome meeting the need for taking into account these goals and IBST-L design principles were emphasized.

One consequence of taking into account the goals and IBST-L perspective, was formulated as a first guideline: *coherence* with IBST-L; two other general guidelines were expressed in terms of the two dimensions producing a tension in the adaptations: on the one hand *preservation of key features* of IP and on the other hand *identification of target features in need of change*.

1. **Coherence with IBST-L**: In the process of transformation of the IPs adapting them to the new context, it is necessary to take care of preserving the features coherent with IBST-L. In other words there are features that can be changed without affecting this coherence (as for instance changing the educational level from kindergarten to primary or including different activities), while others as active role of students, hands-on and minds-on experiences, or tasks connected to students' daily lives, should not be modified, for then the IP would change its nature. For instance, an innovation requiring active participation of students in a task should not be substituted by a teacher's presentation.

2. **Preserving the key features of the innovation**: In more general terms, it is necessary to identify the key feature of each adapted innovation in order to preserve it in

the adapted practice. For instance, if the key feature of an IP is cultural diversity, the adaptation should also address it, and this feature should not be eliminated or changed. Another instance is 'Science in Family', whose key feature is that experiences should be carried at home, and that should not be adapted as regular school experiments.

3. **Identifying the target features or dimensions in need of change** (this needs to be achieved in close collaboration with the teachers): These target features would be different for each country or school context. The features in need of change could range from the simplest, as translation of materials to the national language to more complex modifications, as contextualizing them for the particular situation of a country or school. For instance, teachers and kidsINNscience partners can decide to modify the innovation in order to use it in a different school level. Another change could be to extend or to reduce the number of sessions in order to match the local curriculum. And, as seen in the drafts of adaptations reproduced in the Annex ‘Teaching Materials’, some teachers and kidsINNscience partners incorporated new activities and tasks for students in their adaptations.

These two last guidelines could be summarized in terms of a tension between the original IP, whose key features should be preserved, and the new practice, which could be very similar to it (the main change being a translation to the target language), or incorporate several changes.

It was also suggested to identify (also in collaboration with teachers) the **resources** needed in order to implement the adaptation in the schools.

Finally, when choosing the five IP for adaptation, it was suggested to keep in mind a **balance**, both in terms of disciplinary backgrounds (Biology, Chemistry, Geology, Physics, Technology), and of educational levels: kindergarten, primary, secondary.

Although these guidelines have as a goal to support the process of adaptation, it needs to be noted that the adaptation of the same IP could be very different for each country or partner. Nevertheless, it was expected that sharing the results of the first phase of selection would help partners to identify IP that were chosen by several countries. Then partners could cluster in the adaptation and implementation of the same innovation.

6. SELECTION PROCESS: PHASE 2

This section discusses the second phase of the selection process. First we introduce the purpose and procedures or steps of this phase of the process. Then the partners' selections –of five IP– are presented and synthesized, and finally the emerging patterns discussed.

6.1 Purpose and processes in the second phase of the selection

This second phase had the *purpose* of producing a final selection of five IP that were to be adapted and implemented in the field trials. This required *two processes*, first to narrow the country selection down to five practices, and second to identify the features in need of adaptation, as discussed in the previous section. This step was carried out taking into account the initial choices of all countries, and the potential for clustering together in adapting IPs.

An important feature of this second phase is that it needed to be undertaken in close *collaboration with the schoolteachers* who will be implementing the adaptations. This phase, which had been scheduled for September 30th 2010, proved to be more complex (due to its dynamic developmental nature) and time-consuming that initially thought, and the deadline needed to be extended.

The process of selecting, in collaboration with teachers, the five IP, involved several steps (some of them overlap):

– *Translating* all or part of the 20 selected IP to the target language, in order to offer teachers the possibility of selecting themselves. For instance, AIE translated most or all of their IP to English for other partners, as well as core parts of one RM3 IP from Italian to German in order to be able to discuss it with teachers; in the USC 14 IP for secondary school were summarized in Spanish; UZH translated to English support documents from one IP for other partners, etc.

– *Contacting teachers* in each country: this was achieved, as detailed for instance in the reports from RM3 and UFJR, through two main ways. One wider, for instance sending email messages to teachers' mailing lists. The second, more focused, was to make personal contacts with teachers' networks that had been collaborating with each partner. Most partner institutions combined these two approaches, and from the reports it seems that the second was more successful.

– *Meeting with interested teachers*: Once teachers had expressed their willingness to participate in the adaptation and implementation of IPs, most partners met with them (usually in separate meetings for each IP/ school / school level), and discussed the 20 IPs resulting from the first selection, which in some cases had already been sent to them. It needs to be noted that there are not one, but several meetings scheduled, some have already been held, others will take place during the adaptation process.

– *Selecting the IPs in collaboration with teachers*: In some cases the decision about which IP to adapt was made during the first meeting with the teachers (who had previously read the translations); in others the teachers took the documents and information with them, and the decision was reached in a second meeting.

– *Identifying the target features in need of adaptation*: this step, also carried out in collaboration with teachers, does correspond to an iterative process or cycle of identification, discussion and selection, rather than to a one-step decision.

Other steps that were initiated, although corresponding to the phase of adaptation, were to identify resources needed and to schedule the dates for the field trials.

6.2 Results of the second phase of the selection

A template was sent by USC, with substantial input from UZH and AIE, about the steps and dimensions of the process, including the procedure of selection. It is reproduced below. The results were compiled by the USC, and shared immediately with the consortium, in order to facilitate clusters. They are presented in the following formats:

– The report from RM3, which is a narrative with a different format, but can be considered a model in reporting the process in detail.

– The template and *separate choices* of 5 IP, by nine partners, are reproduced.

– Table 21 is the *synthesis* of the IP selected by all partners.

REPORT on the procedure of selection and adaptation of Innovative practices

Prof. Eugenio Torracca, Dr. Michela Mayer - Roma Tre University (RM3)

This report describes the process and the present (October, 2010) situation; since the selection of the IP's to be adapted have not yet been done, it is not possible to fill the template but we will touch as far as possible all the elements therein proposed.

The Process of selection of interested schools/teachers

In order to find schools/teachers interested in the project a mail was sent at the beginning of September to the teachers' mailing list of Roma Tre university and some personal contacts has been taken. The teachers that have responded to this first invitation were mainly those contacted personally. They were sent by email a file with the IP related to their level of school, + the web site address where from to download the whole Deliverable.

In a *first meeting*, hold at the end of September, the interested teachers received more information about the project. All teachers accepted to propose the collaboration with the University to their school and to include the experimentation of minimum one innovative practice in the School Annual Programme (POF in Italy) that has to be finalized in every school in this period of the year.

In a *second meeting*, held the 11th of October, teachers of 6 schools (2 primary, 3 lower secondary, 1 upper secondary) confirmed their decision to participate (one more primary school has not sent yet this confirmation, and may be that one upper secondary school, not from Rome, will join) and expressed their preferences, taking into account both the 20 INNP that has been better evaluated by the Consortium and the whole deliverable. In the following there is the list of IPs from which the final choice and adaptation will be done after having received the materials from the authors .

The *criteria* of this first selection made by teachers have been collected and are detailed in the following. Our general suggestion was to choose preferably among the 20 IP's considered on average more easily transferable, but we accepted alternative choices based on the whole deliverable because we think that teachers point of view, enthusiasm and willingness are the more relevant features. Moreover the IPs from Netherlands that were not included in the 20 could fully participate in the process of choice. Another common criterion was to have the same IP implemented in two schools of the same level, for possible comparisons and improvements.

We hope to receive the materials from other countries as soon as possible, and in English (we have no money and no competencies for translation from German, or Dutch, or Slovenian!) so that teachers can proceed to the final choice within one month. Because of the time needed for receiving, translating and adapting the material teachers have planned to experiment the IP finally chosen after January, in order to have also the time for involving other teachers in their school. In fact, almost all schools have accepted formally to collaborate to kidsINNscience, and now they need to decide if only 1-2 class will participate or more.

We planned also to have regular meetings with this kidsINNscience -Teachers group in order to compare and discuss common difficulties and questions and plan the common collection of field trial and evaluation data.

List of teachers/schools involved with their first choice of IP and Key features, considered by teachers as quality elements

Two Teachers

Kind of school: Primary school. Full time school with outdoor facilities, very active in innovation, families with medium-high social background. The school will support the experimentation also economically (materials, etc.).

