kidsINNscience

Innovation in Science Education – Turning Kids on to Science

PUBLISHABLE SUMMARY

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1. Executive Summary

kidsINNscience. Innovation in Science Education – Turning Kids on to Science was a collaborative SICA action funded under the 7th Framework programme of the EC. The aim was to develop strategies to facilitate educationalists at different positions in the education system to work towards a more innovative Science and Technology (S&T) education, which supports equity amongst all learners, raises the students' interest in and the motivation towards S&T and their scientific literacy. Therefore, from November 2009 to July 2013, the research project analysed and compared strategies for innovating curricula, for teaching and learning in S&T in ten different partner countries in Europe and Latin America, and spread the findings in journals, conferences and national dissemination events.

The project team of kidsINNscience collected innovative approaches/practices (IP) in S&T education for exchanging them among the partner countries: Austria, Brazil, England, Germany, Italy, Mexico, the Netherlands, Slovenia, Spain and Switzerland. kidsINNscience acted on the basic assumption that an IP which originated in a different country or educational context, would work well, if it met agreed quality criteria and if it was adapted to the local circumstances and conditions. Hence, the project team investigated how to transfer innovation in S&T education from one educational context to another, from one country to another, addressing the following core questions:

1. What strategies for teaching and learning in S&T motivated teachers and learners in the ten participating countries?
2. What similarities and differences were there in the process of adapting innovating S&T teaching and learning in the participating countries?
3. Which strategies innovating S&T teaching and learning would work in the participating countries, taking into account their contexts and characteristics of S&T teaching and learning?

Throughout the whole project, diversity and inclusiveness, gender equity and activity based and learner centred approaches (such as hands-on or Inquiry Based Teaching and Learning, IBTL) were explicitly addressed. The adaptive approach - involving teachers and taking into account the context and the conditions in their classrooms - proved to be crucial for a successful transfer and implementation of an IP. During two cycles of field trials (2010/2011 and 2011/2012), the innovative approaches were carried out in nearly 100 schools, involving more than 180 teachers and reaching more than 4100 learners of all ages and levels of achievement. The field trials were evaluated with respect to feasibility and effectiveness of the activities, addressing at least one of the aforementioned aspects (diversity/inclusiveness, gender equity, learner/activity centred teaching).

It turned out that the adaptive approach helped to

- involve all learners in a class,
- support the awareness of gender differences and individualized teaching to include girls and boys equally,
- reach pupils with various levels of achievement or with different cultural and socio-economic background.

The evaluation of the field trials showed that learner and activity centred teaching (IBTL or hands-on activities) and the integration of real-life contexts increased the motivation of both, teachers and learners. For a successful implementation, an IP must match the curriculum or the curriculum must be flexible enough to integrate it. Support and acceptance of educational authorities, colleagues and parents is as vital as the teachers' willingness to reflect on the integration of issues of diversity/inclusiveness, gender or IBTL and the like in their own teaching.

The team of kidsINNscience formulated main patterns of strategies for a structural change in S&T education. Besides the already mentioned issues, the importance of supporting teacher education by educational research results, the need of flexibility and teaching freedom as a structural context, and the support given within and to existing professional learning communities are vital for innovating S&T education.

2. The project context and objectives

Education in general and science and technology (S&T) education in particular are important factors for the success of a country in terms of the level of economy and of democracy. Scientific literacy – together with maths and reading literacy – has become a worldwide aim and an important "tool" for citizenship and democratic participation.
However, surveys as TIMSS (Trends in International Mathematics and Science Study) or PISA (Programme for International Student Assessment) register a lack of interest and a decrease in competences in S&T of students. Differences are detectable amongst learners with different socio-economic background and between girls and boys. A few examples: Learners with a more advantaged socio-economic background show more interest in science and identify science as important for their future. Performance and scientific literacy, but above all the self-concept of boys and girls in terms of scientific competences differ – with girls having lower confidence in their scientific abilities. (Science Education in Europe: National Policies, Practices and Research, Eurydice, Education, Audiovisual and Culture Executive Agency, 2011) In the face of the ever more complex "knowledge society" and the current and predicted lack of persons taking up a career in S&T the improvement of scientific competences and scientific literacy of all learners is essential. (Rocard, Science Education now: A Renewed Pedagogy for the Future of
Europe, 2007; Osborne & Dillon, Science Education in Europe: Critical Reflections, 2008; results of
TIMSS 2011 and PISA 2009) Innovative S&T education contributes to support equity amongst all S&T learners and to raise the learners' interest in and the motivation towards S&T.