First choice of the innovations to examine before deciding the adaptation:

- Austria: Posing the question why
- Netherlands: Concept – context
- Austria: Sunny side up

Reasons for teachers choices: possibility to work on vertical 'continuity' (10 Science teachers from different grades will work together and they were looking for something that could involve other colleagues); possibility to develop interdisciplinary teaching; interest in the methodology.

Two Teachers

Kind of school: Primary school. Full time school with Montessori methodology. Active in innovation. Families with medium social background.

First choice of the innovations to examine before deciding the adaptation:

- Austria: Posing the question why
- Netherlands: Concept – context
- UK: PREP
- Brazil: Physical Knowledge activities
- Switzerland: Walkabout through the body

Reasons for teachers choices: main interest is about methodology, and also in the possibilities to develop interdisciplinary teaching.

One Teacher

Kind of school: Lower Secondary School. Catholic 'paritarian' (recognized by the State) school (as many catholic schools it is recognized and partially funded by the State; it has more internal freedom and less constraints in the choice of teachers), not specially innovative with families with medium social background. The teacher is a very active one.

First choice of the innovations to examine before deciding the adaptation:

- Spain: Cooking with the Sun.
- Switzerland: X-rays.
- UK: Science across the world.
- Brazil: Literature and Science teaching

Reasons for teacher choices:

Importance is given to the possibility to work across the disciplines with other teachers: technology or humanities. There are problems with the choice of the class where the innovation will be proposed (a last year, 13 years old, class, so not every topic is possible)

Cooking with the Sun: clear description and definition of the topic and methodology. Important the hands-on component. The topic fits in the Italian curriculum and does not require too much time.

X-rays: problems with the time schedule. Will the Swiss documentation arrive in time for the introduction in the curriculum; maybe it is better next year?

Literature and science: the adaptation requires the choice of an equivalent Italian text, probably this too will not be possible before next year.

One Teacher

Kind of school: Lower Secondary School. Families with medium social background. The teacher is a very active one.
First choice of the innovations to examine before deciding the adaptation:

- Spain: Cooking with the Sun.
- Austria: Renewable Energy
- UK: Science across the world.
- Netherlands: The most CO2 friendly journey

Reasons for teacher choices: Personal interest for topics related to the energy concept; possibility of interdisciplinary work.

One Teacher
Kind of school: Lower Secondary school. Rome suburbs on the sea side. Families with medium-low social background. Medium active school.
First choice of the innovations to examine before deciding the adaptation:

- Austria: Secrets of culinary art in science experiments.
- Austria: Physics and sports.
- UK: Science across the world.
- UK: Drama and science.

Reasons for teacher choices: Mainly the opportunity of interdisciplinary cooperations with teachers from different areas: gym (Physics and sports) or humanities (Drama and science) .

One Teacher
Kind of school: Upper secondary school. One of the best known Lyceum in the centre of Rome. Families with high social and cultural background. Formally a 'Classical humanities Lyceum', has since more than 40 years some 'special classes' where more innovative curricula are experimented, especially in the field of science and technology education. The class where the kidsINNscience IP will be proposed is one of these special classes, with more than average time for Chemistry (4 hours for week)
First choice of the innovations to examine before deciding the adaptation:

- Austria: Secrets of culinary art in science experiments
- Brazil: Water in the spotlight
- Slovenia: Didactic differentiation: food digestion

Reasons for teacher choices: Special time for Chemistry lab with large freedom in the choice of the topics. Interest in hands-on activities and topics related to everyday life or human body.

Table 11. **TEMPLATE Summary of Selection of five innovative practices (IPs) for Adaptation** **Partner name............................**

	INNP	Key Features / Quality criteria of IP	Target features / dimensions in need of change	School level, Teacher	Adaptation's state & resources needed	Procedure of selection	Field trial planned start
1.							
2.							
3.							
4							
5							

This template is the result of merging templates from USC and UZH and suggestions from AIE
- Column 1 (number)
- Column 2: Name of Innovative Practice (e.g. Potatoes don't grow on trees)
- Column 3: Key features of the InnP or quality criteria (as evaluated by each partner, for instance: Addresses gender equity; stimulates motivation towards science
- Column 4: Target features / dimensions **in need of change**: this needs to be done in collaboration with teachers. For instance this would be different in each country, but it could range from the simplest, as translation of materials to the national language; to contextualizing them for the particular situation of a country / school; to modification in order to use it in a different school level; to extending / reducing the number of sessions in order to match the local curriculum; etc
- Column 5: School level (of the adaptation, which may be different from the source InnP); and name of teacher
- Column 6: Adaptation's current state: for instance, partner has the teaching sequence and is translating it / discussing it with teachers / identifying resources // Resources needed to implement it
- Column 7: Information about the **procedure of selection of IP**: e.g. the range of innovative practices you provide to teachers to choose; the selection criteria
- Column 8: The field trial or implementation planned start date (not all the adaptations would be object of the field trial)

Notes:
1. You can also send **additional information** in a word document
2. Some partners may like to join in a **cluster** for adapting the same InnP

Table 12. **Table Summary of Selection of five innovative practices (INNP) for Adaptation** **Partner name** **AIE**

	INNP	**Key Features / Quality criteria of IP**	**Target features / dimensions in need of change**	**School level, Teacher**	**Adaptation's state & resources needed**	**Procedure of selection**	**Field trial planned start**
1	RM3 From complex to simple	- Takes gender and (multi)cultural issues into account. - Motivation / interest in science is stimulated. - Stimulates argumentation and critical thinking. -Resources and teaching contexts from outside the school.	- Added value: two schools in different biological systems. - Reduction of time needed and classes involved. -Need of translation.	Primary, VS Zederhaus	-Teaching material sent to AIE -School searches for a partner school in town	-AIE selected it regarding to "problem addressed" and "quality criteria" . -AIE asked well experienced school partner to implement innp.	February/ March 2011
2	CINVESTAV Science in family	- Provides insight in the way scientific knowledge is constructed. - Motivation / interest in science is stimulated. - Promotes public understanding of science. - Fosters scientific literacy - Includes practical work. - Uses resources and teaching contexts from outside the school.	- Reduction of classes involved. - Adaptation for younger children. - Added value: school with special pedagogical focus on Montessori.	Primary, VS Langegasse Wien	-Teaching material sent to AIE	-AIE selected it regarding to "problem addressed" and "quality criteria". -AIE asked well experienced school partner to implement innp.	Not yet decided
3a 3b	FUB "The principle of Le Chatelier" UFRJ Students'	-Offers inquiry based learning activities. -Includes practical work -Socially relevant. -Use of scientific content/	 -Translation may be	-Secondary school (upper level) -Suggestions: BG Christian Doppler	Finding a teacher for one of these three innp.	-AIE selected it regarding to "problem addressed" and "quality criteria". -Choice out of one disciplinary field and one educational background.	Not yet decided

           3c	video production UZH X-rays	knowledge according to the context. -Provide insight in the way scientific knowledge is constructed. -Promotes changes or improvements in educational contexts. -Includes practical work, stimulates collaborative work and uses ICT-skills. -Uses daily life materials and resources. -Stimulates students' interest and motivation. -Involves experiment and hands-on activities. -It is flexible. -It is interdisciplinary.	necessary	Gym or PG St. Ursula		-Contacted well experienced school partners for their interest	
4	UZH Dynasty of the Kuglinge	-Use of scientific content/ knowledge according to the context. -Diversity in learning materials and teaching methods. -Stimulates argumentation and critical thinking -Promotes public understanding of science	Adaptation according to the school-level (lower and upper level) in which genetic is a compulsory curriculum-topic	-Secondary school (lower level) -Suggestions: biology-teacher, colleagues of Johanna	Finding a teacher for this innp.	-AIE selected it regarding to "problem addressed" and "quality criteria". -Contacted well experienced school partners for their interest	Not yet decided
5	Possibility to join a cluster						

Further respected selection-criteria: Different educational levels and disciplinary fields / subjects
- INNP should fit to the profile of the forerunner-schools and/or partner-teachers

Table 13. **Summary of Selection of five innovative practices (INNP) for Adaptation** **Partner name: CINVESTAV**