Within this context, kidsINNscience defined its main aims as the following:

- to facilitate educationalists at different positions in the educational system to operate more creatively within the system.
- to help generate changes toward more active learning systems in S&T education.
- to improve performance and interest in S&T among young people.

The project focused on inspiring ways to teach and learn S&T, covering all age classes, from kindergarten to secondary school, and various subjects. Starting from the idea that innovations in S&T education that work well in one country can be transferred to another country and in this way contribute to improve S&T education, kidsINNscience investigated the transferability of innovative approaches and developed innovation strategies. As innovations originated in one educational context do not automatically work well in the targeted context, it is useful to adopt an adaptive approach.
The ten partner countries from Europe and Latin America represent a variety of different languages, cultures, sizes, numbers of population and hence learners and teachers. Education policies and investments in education differ substantially. As a matter of fact, this variety is reflected in the educational systems, with various types of curricula for S&T education as well as for teacher training and with different standards and educational goals.

To start from a common idea on what is innovation, what is a good innovative practice and from a common knowledge about the various national contexts of S&T education, the first objectives defined in the Technical Annex of the project (Annex I, October 2009) were the following:

- an analysis of the current situation of science education in the participating countries together with a collection of innovative approaches/practices, and
- a definition of a common set of quality criteria of innovative approaches.

The innovative practices (IP) identified in the participating countries were described in a catalogue. Teachers were then invited to choose innovations from this extensive source, adapt them to the needs and frame conditions in their classrooms, and pilot them in field trials. To find out about the efficiency of the IP, the project team evaluated the field trials with respect to feasibility and effectiveness of the activities. The objectives were defined as the following (Annex I):

- Evaluate the field trials regarding the efficiency of innovative approaches, to finally, on the basis of the results of this evaluation
- design tailor made innovation strategies in science education for every participating country

Summarizing the main objectives that framed the sub-objectives, kidsINNscience

- identified and promoted innovative approaches to teaching and learning science,
- adapted and tested them for implementation in mainstream schools
- developed innovation strategies for S&T education in all participating countries.

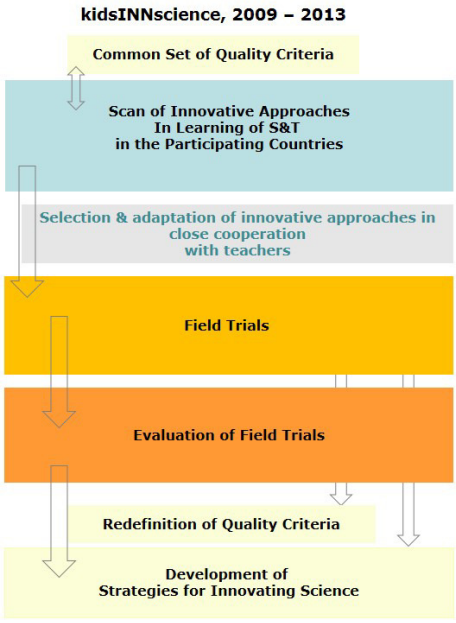
To support changes towards more innovative learning and teaching in S&T, the project team disseminated the results and findings - also defined as objectives in Annex I:

- Contribute to the scientific discussion on innovation in science education, and
- make all products & experiences available for scientific communities as well as the broader public in the participating countries and further countries to be adapted and implemented and/or as point of reference.

The main objective of the dissemination activities was in addition to inform the broader public, to address key change agents – persons who play a decisive role when it comes to support and generate changes towards more active learning systems and innovation of S&T education on various levels in the education system.

Not explicitly described as such in the list of objectives in Annex I, nevertheless crucial during the entire research and dissemination process was the focus on diversity and inclusiveness, gender aspects and activity based and learner centred approaches and the highlighting of the importance of these issues when one aims to enhance interest and performance in S&T amongst young people.

The main objectives, as described above, correspond to the project steps. The following picture provides an overview of these steps and shows the interrelation within the research activities. The respective public deliverables addressing teachers, education researchers, key change agents and the broader public are also indicated. The picture shows all decisive steps, but the dissemination activities, which took place during the entire course of the project.



The starting point was the definition of a **set of quality criteria** to describe and compare S&T curricula and practices. These criteria constituted the basis for describing and comparing innovative practices (IPs). The IPs were collected in each of the ten participating countries and merged in the **catalogue of innovative practices (D3.1, RM3)**. It comprises 80 innovative practices from pre-primary to upper secondary school, covering a broad range of subjects and topics. A **comparative report on national contexts and innovative practices in science education (Annex to D3.1, RM3)** allowed an overview of the main similarities and differences between S&T education policies and practices in the partner countries. In parallel, the **selection and adaptation of IPs (D4.1, USC)** focussed on providing a frame to be considered when transferring an IP from one context to another.

3. Main results

The project results may be divided into two categories:

- Results that arose from a discussion on concepts and their application in the research activities: These results were crucial for adjusting the subsequent steps in the project. The project team re-framed concepts or definitions and discussed their applicability for the research activities of kidsINNscience. We consider the outcomes of these discussions important for further discussion and, if appropriate, application in research on innovation in education in general - beyond the activities of kidsINNscience. Amongst others the topics were:
  a. What idea of diversity is appropriate for investigating improvements of S&T education?
  b. What is a good innovative approach/practice?
  c. Can we judge the quality of an innovative practice in S&T education by applying indicators or are other tools more recommendable?
  d. Who are the key change agents in the single partner countries? Meaning: who (may) support changes in S&T education?

- Results that stand at the end of single project steps or of the project itself, such as:
  e. trends in the field of S&T education: looking at the innovative approaches identified in the partner countries, what trends can one derive from the collection and international comparison of the innovative practices?
  f. guidelines for adaptation of innovative practices to other contexts than the original one
  g. evaluation results showing what motivates teachers and learners in S&T education and which features of an IP facilitate its successful transfer
  h. quality criteria for innovative approaches in S&T education
  i. strategies to facilitate innovative education in Science & Technology

It is useful to start with a description of the findings that frame the understanding of various concepts and definitions applied in the research process of kidsINNscience.

a. *Cultural diversity* or *Diversity and Inclusiveness* - a brief discussion on diversity in the classroom in S&T education

Within the progress of the project and on the base of discussions at the very beginning of the research activities, the project team decided to broaden the concept of cultural diversity in order to be able to deal with all aspects of inclusiveness versus exclusion in S&T education.

Three strands of cultural diversity were of main interest within the definition of work of kidsINNscience (also addressed in Annex I Description of Work, p. 12):

1. Cultural diversity because of migration: cultural diversity may be encountered in the class rooms because of learners or/and teachers with migration background
2. Cultural differences within countries: all participating countries are heterogeneous in terms of cultures. In countries with various official or co-official languages, such as in Switzerland or in Spain it is more obvious than in others.
3. Family culture: the parent's level of education, the number of books at home, general values, etc. are explanative factors.

All these strands should be focussed on when working on innovation in any field of education. Nevertheless, if the aim is to foster the performance of disadvantaged and underachieving groups, it is not enough to take explicitly gender and cultural differences/diversity into account. It is essential to open the focus also on the situation of learners with various learning aptitudes and needs. Hence, it was more appropriate to talk about "Diversity and Inclusiveness". For further research activities in the field of innovation in (S&T) education, it is recommendable to adopt this broad concept of "Diversity and Inclusiveness" to guarantee a perspective which really respects the variety in classrooms.

b. What is a good innovative practice?