	INNP	Key Features / Quality criteria of IP	Target features / dimensions in need of change	School level, Teacher	Adaptation's state & resources needed	Procedure of selection	Field trial planned start
1	RM3 Minimum aquarium	Motivation / interest in science is stimulated.	-Contextualization for the particular situation of the country (species available, school conditions, number of students, teachers' abilities).	-Primary school, (5th grade). -Two teachers contacted.	-Identifying resources. -Teachers are going to prepare student's materials.	-Meetings with the teachers took place. - Four IP presented to choose one to be implemented in their classrooms. -Overview of the adaptation and implementation difficulties discussed.	November 2010
2	UZH The circulatory system	-Include practical work (hands-on activities, lab-work, experiments etc.) -Offer inquiry based learning activities.	-Translation of materials. -Group organization. -Introducing some new activities.	Primary school, 6th grade. -Three teachers contacted.	-Identifying resources. -Teachers are going to prepare student's materials.	-Meetings with the teachers took place. - Four IP presented (see above). - Overview discussed (see above).	November 2010
3	AIE Apple, apple, apple	-Includes practical work (hands-on activities, lab-work, experiments) -Promote actions, reflections and debates concerning science responsibility towards health, environmental and SD issues.	-Contextualization to the national/cultural interest. -Changing apples for corn.	Primary, (2nd grade of pre-school, 4-5 years old)	-Identifying resources. -Teachers are going to prepare student's materials.	-Meetings with the teachers took place. - Four IP presented (see above). - Overview discussed (see above).	November 2010
4	UFRJ Science Blogs	- Raise awareness of social, ethical and	-Contextualization to the national/cultural interest.	Secondary school	-Identifying resources - Teachers are going	Meetings with the teachers took place.	January 2011

		cultural influence and implications of science and technology			to learn about ICT (blogs creation). -Teachers are going to prepare student's materials.	Four IP presented (see above). - Overview discussed (see above).	
5	USC Kitchen chemistry	Take gender issues into account Foster scientific literacy (identify scientific issues, explain phenomena scientifically, use evidence)	Selection of activities and familiarization with experimental activities.	Secondary school	-Identifying resources - Familiarization with lab work -Teachers are going to prepare student's materials.	Meetings with the teachers took place. Four IP presented (see above). - Overview discussed (see above).	January 2011

Table 14. **Summary of Selection of five innovative practices (INNP) for Adaptation** **Partner name....FUB**

	INNP	Key Features / Quality criteria of IP	Target features / dimensions in need of change	School level, Teacher	Adaptation's state & resources needed	Procedure of selection	Field trial planned start
1	UZH The mobiLLab	-Motivation / interest in science is stimulated. -Provides insight in the way scientific knowledge is constructed.	-Modifications for synergies with "Science on Tour" -Preselection of experiments -Contacts with various industries	-Upper secondary. -Evaluation for use in primary schools.	-Discussion with responsible persons of "Science on Tour". -Discussions with the network of "Science on Tour". -Identification of ressources needed.	-Meetings with responsible persons of "Science on Tour" and teachers from the existing network of participating schools	December 2010
2	USC Physics and toys	-Provides insight in the way scientific knowledge is constructed. -Fosters scientific literacy. -Diversity of learning materials and teaching methods.	-Translation from Spanish -Modifications for use in primary school. -Modifications in order to match the relevant state curriculum.	-Primary. -Secondary planned.	-Discussion with teachers. -Identification of ressources needed. -Implementation into local/state curriculum 2010/2011 discussed	-Preselection of INNPs discussed. -Discussion with teachers. -Selection according to a potential variety of school levels and quality criteria	February 2011
3	IJS Gender aspect in Science Experiments	-Use of scientific content/knowledge according to the context. -Takes gender issues into account.	-Translation from Slovenian. -Modification for particular situation of school. -Reduction of sessions in order to match the state curriculum.	-Primary and secondary.	-Discussion with teachers. -Identification of ressources needed	-Preselection of IPs discussed. -Discussion with teachers	Not scheduled yet
4	UFRJ Life cycle of industrialised	-Raises the awareness of social, ethical and cultural influence and	-Translation from Portuguese. -Reduction of sessions in	-Secondary	-Discussion with teachers. -Identification of	-Preselection of INNPs discussed. -Discussion with	January 2011

	products	implications of STS. -Environmental and sustainable development issues.	order to match the state curriculum. -Modification for specific situation at school.		ressources needed. -Implementation into curriculum 2010/2011 discussed	teachers. -Selection according to a potential variety of school levels and quality criteria.	
5	Reserved for clustering with other partner countries*		INNP adapted and used in preferably more than 3 countries.	-Primary preferred, secondary possible	-A range of INNPs from the preselection of all partners has been discussed with teachers from various schools		March-June 2011, according to the implementation into the curriculum

* Clustering with other countries is one of the aims of FUB, preferably half of the field trials of both years should be comparable to the results of a number of other countries

Table 15. **Summary of Selection of five innovative practices (INNP) for Adaptation** **Partner name IJS**

	INNP	Key Features / Quality criteria of IP	Target features / dimensions in need of change	School level, Teacher	Adaptation's state & resources needed	Procedure of selection	Field trial planned start
1	AIE Secrets of culinary art	-Offers inquiry-based learning activities. -Fosters scientific literacy.		Upper secondary			Not yet decided
2	CINVESTAV Science for visually-impaired children	-To implement new science lessons for visually-impaired children.	-Probably need of translation.	Primary			Not yet decided
3	FUB: Mobile education	-Promoting science education / experimentation over the country.		Upper secondary			Not yet decided
4	UFRJ Life cycle of industrialized products	-Inquiry – based learning. -Science in environment.	-Probably need of translation.	Upper secondary			Not yet decided
5	USC Cooking with the sun	-Practical use of renewable energy. -Environmental education.	-Probably need of translation.	Lower secondary			Not yet decided
6	UFRJ Science blogs	-Analyse science issues by students. -Use ICT skills in science.	-Probably need of translation.	Lower secondary			Not yet decided
7	LSBU PREP: play, research, explore, practice	-Preparation to science methods. -Motivation for children	-Probably need of translation.	Primary			Not yet decided

Table 16. **Summary of Selection of five innovative practices (INNP) for Adaptation** **Partner name** **LSBU**

	INNP	Key Features / Quality criteria of IP	Target features / dimensions in need of change	School level, Teacher	Adaptation's state & resources needed	Procedure of selection	Field trial planned start
1	RM3 Potatoes don't grow on trees	-Pre primary age phase. -Practical and hands-on. -Diversity in teaching and learning materials.	Presence of outdoor space to grow potatoes.	Kindergarten	Number and types of potatoes will be changed depending on local circumstances	School teachers already identified	January 2011
2.	AIE Sunny Side up	-Nature of science. -Linking science with environmental work.	Time and content of innovation will be changed/shortened	Primary	Resources will be dependent on school available materials.	School teacher already identified	January 2011
3.	CINVESTAV Science in Family	-Promotes scientific literacy. -Public understanding of science.	Collaborative learning between home and school will need local discussions.	Primary	Resources dependent on current school content of science curriculum.	Not yet decided	Not yet decided
4	RM3 Modelling of invisible structures	-Provides nsight into the way scientific knowledge is constructed.	Precise content area depends on school curriculum at time of trial.	Primary or pre primary	Depends on content of curriculum at time of trial.	Not yet decided	Not yet decided
5	AIE Apple apple apple	-Diversity in learning materials and teaching methods. -Promotes global citizenship.	Link between science and geography and health.	Primary	-Open to cross cultural learning. -Depends on children's awareness of different types of food.	Not yet decided	Not yet decided

Table 17. **Summary of Selection of five innovative practices (INNP) for Adaptation** **Partner name** **SLO**

	INNP	Key Features / Quality criteria of IP	Target features / dimensions in need of change	School level, Teacher	Adaptation's state & resources needed	Procedure of selection	Field trial planned start
1.	AIE Question WHY	- hands-on/mind-on - children questions - argumentation and critical thinking	- choose a fitting topic - translation	primary	discussion with teachers about: - identification of resources needed - match with school curriculum 2010/11	to be discussed with teacher trainers and teachers of pilot school	Jan/feb. 2011
2.	FUB Hyper-soil	- hypermedia learning environment, - interdisciplinary learning	- translation - reduce and modify to match school curriculum	primary	discussion with teachers about: (see above)	to be discussed with teacher trainers and teachers of pilot school	Jan/feb. 2011
3.	RM3 Parallel globe	- perception vs knowledge, - initial conceptions, - relativity of inter-pretations.	- translation - modify to match school curriculum	Primary Lower secondary	discussion with teachers about: (see above)	to be discussed with teacher trainers and teachers of pilot school	Jan/feb. 2011
4	UFJR Analysing the life cycle of industrialised products	raise the awareness of social, ethical and cultural influence and implications of science and technology, environmental and sustainable development issues	- translation - reduce and modify to match school curriculum	primary	discussion with teachers about: (see above)	to be discussed with teacher trainers and teachers of pilot school	Jan/feb. 2011
5	* Reserved for cluster activities with other partners	one IP to be piloted simultaneously in several countries. To be decided, for instance during the Amsterdam meeting	n.a	preferably in primary school, secondary education is possible	n.a.	n.a.	Second half of 2011