The project team defined "good" and "innovative" in the following way:
A good innovative practice (IP) helps to increase motivation of teachers and learners and to decrease the gap between various learners (girls/boys, native/non native speakers, disadvantaged/advantaged pupils, etc.).
In other words:

- A good practice is innovative if it aims at changing and/or improving the learning/teaching in a regular context.
- It should be clearly described, but flexible enough to be adapted to various educational contexts.
- It should address one of the problems nationally perceived as important in S&T education.

Every innovation is relative to a cultural context and a good innovation should achieve successful results concerning the problems addressed. (Mayer & Torracca, Innovative methods in learning of science and technology. National findings and international comparison, D3.1, 2010, p. vii of xii).

c. Indicators or quality criteria – flexible instruments to describe the quality of an innovative approach

A general set of indicators is problematic because of two crucial aspects: First, indicators should be changeable and adaptable. They cannot be considered as rigorous measuring tools, as according to the national context of S&T education and therefore to the national problems (within S&T education) that should be addressed to improve S&T education, not the same indicators may be applicable in the same degree for each country or context.
Second, it seems necessary to shift from an abstract idea of quality criteria, consistent with the principles of good S&T education (described by categories) to a description that is closer to the multiplicity and diversity (generated by the context on national/regional/local/school/ class/… level) of the concrete real S&T class or practice undertaken.

d. Who are the key change agents?

One essential step when trying to innovate a system is to find out who are the key change agents and encourage them to participate in the innovation process. In the field of science education they are located in various segments of the educational system. They are persons or institutions and decision makers at different levels in the educational system: at the school level they are the school headmasters; at the regional and national level teacher associations and research institutions that conduct research on S&T education, or even educational publishers. On the national level, ministries of education are crucial.
kidsINNscience found out that the most important key change agents are the teachers, or in other words: the key change agents that mostly influence the implementation of innovations in the classrooms are - in all partner countries - the teachers. The grade of influence of other key change agents depends on various conditions in the single countries, ranging from flexibility of ministries and teacher associations, grade of cooperation between education research and teacher training or professional development, amongst others.

e. Main trends and differences in S&T education derived from the collection of innovative practices

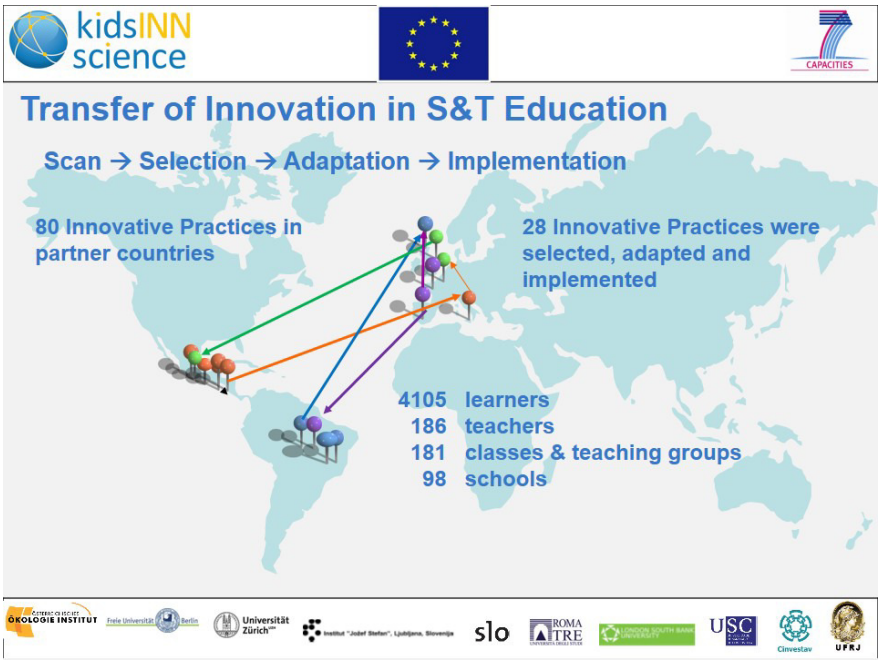
Many of the 80 innovative practices (IPs) collected in the Scan (D 3.1) deal with issues of health or environment or with Education for Sustainable Development. These themes are especially suitable due to their connection to everyday life and their social relevance. Both, the connection to every day, real life and the social relevance of the topics, act as motivating agents for the learners and teachers. The integration of scientific and social competences is considered relevant for giving the learners a more correct idea of how scientific knowledge is built and how it can be used. The need to overcome the artificial division among disciplines is shown in the relevant group of interdisciplinary IPs. Furthermore, learner and activity centred teaching such as Inquiry Based Science Teaching and Learning (IBTL) and hands-on activities are present in the majority of the IPs.
(Mayer & Torracca, Innovative methods in learning of science and technology. National findings and international comparison, D3.1, 2010)