Table 18. **Summary of Selection of five innovative practices (INNP) for Adaptation** **Partner name** **UFRJ**

	INNP	**Key Features / Quality criteria of IP**	**Target features / dimensions in need of change**	**School level, Teacher**	**Adaptation's state & resources needed**
1	CINESTAV Biodiversity in the Caribean Sea	-Scientifically sound. -Foster scientific competencies. -Socially relevant. -Supports teachers' professional development. Other features mentioned by teachers: -Includes observation activities. -Includes activities related to production of materials. -Aims at educating for improving and changing habits. -Relates to environmental education.	-To identify ecosystem/bioma affected by environmental impact. -To give emphasis on waste as an issue which impacts biodiversity. -To make more explicit relationships with Brazilian science curriculum for 12/13 year olds (ecology, living organisms). -Teachers' workshop may be skipped as (a) it is time consuming and (b) innovation has been thoroughly discussed with teachers already.	Primary (12/13 years old)	-Adaptation has not started yet. -Resources: transportation for field work; resources for production of educational materials.
2.	UZH Acting instead of talking	-Foster scientific competencies. -Socially relevant. Other features mentioned: -Involves school as a whole.	-To widen thematic scope (e.g. soil, work, consumism). -To widen discussion so that there may be a discussion of waste and consumism both inside and outside school. -To offer recycling workshops for the school community. -To bring professional who works with recycling to talk to students in school. -To discuss specific aspects such as time that different materials take to decompose.	Lower secondary (11 to 14 years old)	-Adaptation has not started yet. -No special resources needed.
3	Invasive Species - USC	-Foster scientific competencies. -Socially relevant.	-Need to change questions to a more open-ended format.	Lower secondary	-Adaptation has not started yet. -No special resources needed.

		Other features mentioned: -Fosters students’ curiosity and creativity. -Allows students to express their own views and interests. -Addresses problem identified in Brazilian educational reality. -Links with topics present in textbooks and in curriculum.	- Need to reformulate the questionnaire to make it more suitable to students’ age range. -To work with species that were found to have played similar role in Brazilian ecosystems.	(11 to 14 years old)	
4	UZH X -rays	-Scientifically sound. -Foster scientific competencies. -Socially relevant. -Supports teachers’ professional development. Other features mentioned: -Fosters interdisciplinarity. -Offers potential to integrate contents from different disciplines. -Uses easy-reach low-cost materials.	-To organise lectures with medical doctors, medical physicits, scientists. -To explore references to history of science teaching approaches. -To adapt to school year when radioactivity is taught. -To address health issues more explicitly.	Lower secondary (14 years old)	-Adaptation has not started yet. -Financial resources needed: high translation costs.
5	LSBU Science across the world	-Foster scientific competencies. -Socially relevant . -Stimulates colaborative work. Other features mentioned: -Stimulates cooperation amongst students from Portuguese speaking countries. -Widens world views. -Help develop both self and other cultural awareness. -Help explore different views of	-To seek collaboration of foreign language teachers (English and Spanish) to make interactions with students from non-Portuguese speaking countries viable. - To involve an ICT teacher in the workshops.	Lower secondary (11 to 14 years old)	-Adaptation has not started yet. -Financial resources needed: high translation cost of published materials. -Access to internet may be limited to school hours.

		science. -Potential articulation with science curriculum. -Capitalises on students' interest and proficiency in ICT skills. -Promotes digital inclusion.			

Procedure of selection (for all the InnPs)
-15 primary and secondary school teachers participated in a 45 hour professional development course.
-Teachers were presented a list of 9 InnP previously selected considering disciplinary and school level diversity, and interest for Brazilian Science Education.
-InnPs were analysed by teachers individually and, later, through group discussion.
-InnPs were selected following these criteria:
a) Relevance (the extent to which they address local science education problems).
b) Feasibility and extent of changes that would have to be made.
c) Nature of adaptations to be made were discussed in terms of demands of both official and pedagogic fields of recontextualisation.

Field trial planned start March 2011(InnP that are going to be implemented are not known yet)

Table 19. **Summary of Selection of five innovative practices (INNP) for Adaptation** **Partner name USC**

	INNP	Key Features / Quality criteria of IP	Target features / dimensions in need of change	School level, Teacher	Adaptation's state & resources needed	Procedure of selection	Field trial planned start
1	RM3 Potatoes don't grow on trees	-Diversity of learning materials and teaching methods. -Offers IBSL learning activities and stimulate collaborative work.	-Introducing new hands-on (lab) experiences (identification of substances) -Including social science dimensions: local cultural references; tales, songs, art; History of potatoes (Parmentier). -Adaptation to local climate conditions for growing plants.	-Kindergarten, 1st grade Primary. -Six teachers from five schools are participating in the adaptation (some will participate in field trial 1, some in field trial 2).	-Teachers selected it -Take into account varieties of potatoes locally available -Need of outdoor space to grow potatoes. -Design of the adaptation in process.	-First meeting with teachers took place. -The teachers were offered all the Kindergarten INNPs and decided on "potatoes". -A relevant criterion was the novelty of the INNP.	-Field trials scheduled to begin in January 2011 (it will run for several months).
2	UZH X-rays	-Uses authentic daily life materials and resources. -It has potential to stimulate students' interest and motivation. -Involves experiment and hands-on activities. -It is flexible and can be adapted. -It is interdisciplinary.	-Need of adaptation for the Curriculum Diversification Program, special group for students with low achievement in the 9th and 10th grades. -Adjusting the contents to the Spanish national curriculum.	-Lower Secondary. -Two teachers from two high schools are participating in the adaptation and in the first field trial.	-Teachers and US staff have received the materials and the contacts with the Swiss teachers. -Translation from German to Galician is needed. -Design of the adaptation in process.	-Firsts meetings with teachers took place. -The teachers were offered the Secondary school proposals from the 20 INNPs chosen by USC (they also had access to all INNPs). -Criterion: the INNP interdisciplinary	-Field trials scheduled to take place in the first semester of term 2010-2011.
3	UZH Eye and optics	-Socially relevant issues so motivation/interest in science is stimulated. -Use of resources and teaching contexts from outside the school.	-Need to reduce extent and number of lessons. -Possibility of adaptation for the Curriculum Diversification Program), see number 2 for details.	-Lower Secondary -Two teachers from two high schools are participating in	-Translation from German to Galician is needed. -Scan for specific lab resources (Optics resources) in schools	-First meeting with teachers took place. -The teachers were offered the Secondary school proposals from the 20 INNPs	Not yet decided

		-Takes gender and (multi) cultural issues into account. -Stimulates argumentation and critical thinking, including decision-making activities. -Stimulates collaborative work.	-Including activities of construction of eye models designed by the teachers.	the adaptation and in the first field trial.	is in process.	chosen by USC (they also had access to all INNPs).	
4	UFRJ Science Blogs	-Building connections between school culture and youths culture. -Motivation/interest in science is stimulated. -Flexibility.	-Need of adaptation for upper secondary. -Builds on a science blog already established by the teacher.	-Upper Secondary (11th grade). -One teacher participates in the adaptation.	-Materials are in Portuguese, so no translation to Galician is needed. -Need to identify the particular focus of the blog for this term.	-First meeting with teacher took place. -Other teachers and schools may join in.	-Field trials scheduled to take place in term 2010-2011.
5	IJS 5 minutes of science news	-Use of news as a teaching resource. -Stimulates motivation in science and critical thinking. -Fosters scientific literacy.	-Identification of media that will be used as source for the news (journals, internet, TV, etc.) -Adjusting the contents to the Spanish national curriculum.	-Lower Secondary. -One teacher participates in the adaptation.	-Translation of the KIDSINNSCIENCE template to Spanish.	-First contact with teachers took place.	Not yet decided

Comments: possibility to cluster for the potatoes.

Table 20. **Summary of Selection of five innovative practices (INNP) for Adaptation** **Partner name** **UZH**

	INNP	Key Features / Quality criteria of IP	Target features / dimensions in need of change	School level, Teacher	Adaptation's state & resources needed	Procedure of selection	Field trial planned start
1	RM3 Potatoes don't grow on trees	-Motivation / interest in science stimulated. - Take gender and (multi) cultural issues into account. -Include practical work (hands-on activities, lab-work, experiments etc.) -Stimulate argumentation and critical thinking. -Stimulate collaborative work -Promote actions, reflections and debates concerning science responsibility towards health, environmental and sustainable development issues.	-Translation of materials to German. -Modification to use it in a different school level (kindergarten to primary).	-Primary. -Teachers identified.	-Teaching material has been sent to UZH.	-Preselection of 22 InnP was presented and discussed with teacher. -The teacher indicated his/her main interest. -The teacher had also the option of chosing an IPSE not from the preselection.	March 2011
2	USC Cooking with the sun	-Motivation / interest in science stimulated. -Include decision-making activities. -Stimulate collaborative work -Use resources and teaching contexts from outside the school.	-Translation of materials to German.	-Lower secondary. -Teachers identified.	-Teaching material has been found online and sent to the teacher. -UZH asked KIDSINNSCIENCE partner if there was more teaching material available.	-Preselection of 22 InnP (see above) -Teacher's choice (see above)	August 2011
3	AIE Physics and sports	-Motivation / interest in science stimulated. -Allow for diversity in learning materials and teaching methods. -Include practical work (hands-on activities, lab-work,	-Translation of materials to German. -Modification to use it in a different school level (upper secondary to lower	-Lower secondary. -Teachers identified.	-Teaching material has been sent to UZH	-Preselection of 22 InnP (see above) -Teacher's choice (see above)	August 2011

		experiments etc.)	secondary).				
4	Science Blog (UFJR)	OLD for RM3 Minimum Aq -Provide insight in the way scientific knowledge is constructed. -Include practical work (hands-on activities, lab-work, experiments etc.) -Offer inquiry based learning activities.	Translation of materials to German	Lower secondary, open		-Preselection of 22 InnP (see above) -Teacher's choice (see above)	Not yet decided
5	Analysing the life cycle of industrialised products (UFRJ)						

Table 21. **Summary of the choices of five innovative practices (INNP) for Adaptation**

	INNP	**Partners**
1	X-rays (UZH)	AIE, RM3, UFRJ, USC
2	Science Blogs (UFJR)	CINVESTAV, IJS, USC, UZH
3	Analysing the life cycle of industrialised products (UFJR)	FUB, IJS, SLO, UZH
4	Potatoes don't grow on trees (RM3)	LBSU, USC, UZH
5	Cooking with the sun (USC)	IJS, RM3, UZH
6	Apple apple apple (AIE)	LBSU, CINVESTAV
7	The circulatory system (UZH)	CINVESTAV, RM3
8	Science in family (CINVESTAV)	AIE, LBSU
9	Science across the globe (LSBU)	RM3, UFRJ,
10	Physics and sports (AIE)	RM3, UZH
11	Secrets of culinary art (AIE)	IJS, RM3
12	PREP: play, research, explore, practice (LSBU)	IJS, RM3
13	Posing the question 'WHY' (AIE)	RM3, SLO
14	Kitchen Chemistry (USC)	CINVESTAV
15	Sunny Side up (AIE)	LBSU
16	Minimum aquarium (RM3)	CINVESTAV
17	Invasive species (USC)	UFRJ
18	Eye and optics (UZH)	USC
19	5 minutes of science news (IJS)	USC
20	Air to Breath (UZH)	UFRJ
21	From complex to simple (RM3)	AIE
22	Students' video production in the physics laboratory (UFJR)	AIE
23	Dynasty of the Kuglinge (UZH)	AIE
24	The mobiLab (UZH)	FUB
25	Physics and toys (USC)	FUB
26	Gender aspect in science experiments (IJS)	FUB
27	Modelling of invisible structures (RM3)	LBSU

28	Science for visually-impaired (CINVESTAV)	IJS
29	Mobile education (FUB)	IJS
30	Acting instead of talking (UZH)	UFRJ
31	Human transformations on the landscape (USC)	UFRJ
32	Biodiversity (CINVESTAV)	UFRJ
33	Role plays (RM3)	UFRJ
34	Physical knowledge activities for Primary Education (UFJR)	RM3
35	Literature and science teaching (UFJR)	RM3
36	The principle of Le Chatelier (FUB)	AIE
37	Drama and Science (LSBU)	RM3
38	Design a plan for the most CO2 friendly journey (SLO)	RM3
39	Concept-context (SLO)	RM3
40	Renewable energy AIE)	RM3
41	Water in the Spotlight (UFJR)	RM3
42	Didactic Differentiation: Food digestion (IJS)	RM3
43	“Hypersoil” (FUB)	SLO
44	The parallel globe (RM3)	SLO

6.3 Discussion: Goals and patterns in the final selection

A first analysis of the consortium final selection, as reflected in table 21, in terms of breadth, convergence, and focus, yields the following results:

Breadth: the number of IP has been reduced almost by a half. While, in the initial selection, 67 IP (out of the initial 81) were selected by one or more partners, in the second selection there are 44 IPs. As some partners, like RM3 still have to decide, and provided a list of more than five IP, the final selection would be even smaller.

Convergence: The convergence of choices is reflected in the fact of 13 IPs being selected by two, three or four partners. Nine of these 13 IPs belonged to the list of most selected IP from the initial selection, while the remaining four are different (that means that they were previously selected by three, two or one partner). This shows that consistency with previous choices coexists with modifications, probably related to the collaboration of schoolteachers at this stage. At the same time, we may point out that five other IPs from this list of most selected IP in the initial selection are chosen by one partner, while another two have been dropped.

Focus: The second selection exhibits also a variety of focus. There are IPs for all educational levels, (one for kindergarten, 12 for primary and 31 for secondary school) and science fields, (Biology, Chemistry, Geology, Physics and Environmental Sciences). Eight of the 13 IP selected by two, three or four partners address Socio-Scientific Issues (SSI) or are set in a Science – Technology – Society perspective.

In terms of kidsINNscience goals, IBST-L figures prominently in most of the chosen IPs, in particular in the most selected. We may say that several of the IPs address diversity, and gender equity.

About the justification in terms of quality criteria, as happens with the initial selection, there is great diversity, with some partners offering a detailed account and specific analysis, while others just give general sentences.

7. ADAPTATIONS: INITIAL STATUS AND TEACHING MATERIALS

This section discusses the status of the adaptation by the end of October 2010. The purpose and processes involved in this stage are first outlined. Then the status of the five adaptations in nine of the partner institutions (which reported about it, while one did not) is synthesized.

Purpose of the **Adaptation of Innovative Practices**: to modify the five selected IPs to match the features of each national and school context. This step is a dynamic process, which is taking place in parallel with the implementation of the first field trial. Rather than a fixed product that would be then implemented in schools, adaptations are more adequately characterized as a *developmental process*. They experience different stages of transformation, from the original IP to the implementation in the classroom.

Although not all adaptations are homogeneous, there are several processes involved in them, all carried out in cooperation with teachers:

– *Analysis of the original IP*: this process, overlapping with the selection of the five IP, resulted in the identification of IP adequate for the each target country and school.

– *Exchange of support materials*: although the initial analysis was carried out on the basis of the IP's summaries compiled in Deliverable 3.1, partners exchanged other materials, research papers, teaching units and resources, needed to implement the IPs.

– *Translation of documents*: The IP's summaries in D3.1 were in English, but most of the support materials were in the original languages of each country. Therefore it was necessary, first to translate part or all the summaries in order to share them with the teachers; and second to translate part or all of the support materials.

– *Identification of features kept and changed*: this is the core process of the adaptation, involving not just a simple translation, but an adaptation to the new context.

– *Design of the adapted IP*: this could involve, for instance, first an outline of the adapted IP, then consecutive drafts, and then writing new handouts, activities or teaching units.

Below we summarize the documents exchanged, translated and produced by each partner, with a focus on the *receiving* partner. When an IP is selected by several partners, the exchanged documents are listed only the first time, and in subsequent occurrences they are referenced by the acronym of the partner and the IP number, for instance 'Potatoes don't grow on trees', LSBU1.

In some cases, where the innovations, teaching sequences and original documents are available online, there is no physical 'exchange' of materials. These web links were provided in the summaries in D 3.1, and are also reproduced here.

In the annex 'Teaching Materials' some of these documents are reproduced. It has to be noted that original papers and teaching sequences subjected to copyright cannot be reproduced in full, so in these cases only the reference is provided. In some cases, where web links are available, they are given. The documents reproduced in the annex are support materials not subjected to copyright, partial translations and outlines of teaching sequences.

Teaching materials for IP adapted by AIE

AIE 1: From complex to simple (RM3)

Original papers in Italian, French or English:

-Caravita, S., Giuliano, E. (2001) Composer des textes pour de vrais lecteurs: une expérience à l'école élémentaire italienne. *ASTER*, 33, 189-22*4*. .