f. Initial guidelines for adaptation

When adapting an innovative practice from one context to another it is essential to first identify and then preserve or keep the core and the key features of the innovative practice. Secondly, it is necessary to know what are the target features that must be changed in order to fit the conditions in the classroom. For example, if the core of an innovative practice is to include the parents in the activities of the school by motivating them to do experiments with their children at home, one cannot omit the families' participation in the adapted version of the IP.
(Source: Jiménez Aleixandre & Eirexas Santamaría, Adaptation of Innovative Methods in Science Education, D4.1, 2010)

Field Trials:

The picture "Transfer of Innovation in S&T Education" is a simplified representation of the process of the identification (scan), selection, adaptation and implementation of the innovative practices: the **transfer of innovation**.



First, innovative practices had been identified in the partner countries (taking into account the common set of criteria and the national context of S&T education) – the pins stand for the IPs. Second, teachers selected IPs from other partner countries, adapted and implemented them in their classrooms – the arrows stand for the transfer.

During the school years 2010/2011 and 2011/2012, **field trials adapting and implementing 28 IPs** from other partner countries were performed at schools. This core part focused on three important issues in S&T education - diversity and inclusiveness, gender equity and activity based and

learner centred approaches - to contribute to a reduction of the exclusion of disadvantaged groups in S&T education. 186 teachers and 181 classes and teaching groups were involved at 98 schools. A total of 4105 learners of all ages were reached! An **internal document (D4.2, IJS,** restricted report**)** collected all information gathered during the field trials and used for the evaluation.

g. Evaluation results

The formative evaluation of the field trials focused on their effectiveness with respect to the problems addressed and the three additional important areas of innovation of S&T education: Diversity and Inclusiveness, gender aspects and activity based and learner centered approaches. The evaluation results show what features facilitate a successful implementation and what motivates learners and teachers:

- The original IP must be attractive and close to the learners' and teachers' real-life.
- It matches the syllabus or curriculum or the curriculum is flexible enough to integrate it.
- The support and acceptance of educational authorities, colleagues and parents is crucial.
- The teachers should be free to adapt the IP according to their context and interests.
- Interest in their professional development allows the teachers to broaden their repertoire of teaching methodologies.
- The teacher's willingness to reflect on the integration of important issues, such as diversity and inclusiveness, gender and IBTL in their own teaching is vital.
- The professional development stretches over a certain amount of time and allows the exchange with critical friends.

(Gerloff-Gasser & Büchel, Evaluation of field trials of innovative practices in science education, D5.1, 2012).

h. Quality categories – definition of quality criteria of a good innovative practice

Due to the complexity and the differences among the educational environments the consortium could not design a compulsory list of quality criteria for innovations that would be appropriate for all countries. Nevertheless, three compulsory quality categories have been identified, which are basic for each practice:

The innovative practice must be

- scientifically sound
- pedagogically and methodologically sound
- fostering scientific competencies

Three more categories are optional:

- socially relevant
- supporting teacher participation and professional development
- considering developments in science education and science education research

Finally, there are two categories that are relevant for a potential transfer of an innovative practice to another country or educational context.