-Cesareni, D., Caravita, S. (2003) Pensiero individuale, pensiero collettivo: processi collaborativi a vari a vari livelli dal gruppo alla rete. In Caravita, S., Ligorio B. (Eds.) *Apprendimento collaborativo: dal gruppo alla rete*. Roma: Istituto Carlo Amore. pp. 154-172.

-Caravita, S. Le "voci" degli insegnanti. In Caravita, S., Ligorio B. (Eds.) *Apprendimento collaborativo: dal gruppo alla rete*. Roma: Istituto Carlo Amore. pp.187-200.

-Caravita, S. (2004) Insegnare/Imparare a pensare per relazioni sistemiche. Atti 18° Congresso Nazionale AIP- Sezione di Psicologia dello sviluppo, 20-23 settembre 2004, Sciacca, pp.20-23.

-Caravita, S., Talamo, A., Ligorio, B., Colazingari, M. (2004). The "our world" project case description. In: H.van der Meijden, R.J. Simons and F. De Jong (Eds.) Final Report of Computer supported Collaborative Learning Networks in Primary and Secondary Education. Project 2017. Annex 2, Case studies. Pp.96-126.

-Caravita, S. (2006) Ambiente come intreccio. *Cooperazione Educativa*, 55 (2), 70-78.

-Caravita, S. (2007) Da ambiente-luogo ad ambiente-intreccio. Lo sviluppo di un modo di guardare sistemico in ragazzi di scuola elementare. *Naturalmente*, 20 (1), 48-52.

-Caravita, S. (2006) Organismi e ambiente: sistemi in interazione. Atti del Forum delle Sezioni ANISN "Educazione al futuro: come fare Scienze ai bambini e ai ragazzi". Napoli, 4-5 marzo 2006. In: *Le Scienze Naturali nella scuola*, anno XV, (Numero speciale), pp. 23-31.

Support documents –activities-:

-Forma e funzione (Italian).
-Città de Ottavia (Italian).
-Out of windows (Italian).
-Regole (Italian).
-Sistema urbano (Italian).

Support documents –comments-:

-Author´s explanations for implementing InnP (English).
-Forum "Il nostro mondo" (Italian).
-Principi di programmazione (Italian).
-Sintesi sequenza attivitá (Italian).
-The software or "Our World" (English).
-Verifiche finale (Italian).

AIE 2: Science in family (CINVESTAV)

Support documents –activities-:

-Summary of 36 activities (English).

-A fregar se ha dicho (Spanish).
-Agua que no has de beber (Spanish).
-Aguas con el agua (Spanish).
-Aire entra, aire sale (Spanish).
-Bacterias en mi yogurt (Spanish).
-Burbujas (Spanish).
-Come sano, y sano soy (Spanish).
-Como pez en el agua (Spanish).
-Con ritmo (Spanish).
-Cuentagotas (Spanish).
-Ecopintura (Spanish).
-Extrayendo el ADN (Spanish).
-El color (Spanish).
-El planeta tiene sed (Spanish).
-Gana o pierde (Spanish).
-Huellas del pasado (Spanish).
-Naveguemos con la física (Spanish).
-Por las barbas del abuelo (Spanish).
-Que no te den gato por liebre (Spanish).
-Quien es mayor que yo (Spanish).
-Quien sube, sube (Spanish).
-Recuperar la tierra está en tus manos (Spanish).
-Si caminas no contaminas (Spanish).
-Tras la huella (Spanish).
-Un vistazo al firmamento (Spanish).
-Yo solo cuento las horas soleadas (Spanish).

AIE 3a: "The principle of Le Chatelier" (FUB)
Original papers and teaching materials in German:
www.lncu.de, www.lehrer-online.de

AIE 3b: Students' video production (UFRJ)
Materials sent to AIE by UFRJ.

AIE 3c: X-rays (UZH)
Original papers and teaching materials in German:
Downloadable: http://www.educ.ethz.ch/unt/um/ta/roe

Outline of teaching sequence:
Translation to English sent by UZH (not necessary for AIE, but for other partners)

AIE 4: Dynasty of the Kuglinge (UZH)
Support documents (German):
- Evolution in Volksschule und Frühgymnasium - Erste Erfahrungen mit einem Lernspiel. PPT by Luigi Bazzigher, Claudia Kunfermann and Peter Jann, PHZH Zurich and Life Science Zurich Learning Center.

AIE 5: (reserved for clustering)

Teaching materials for IP adapted by CINVESTAV

CINVESTAV 1: Minimum aquarium (RM3)

Original paper:

-Lab-work in Italian schools: an example use of a model organism in education.
Webpage in Italian/English: http://www.openscience.it/opendanioeng.htm

CINVESTAV 2: The circulatory system (UZH)

Translation of support materials

Translation to Spanish of materials sent by UZH and

Outline of teaching sequence:

Outline of teaching sequence (Spanish).

CINVESTAV 3: Apple, apple, apple (AIE)

Original paper in German:

-Salber, A., Kröpfl, P. & Prskavec, A. (2009) Apfel, Apfel, Apfel. Download link: http://www.generationinnovation.at/fileadmin/document_browser/scripts/frontend/download.php?file=10

Translation of teaching materials

- Translation to Spanish of materials sent by AIE.

CINVESTAV 4: Science Blogs (UFJR)

Original innovation, blog (Portuguese):
http://remexo9b7.blogspot.com

This IP is very context-dependent; therefore no actual 'original materials' exist, beyond the blog itself. The challenge is to implement the practice with the students in the new context.

CINVESTAV 5: Kitchen Chemistry (USC)

Original documents with activities and rationale (Spanish)

– Solsona,N. (2002) La química de la cocina. Educación Secundaria. Instituto de la Mujer. Cuadernos de Educación no Sexista, 13. http://www.inmujer.migualdad.es/mujer/publicaciones/catalogo/cuadernos_educacion.htm
– Solsona, N. (2002) La actividad científica en la cocina. Educación Primaria. Instituto de la Mujer. Cuadernos de Educación no Sexista, 12. http://www.inmujer.migualdad.es/mujer/publicaciones/catalogo/cuadernos_educacion.htm

Original papers about the innovation in Spanish and Catalan

– Solsona, N. (2001a) El conocimiento doméstico y los cambios químicos. Pasteles, tortillas y sustancias. *Cuadernos de pedagogía*, 299, 40 –50.

- Solsona, N. (2001b) Química culinaria y saberes femeninos. *Aula de Innovación Educativa*, 106, 41 - 44
- Solsona, N. (2001c) La química de la cuina, una experiència per repensar l'ensenyament de la química. *Senderi*, 8. www.senderi.org
– Solsona,N. (2002) La química de la cuina i els sabers femenins a l'aula. *La talaia*, 4. www.bcn.es/laTalaia
– Solsona, N. (2003) Quatre anys d'experiències: entre les espàtules i els fogons. *Perspectiva escolar*, 277, 19 - 27.
– Solsona, N. Izquierdo, M (2003) El uso de la explicación en una receta de cocina científica. *Investigación en la Escuela*, 49, 79 -88
– Solsona, N. (2004) *La ciencia de la cocina, una experiencia en el aula, en Educación Primaria. Orientaciones y recursos* (6-12 años)468 /30 – 46). Madrid, Praxis.
– Solsona, Núria; Martín, Rosa (2004) De los modelos del alumnado al modelo escolar sobre los cambios químicos. *Alambique*, 42, 19-28
– Solsona, Núria (2005) Una introducció a la química des de la cuina. http://crecim.uab.cat/revista_ciencies/revista/numeros/numero%20001/index.htm, *Revista Ciències,* 1, 12-15
– Solsona, Núria (2005) *La cocina de mestizaje, un puente entre culturas*. Barcelona, Praxis.
– Solsona, Núria (2006) Ámbito Científico-Tecnológico, Ciclos Formativos y TIC, en Guía de Buenas Prácticas para favorecer la Igualdad entre hombres y mujeres en educación. Sevilla, Junta de Andalucía, Consejería de Educación.
– Solsona, Núria (2006) Algunas preparaciones culinarias, un apoyo para el trabajo en el aula de Química, en Quintanilla, M. Adúriz, A (ed). *Enseñar Ciencia en el nuevo Milenio. Retos y propuestas*, 91 -118. Santiago de Chile, U. Católica de Chile.
– Solsona, Núria (2007) La cocina, un espacio educativo. *Aula*, 159, 28- 32
– Solsona, Núria (2008) Innovación educativa centrada en los saberes de las mujeres, en Emakunde (ed) Congreso Interrnacional Sare 2008: Igualdad en la innovación, innovación para la igualdad, 83-96. http://www.sare-emakunde.com/pags2/s03_07_01.asp#subsec_6 (consulta 11-02-2009)
– Solsona, Núria (2009) La química de la cocina, una reflexión para saber que sabemos. *Emakunde,* 76, 30 -33
– Solsona, Núria (2010) Una experiencia competencial de química y bizcochos en el aula. *Aula*, 188, 52 -55

Note: As the documents are in Spanish, which is also the language used in Mexico, no translation is necessary.