- sustainable: the IP can be implemented for several years and by "regular" motivated teachers in "regular" classrooms without special extra requirements in terms of costs, time or staff resources
- transferable: the core of innovation and the problems addressed are clearly described, the critical points are highlighted, and the IP is flexible enough to be adapted to different contexts

(Lorenz & Fischbach Redefinition of Key Indicators (Revision of Quality Criteria), D5.2, 2012)

i. Strategies to facilitate innovative education in Science and Technology:

The project team formulated main patterns of strategies for a structural change in S&T education:

- **Teacher education supported by educational research results:** An early discussion of diversity, inclusiveness and gender issues raises the awareness regarding these issues. Hands-on activities and IBTL should also be part of teacher education and in-service training.
- **Teaching material** – a selection of up to date IPs, well documented in the national language – should be available to a variety of teachers, teacher associations and institutions for teacher education and professional development.
- **Everyday contexts/life aspects** increase motivation and interest of learners – therefore this approach should be integrated in teacher education and in teaching material/methods.
- **Flexibility and teaching freedom** as a structural context: Curricula with a limited compulsory core curriculum together with other suggested topics allow the teacher to choose among different contents and methodologies.
- **Existing professional learning communities** (working group of teachers) support the implementation of innovations. Co-operation among educational researchers, teachers and schools supporting each other is crucial. Teachers who implement innovations need a kind of "safety net" provided by the researchers and/or the authors of the original innovation.
- **A network of schools and research institutions** enables schools to increase the use of equipment and the related activities in S&T education, either by purchasing their own new and up-to-date equipment or by sharing resources with others.

(Lorenz & Fischbach, Strategies to facilitate innovative education in Science & Technology, D5.3, 2013)

Summarizing, we underline that to support a successful **transferability of innovation in S&T education** an adaptive approach – involving teachers and taking into account their context and the conditions in the classroom – proved to be crucial. This approach helped to involve all learners in a class. The awareness of gender differences and individualized teaching to include girls and boys equally as well as pupils with various levels of achievement, or with different cultural and socio-economic background, is supported. Learner and activity centred teaching such as Inquiry Based Science Education and hands-on activities and the integration of real-life contexts increase the motivation of both, teachers and learners.

Scientific publications

kidsINNscience contributed – or is still contributing - to the scholarly debate with nearly 30 articles: papers have been submitted to international conferences and are published, book chapters were written. In Mexico, a book with results and reflections on kidsINNscience in the field of basic education will be published in autumn 2013. In Italy, eight schools of different levels and 19 teachers reflected on the methodologies of Inquiry-Based Learning giving values to cultural and gender differences. Their articles have been published on the electronic journal education 2.0: http://www.educationduepuntozero.it and collected in a book.

All public scientific articles are available on the website of kidsINNscience http://www.kidsinnscience.eu/results.htm

4. The potential impact

4.1. Potential impact

kidsINNscience contributes to improve the quality of S&T teaching at the classroom level. In addition, the results improve the decisions of key change agents at all levels of the educational system and support the interaction between them.
To cooperate with various segments of the education systems in the partner countries, the project team addressed and involved these key change agents – carefully selected target groups, persons, institutions and decision makers at different levels in the respective systems. The special focus on diversity and inclusiveness, gender equity and activity-based and learner centred approaches - in all steps of the project –- contributed to a reduction of the exclusion of disadvantaged groups (see Annex I, 2009).
At the end of the project, it is obvious that the potential impact varies between the countries and that the degree of impact is as diverse as the education systems are diverse.

Naturally, many factors influence the potential (socio-economic) impact of a research project in the scale of kidsINNscience:

- actual (political) discussion of educational policies in the partner countries
- flexibility of education systems, including the relationship between the various key change agents
- awareness of the need of innovation in S&T education
- willingness to changes towards more flexible and innovative education systems

The list might be supplemented by more factors, also differing from country to country.

Investments and improvements in education in general and S&T education in particular contribute to improve the skills of citizens/labour force which in turn can have a large impact on future well-being due to strengthening of a nation's labour force (see The High Cost of Low Educational Performance, OECD 2010).
Dividing the areas of impact into various levels it is possible to outline trends, some future and some achieved impact.