Teaching materials for IP adapted by FUB

FUB 1: The mobiLLab (UZH)

Materials sent by UZH. Further contacts established with IP-institution, experimental visits planned by FUB. Currently, basic teaching materials are being compiled.

FUB 2: Physics and toys (USC)

Original documents with activities and instructions (Spanish)

– 24 examples already available online (Spanish) with instructions about the construction of toys and the Physics involved: http://www.jpimentel.com/ciencias_experimentales/pagwebciencias/pagweb/Los_talleres_de_ciencias/Taller_de_fisica_y_juguetes.htm (High School Juana de Vega, Ávila).

– Each toy file will be available at the end of the project at CFIE León webpage: http://cfieleon.centros.educa.jcyl.es/sitio/

Original papers about the innovation (Spanish):

-López García, V. (2004). La física de los juguetes. *Revista Eureka sobre Enseñanza y Divulgación de las Ciencias, 1*(1), pp. 17-30. Can be downloaded from: http://www.tareaescolar.net/tareaescolar/fisica/LA%20FCDSICA%20DE%20LOS%20JUGUETES.pdf

-Varela Nieto, M. P. & Martínez Montalbán, J. L. (2005). "Jugando" a divulgar la física con juguetes. *Revista Eureka sobre Enseñanza y Divulgación de las Ciencias, 2*(2), pp. 234-240. Can be downloaded from: http://www.apac-eureka.org/revista/Volumen2/Numero_2_2/Varela_Mart%EDnez_2005.pdf

FUB 3: Gender aspect in Science Experiments (IJS)

No materials exchanged yet.

FUB 4: Life cycle of industrialised products (UFRJ)

No materials exchanged yet.

FUB 5: (Reserved for clustering)

Teaching materials for IP adapted by IJS

IJS 1: Secrets of culinary art (AIE)

Original papers (German):

-Lenz, H., Binder, R. (2006). Die Geheimnisse der Kochkunst im naturwissenshaftlichen Experiment. Download link: http://imst.uni-klu.ac.at/imst-wiki/images/2/2d/353_Langfassung_Lenz.pdf

Translations:

Partial translation to English by AIE of the overall project description; detailed translation of phase 1-3; phase 4 „Selected food“ will be translated in detail if the teachers decide to implement this IP.

IJS 2: Science for visually-impaired children (CINVESTAV)

No materials exchanged yet.

IJS 3: Mobile education (FUB)

Original papers (German):

-From “Science On Tour” project: “Arbeitsblatt Bau einer Farbstoffsolarzelle”

- from “Science On Tour” project: “Bewegungskoordination aus der Physiotherapie”
- from “Science On Tour” project: “Kosmetikversuch aus der Chemie.”
- from “Science On Tour” project: “DNA-Isolierung”

School visits planned by FUB / IP to Slovenian schools during implementation

IJS 4: Life cycle of industrialized products (UFRJ)

No materials exchanged yet.

IJS 5: Cooking with the sun (USC)

Original papers (Spanish):

-Carretero, B. (2010). El sol la cocina solar y la solidaridad: una receta muy sabrosa. *Revista Eureka de Enseñanza y Divulgación Científica*, 7(2), pp. 544-557. Download link: http://www.apac-eureka.org/revista/Volumen7/Numero_7_2/Carretero_2010.pdf

-EDUCADORES PARA LA SOSTENIBILIDAD, (2008b). Es el momento de nuevos compromisos de acción ¡podemos hacerlo y vamos a hacerlo! *Revista Eureka sobre Enseñanza y Divulgación de las Ciencias,* 5 (3), 367-372. Weblink: http://www.apac-eureka.org/revista.

IJS 6: Science blogs (UFRJ)

(See CINVESTAV 4)

IJS 7: PREP: play, research, explore, practice (LSBU)

Original papers (English):

- Phethean, K. (2008) When are you too old to play in Science? *Primary Science Hatfield, 105,* pp.12-15

Teaching materials for IP adapted by LSBU

LSBU 1: Potatoes don't grow on trees (RM3)

Original papers (English):

- Gambini, A. (2009). Potatoes don't grow on trees. In: *Roots. Botanic Gardens Conversation International Education Review*. Vol. 6 (2), 18 – 20. BGCI plants for the planet.

Original papers (Italian):

- Gambini, A. (2008): Biologia a scuola. *Bambini*, n° 10, November, p. 40-47.
- Gambini, A. (2008). Le patate a scuola, educazione scientifica in biologia nella scuola dell.'infanzia. Dipartimento di Scienze umane per la Formazione. Università degli Studi di Milano-Bicocca. Pp. 1-11.

Outline of teaching sequences:

See below Teaching Materials adapted by USC.

LSBU 2: Sunny side up (AIE)

Original documents and activities (German):

-Project overview.
-Sunny side up – Sonne. (Cycle 1 "Suny side up").
-Licht und Schatten, Tag und Nacht, Jahreszeiten, Finsternisse. (Cycle 1 "Suny side up").
-Magnetismus und andere Kräfte. (Cycle 1 "Suny side up").
-Luft und luftleerer Raum. (Cycle 1 "Suny side up").
-Sonne, Energie, Spektrum. (Cycle 1 "Suny side up").
-Actionday „Ticket to the sun". (Cycle 1 "Suny side up").
-Wo schläft der Wind? Woraus besteht die Luft? (Cycle 2 "Raindrops keep falling").
-Wasser. (Cycle 2 "Raindrops keep falling").
-Actionday: „A long Trip of a drop". (Cycle 2 "Raindrops keep falling").
-Sehen, hören, spüren, schätzen. (Cycle 2 "Raindrops keep falling").

Translations:

- Partial translation to English of Project folder by AIE (first two cycles).
- Sun. ("Sunny side up" attachment 1. Translated to English by AIE).
- Light and shadow. ("Sunny side up" attachment 2. Translated to English by AIE. Regl, Ida (2008). Sunny Side Up, Raindrops Keep Falling, Primary School Lichtenberg, Austria. Download link: http://imst.uni-klu.ac.at/imst-wiki/images/8/83/951_Langfassung_Regl.pdf

LSBU 3: Science in family (CINVESTAV)

(See AIE 2)

LSBU 4: Modelling invisible structures (RM3)

Original papers (English):

- Acher, A., Arcà, M., Sanmartí, N. (2007). Modeling as a Teaching Learning Process for Understanding Materials: A Case Study in Primary Education. *Science Education,* vol. 91 (3), pp. 398-418.
- Acher, A., Arcà, M. (2006). Children's representations in modeling scientific knowledge construction, in C. Andersen, N. Scheuer, M. P. Pérez Echeverría, E. Teubal (Eds.), Representational Systems and Practices as Learning Tools in Different Fields of Knowledge, Sense Publishers. https://www.sensepublishers.com/files/9789087905286PR.pdf
- -Arcà, M. Children's models in scientific knowledge construction. PPT presentation at symposium "Children´s drawing: its relation to learning ans instruction in kindergarten and primary education".

Original papers (Italian):

-De Giorgi, E., Arcà, M., Bassino L. (2006) Dentro la materia. Una storia di atomi, molecole, particelle, (Inside matter. A story of atoms, molecules, particles) Scuola Facendo Tascabili, Carocci Editore.

LSBU 5: Apple, apple, apple (AIE)

See CINVESTAV 3

Translation of support materials

-Full translation to English of project description and exercise sheets by AIE.

Teaching materials for IP adapted by RM3

RM3 1: Science across the world (LSBU)
No materials exchanged yet.

RM3 2: Posing the question why (AIE)

Original paper in German:
- Kernbichler, M., Kerschbaumer, H. (2008) Zum Verstehen kommen. Naturwissenshaftliches Lernen und Sprache. Download link: http://imst.uni-klu.ac.at/imst-wiki/images/0/00/1442_Kurzfassung_Kerschbaumer.pdf

Translation:
Partial translation to English by AIE of "Posing the question „WHY" "and most of the list of experiments: The flame Water – Ice, Waster – Colour – pap of disgust (pappa nauseabonda).

RM3 3: Cooking with the sun (USC)
(See IJS 5)

RM3 4: Secrets of culinary art (AIE)
(See IJS 1)

RM3 5: Concept – Context (SLO)
No materials exchanged yet.

RM3 6: PREP: play, explore, research, practice (LSBU)
(See IJS 7)

RM3 7: Physical knowledge activities for Primary (UFRJ)
No materials exchanged yet.

RM3 8: The circulatory system (UZH)
(See CINVESTAV 2)

RM3 9: X-rays (UZH)
(See AIE 3c)

RM3 10: Literature and science teaching (UFRJ)
No materials exchanged yet.

RM3 11: Renewable energy (AIE)

Translation:
- Partial translation to English of the main sections of the project by AIE.

RM3 12: The most CO2 friendly journey (SLO)
No materials exchanged yet.

RM3 13: Physics and sports (AIE)

Original papers (German):

- Duenbostl, Th. (2005). Physik und Sport. MNI -Fonds für Unterrichts- und Schulentwicklung. S 6 „Anwendungsorientierung und Berufsbildung". http://imst.uni-klu.ac.at/materialien/2004/279_endbericht_duenbostl.pdf pp. 1-49
- Oudin, T. (2010). Physik im Sport. Umsetzung eines bereits durchgeführten Physikprojektes in 14 Klassen an 9 Schulen. Fonds fürUnterrichts- und Schulentwicklung (IMST-Fonds). S 6 „Anwendungsorientierung und Berufsbildung". http://imst.uni-klu.ac.at/imst-wiki/images/4/4c/334_Langfassung_Winkler.pdf pp. 1-34.

Translation:

-Partial translation to English of Physik und Sport (Duenbostl, Th.) by AIE Physik und Sport (Duenbostl, Th.): Item "Speed" translated; headers of parts "Jump" translated, to be read together with the original material because of the photos, graphics and diagrams.

RM3 14: Drama and science (LSBU)

Original papers (English):

- Littledyke, M. (2004) Drama and science. *Primary Science Review, 84*, pp. 14-16.
- Nickerson, L. (2009) Science Drama. *School Science Review, 90* (332), 83-89.
- Darlington, H. (2010) Teaching secondary school science through drama. Sch*ool* Science *Review, 91* (337), 109-113.

RM3 15: Water in the spotlight (UFRJ)

No materials exchanged yet.

RM3 16: Didactic differentiation: Food digestion (IJS)

Original documents with activities:

- Food as fuel. What types of substances is food composed of? How can we determine those types of substances? Exercise group 1 (translated to English by IJS).
- Food as fuel. What types of substances is food composed of? How can we determine those types of substances? Exercise group 2 (translated to English by IJS).

Support documents:

- Fat synthesis (English).

Teaching materials for IP adapted by UFJR

UFRJ 1: Biodiversity in the Caribbean Sea (CINVESTAV)
No materials exchanged yet.

UFRJ 2: Acting instead of talking (UZH)
No materials exchanged yet.

UFRJ 3: Invasive species (USC)

Original documents with activities (Spanish):
- Marbá, A. Especies invasoras: el peligro que viene de fuera.

UFRJ 4: X-rays
(See AIE 3c)

UFRJ 5: Science across the world (LSBU)
No materials exchanged yet.

Teaching materials for IP adapted by USC

USC 1: Potatoes don't grow on trees (RM3)

(About original documents see LSBU 1)

Outline of teaching sequence (Galician and English):

– *¿De onde saen as patacas?* (3 pages outline in Galician of the adaptation prepared in the USC in collaboration with teachers). See the Annex.

- *Where do potatoes come from?* (Translation to English of the 3 pages outline by USC, sent to the consortium in November as an example). See the Annex.

USC 2: X-rays (UZH)

(About original documents see comments AIE 3c)

Outline of teaching sequence (Galician):

– Raios X (2 pages outline in Galician of the adaptation prepared by the teachers). See the Annex.

USC 3: Eye and optics (UZH)

Original paper (German):

- Brovelli, D., Wilhelm, M. (2009). Problemorientiertes Lernen für den integrierten Naturwissenschaftsunterricht. Vorschläge für Unterricht zur Optik und Akustik. *Physik und Didaktik in Schule und Hochschule* 2/8/2009, pp. 65-72. Download link: http://www.phydid.de/index.php/phydid/article/view/70/Artikel%2070

Support documents (German):

- Problembasiertes Lernen (PBL) als Ansatz zum Kompetenzerwerb bei fächerübergreifenden naturwissenschaftlichen Themen. PPT by Dorothee Brovelli and Wilhelm Markus, PHZ Luzern.

USC 4: Science Blogs (UFRJ)

– This IP is very context-dependent; therefore no actual 'original materials' exist, beyond the blog itself. The challenge is to implement the practice with the students in the new context. (See CINVESTAV 4)

– Contact through the email has been established with the author of the original innovation, the teacher who implemented it in school (Mônica Fogaça), and currently the teacher who is going to implement it in Galicia is in contact with her (Galician and Portuguese being part of the same language).

USC 5: 5 minutes of science news (IJS)

This IP is very context-dependent; therefore no actual 'original materials' exist. The challenge is to implement the practice with the students in the new context.

Teaching materials for IP adapted by UZH

UZH 1: Potatoes don't grow on trees (RM3)
(About original documents see LSBU 1)
See also USC 1 for outline of teaching sequence.

UZH 2: Cooking with the sun (USC)
(See IJS 5)

UZH 3: Physics and sports (AIE)
(See RM3 14)

UZH4: Science blog (UFRJ)

This IP is very context-dependent; therefore no actual 'original materials' exist. The challenge is to implement the practice with the students in the new context. (See CINVESTAV 4)

UZH5: Life cycle of an industrialised product (UFRJ)
No materials exchanged yet.

8. EMERGING PATTERNS AND DISCUSSION

Although the adaptations are still in progress, there are some emerging patterns that may be outlined.

– *Connections to science education research and innovation*: First, it may be noted that some of the IP that are being adapted with higher frequency, like *X-Rays*, from UZH, that is being adapted by four partners; *Potatoes don't grow on trees*, from RM3, *Science in Family*, from CINVESTAV or *Cooking with the sun*, from USC, adapted by three partners, correspond to innovations that are the product of research, that have been tested in schools and have sometimes generated reflections published in papers. This connection is relevant to the objectives of the kidsINNscience project of disseminating innovative practices of high quality. For instance, in the four cases mentioned it should help to get these innovations known outside the scope of their original languages (German, Italian, Spanish) and to reach a wider audience.

– *Flexibility*: On the other hand, some innovations that are being adapted, like *Science Blogs*, from UFJR, adapted by four partners, or *Science across the globe*, from LBSU, adapted by two, have a high flexibility. They have a contextual nature and we may say that what is being adapted is the idea, for there are even some cases, as *Science Blogs*, or *The weekly 5 minutes of Science News*, from IJS, where there are no 'materials', as the content of the blog or the news will be different, not only in different countries, but also in different school years.

– *Inquiry-Based-Science-Teaching and students' active role*: A feature shared by almost all the innovations that are being adapted and, in particular, by those chosen with higher frequency is that they share an IBST approach. In these IPs students are required to take an active role, either participating in projects, solving problems, carrying out experiences in the laboratory, bringing science news or topics for discussion in a blog or in the classroom. It may be noted that this active role involves hands-on, and also minds-on, engaging students in the construction of their own learning.

In general it seems that the three kidsINNscience criteria are reflected in the consortium adaptations. An interesting development may be partners' clusters in the adaptation of some innovations.

As the adaptations are still in progress, it is not possible to draw definitive conclusions about what is necessary to consider when adapting an innovation from another country. Teachers play the most important role in preserving the innovative nature of the innovation and it is clear that all partners planned and carried out the meetings with teachers with great care. Sometimes this required translating even teaching materials that were not finally selected, in order to provide teachers with a range of potential choices. As could be expected, language is a relevant issue, and it can be seen that the three German-speaking countries chose five innovations from another German-speaking partner, and CINVESTAV, from Mexico, chose one innovation from Spain, requiring no translation.

The role of support materials and papers in facilitating the innovation needs also to be highlighted. The process of adaptation is supported when teachers and kidsINNscience partners may study, besides the original teaching materials and activities, papers that discuss the results of their implementation and provide useful cues about how to carry out the innovation and which results could be expected.

From the responses of teachers it can be anticipated that the exchange of innovations among different countries could prove fruitful. Even when the adaptations mean a great effort, it seems less difficult to adapt an innovation that to design it from scratch. And for teachers whose innovations have been chosen by partners from other countries it could be also a stimulus promoting further innovations.

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