1. Level of European/international education:
   educational policy discourse, international exchange of expertise and know-how, international exchange of innovation strategies
2. Level of national educational systems:
   Educational policy, general curricula for teacher education and/or professional development of teachers
3. Level of individual actors of the educational system – teacher education:
   institutes/professional development of teachers, networks, school boards, individual schools, individual teachers, learners, parents

All of this based on evidence of science education research.

kidsINNscience definitely had and still has an impact on the professional development of teachers. In the field trials, 186 teachers and 181 classes and teaching groups were involved at 98 schools. A total of 4105 learners of all ages was reached. The teachers who participated in the field trials reflected intensely on their teaching context, their needs, their methods, and last but not least, the three important areas to innovate (science) education: diversity and inclusiveness, gender aspects and activity-based and learner-centred

approaches. This professional development was highly appreciated by the participating teachers in most of the countries. kidsINNscience supported and influenced up-to-date and research-based teacher education. In Switzerland, for example, there was and is an impact on the level of individual actors: the teachers who participated in the field trials increased their knowledge and practice of learner-centred approaches such as IBTL (mainly inservice, some preservice).
In Mexico, the impact mainly reaches local educational authorities in S&T education. These authorities were reached by involving them in the project: with documented innovative practices and invitations to attend some of the dissemination activities. In Brazil, regarding policy makers, it is hard to see, for the moment, any impacts, since policy makers are away from schools and researchers. Research results seem to have little influence over policies, or take very long to be noticed by policy makers.
There is concrete impact on the professional development and on science teacher education in Switzerland: the results of kidsINNscience were integrated in science teacher education courses for upper secondary level at the University of Zurich (mainly preservice; one session in fall 2012, three sessions in fall 2013). An inservice teacher education course is planned in collaboration with SUPSI-DFA Locarno, the University for Teacher Education in the Italian area of Switzerland (fall/winter 2013). The new sessions and offers in teacher education integrate results and methods from up-to-date science education research.

The Brazilian partners reported that the more direct impacts of kidsINNscience were in teacher educational development. The experiences of the research project revealed some possibilities of working with pre-service and in-service science teachers, such as adapting and implementing innovative practices, and forming communities of practices among teachers, schools and researchers.
In Italy, from the beginning of the project an effort was made to involve in the project the educational researchers: different institutions (Universities, Museums, Teachers Associations) have been contacted in the phase of the collection of Innovative Practices and regularly updated on the progress made. The same institutions have been invited at the final national event, and many of them participated expressing a strong appreciation of the work done. The former Ministry of Education opened the event as responsible of the Ministerial group for the Development of the Scientific and Technological Culture and expressed his interest for future development. Also, teachers education courses have been involved and many teachers in their training year participated in the event and expressed their interest.

The relationship among key change agents and the research institutions was strengthened, as reported from project partners in Mexico or Slovenia - a fact that will be very convenient for S&T education research and promotion in the respective regions. In Austria, cooperation with S&T education initiatives, education research and teacher training institutes is planned.

A larger impact is expected in Italy as an effect of the articles published on the electronic journal – Education 2.0 -, one of the few national journal, reaching a very large public. The whole series of KIS articles has been collected in a ‘special issue’ to be downloaded. A very concrete impact is also expected by the teachers and by the schools participating in the project: all of them expressed the intention to continue to work together, and to involve other schools and other teachers. As they wrote ‘the change they went through is a permanent one’. http://www.educationduepuntozero.it/

In all countries, the activities of kidsINNscience helped building or intensifying relations among schools and the participant research institution, through which both could and still can

benefit from mutual collaboration on behalf of science education support, in some countries the relations were strengthened between the research partners of kidsINNscience and ministries for education. kidsINNscience definitely has an impact on teacher training and

education research by raising the awareness regarding the three important issues in S&T education: diversity / inclusiveness and gender issues and learner-centered activities.
Besides, international research projects such as kidsINNscience improve the awareness of international affairs in local citizens. All participating schools, teachers, parents and children involved knew about the international scale of the project funded by the European Commission. This might also imply that the participants involved in the project had to come close not only to S&T education matters, but to global and local citizenship, international relations and other related political aspects too. Due to the international character and the method of exchanging experiences – the innovative practices, experiences in the field trials and then the results – relations between schools, learners and teachers of various countries were established, in some cases intense communication about single innovative practices and their implementation in the class rooms was realised between the continents.

4.2. Main dissemination activities

The kidsINNscience team promoted this international research project on various levels and within different (professional) environments.

European and international conferences

To contribute to the scholar debate and the educational policy discourse on international and national level, the experts of kidsINNscience participated at various conferences. There they provided public relation material, presented the process, challenges, results and highlights of the project. The project team published / submitted about 28 scientific articles. The public articles are available on the project website and in deliverable D6.2, available on www.kidsINNscience.eu. Some articles are under preparation beyond the end of the project.

To reach **national educational systems**, information was spread amongst relevant institutions, schools, potential project partners and key change agents. Kindergartens, schools and teacher education as well as institutions such as school councils or national education institutes were informed about the project with folders, leaflets, worksheets and presentations, posters and websites. Especially before and during the field trials (school years 2010/2011 and 2011/2012) when the consortium recruited schools for participation, there was intense dissemination on the project in general, on ethic issues and individual innovative practices. During these phases, a very high number of schools was addressed – reaching teachers and learners, but also parents. All these dissemination activities plus an Annex with the most relevant public relation material is available for download on the project website (D6.1).
During the field trials, teaching material of the innovative practices was distributed in the classrooms and among teachers and teacher training institutes.
In Mexico, a book about the experiences within kidsINNscience in Mexico. In Italy, a compilation of articles done by the Italian project partners and teachers who participated in the field trials summarized their experiences with innovative science and technology education.
A core part of dissemination activities were the **national dissemination events**. They varied between the partner countries, as all addressed the identified key change agents in different ways. Some partners did various activities in this field. During the project, it turned out that the key change agents were mainly teachers and local / national educational authorities.

Dissemination for the broader public

To reach a broader public, print media and radio stations were addressed. Especially, for the international press conference, in Vienna, June 2013, the list of invited journalists was very diverse. There was also an interview-broadcast on Spanish radio and articles in newspapers amongst others in Austria, Germany and Spain. The results of the project were made available on the webpage www.kidsINNscience.eu. Some of the reports can be downloaded there also in other languages than English (German, Italian, Portuguese and Spanish):
The teaching material of and background articles for several innovative practices have been made accessible, also on other webpages: http://www.educationduepuntozero.it is an Italian electronic online journal on education, which is very popular among teachers and teacher educators. http://www.manosalaobra.cinvestav.mx/o is a website of the Mexican project partners such as which constantly inform teachers and learners, but also parents about innovative S&T education.

4.3. Exploitation of results

The exploitation of the results will be manifold. Anyway, three fields which will make use of the results of kidsINNscience can already be identified:

- research-based teacher education
- further research projects
- projects and implementation of innovative S&T education in schools

Up-to-date and research-based teacher education and professional development of teachers

Examples from Switzerland:

- Issues and results of kidsINNscience were integrated in science teacher education courses for upper secondary level at the University of Zurich (mainly preservice; 1 session in fall 2012, 3 sessions in fall 2013) > individual teacher education courses

- An inservice teacher education course is planned in collaboration with SUPSI-DFA Locarno, the University for Teacher Education in the Italian area of Switzerland (fall/winter 2013) > individual teacher education courses.

The new sessions of and offers in teacher education integrate results and methods from up-to-date science education research.

Examples from Italy:

A collaboration is planned between the kidsINNscience teachers group (the teacher who participated in the field trials) and the Science Teachers Education courses at the University of Roma Tre. The collaborating schools are planning internal in service training courses for their teachers. Another collaboration started because of the project, is the one with a very large national teachers association - CIDI -. They collaborated hosting the first 'regional event' and in the dissemination and realization of the national event. Possible collaboration for science education are in discussion.

Further projects (research and implementation) in the field of innovative S&T education are born from some of the results obtained in kidsINNscience

In most of the participating countries, the teachers' interest in implementing further projects of innovative science education in schools is high and therefore some projects will be realised.