INNOVATION IN ENVIRONMENTAL EDUCATION: THE INVOLEN PROJECT

SEPTEMBER 2015

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1. Introduction – the INVOLEN project www.involen.eu

The protection of our natural environment has been globally recognised as the most salient issue for the survival of our planet. Environmental education plays definitely a critical role in raising awareness on this, through formal and informal education channels. Indeed, It has been introduced in school education across Europe, aiming to familiarise young people from an early age to the need to cherish, value and protect the natural heritage of the earth and contribute to its preservation. Knowledge about the valuable assets of our environment and volunteering for their preservation are two pillars for continuing environmental protection, promoted through environmental education.

The INVOLEN project "Intergenerational Learning for Nature Conservation Volunteers" aims to instil to young people, of secondary school age, the wish to take up voluntary activity targeted at environmental conservation and the protection of valuable natural and cultural heritage. To achieve this, it has developed a learning methodology for environmental education which contributes to the above issues in two innovative ways: by introducing ICT and gaming in the learning process so that it becomes more attractive to young people; and by exploiting the experience of older generations through intergenerational learning. Thus, INVOLEN aims also to encourage older people, who have time in their hands, to be similarly involved in voluntary activity, teaming up with the youngsters, so that an intergenerational knowledge transfer takes place.

INVOLEN targets schools, NGOs and other organisations committed to environmental education and to promoting voluntary work for the protection of nature and the conservation of valuable ecological heritage. The main objective of the project has been to develop a methodology that can be widely used by schools, within or outside their curriculum, and by environmental NGOs offering environmental education. The INVOLEN methodology aims to influence the attitudes and behaviour of its target groups towards environmental protection and encourage their voluntary involvement in nature conservation.

The INVOLEN methodology takes a special interest in NATURA 2000 sites, wishing to encourage the teachers and learning facilitators who would choose to apply the proposed methodology to concentrate, as far as possible, on these sites. Such a focus also provides the opportunity to exploit the development model of the NATURA network, which combines the protection of the environment with the invigoration of local communities, while special prominence is given to the role of volunteering in nature conservation.

2. The INVOLEN methodology

2.1 The pillars of the INVOLEN methodology

There are three "pillars" the INVOLEN methodology is built on: firstly, joint learning and cooperation between young and older volunteers; secondly, game-based learning, which involves the creation of location-based games, playable on mobile phones or tablets on site, in protected areas; and thirdly learning by volunteering for environmental conservation.

Intergenerational learning describes the way that people of all ages can learn together and from each other. Further to the transfer of knowledge, intergenerational learning fosters reciprocal learning relationships between different generations and is a way of enhancing intergenerational solidarity. The intergenerational activities can be classified as follows, according to the INVOLEN Leaning Guide for teachers and learning facilitators:

- Meet and create a relationship
- Make together
- Make for the benefit of each other
- Transmit knowledge and skills

A location-based game (LBG) is defined as a form of play designed to evolve on a device in motion, directly linking the game experience with the location of the player. The universal use of mobile devices, and the fast evolution of game technology, has offered ample opportunities to develop place-based games that facilitate the learning process of children and adults. Such games also encourage learning through storytelling and touring of specific locations and routes, introducing the natural or built environment as a participant in the players' interaction with the environment. The ARIS game-design platform has been predominantly used during the piloting of the INVOLEN methodology for the creation of LBGs by the piloting participants.

Volunteering can be summarised in one sentence as: "Action taken by a person or group on their own initiative, in what they perceive to be the public interest, without direct financial reward". The benefits gained by the young people offering their service have a positive impact on them, both immediate and into the future. Such benefits include, indicatively:

- learning to respect others, be helpful and kind, to understand people who are different;
- developing leadership skills;
- acquiring new skills that could lead to professional development and a strong work ethic;
- developing an intergenerational understanding by working together with older people for a common goal.

2.2 The principles of the INVOLEN methodology

Further principles on which the INVOLEN methodology is based include:

- participative approach to learning, bringing all learning stakeholders together to plan their learning process, define their learning objectives and learning outcomes, and become equal "players" of learning;
- re-definition of the roles of teacher and learner by introducing the "learning facilitator" as a key role in the learning process, aiming to mediate the transfer of knowledge between older and younger participants;
- transferability to different locations, settings and audiences;
- balanced contribution by the two groups of volunteers, young and old, so that the seniors do not feel left out in the creation of the game;
- learning by exchange of experience and knowledge between the two groups of learners (youth and seniors) and the facilitators and experts.

2.3 The 7 steps of the INVOLEN methodology

The INVOLEN methodology is implemented in 7 steps:

1. Establishment of the learners' group, including teenagers and seniors, who have confirmed their wish to learn together, work together as volunteers for the protection of the environment and use IT to produce awareness-raising material for the conservation needs of protected areas. One or more learning facilitators and an environmental conservation expert should assist the learners' group.

2. Assessment of the skill needs and the learning needs of the participants (teenagers, seniors, facilitators) to ensure that the needs of all group members are met. Survey techniques, focus groups and consultation with relevant organisations can be used for this assessment.

3. Planning the course of intergenerational learning activities that are necessary to implement the learning methodology of INVOLEN.

4. Taking part in joint conservation activities in the protected area where the group has decided to focus on.

5. Participating in a number of learning sessions/meetings during which seniors and environmental experts transfer knowledge regarding the conservation needs and the heritage of the selected area; ICT experts teach the group how to create location-based games using their mobile phones or tablets; and the learners design and construct one or more games, through joint work, combining the knowledge of the seniors and the affinity with IT of the youngsters.

6. Visiting the protected area at least twice to get to know it better; and test the constructed games on site.

7. Evaluating the learning outcomes and the personal and community benefits that have resulted from the implementation of the project.

3. Implementation of the INVOLEN methodology: how to run an INVOLEN project

3.1 The two models of INVOLEN implementation

The INVOLEN methodology is implemented through a sequence of activities, which can be organised and held within the school curriculum or after school hours, inside the school or outside it with the help and supervision of an NGO. We can briefly refer to two main "models" of INVOLEN implementation:

- **The "in-school" model.**

In this model, the course is embedded in the school curriculum or is added as an extension to it, and takes place within the school hours. This necessitates short and regular, usually weekly meetings. This model has the disadvantage of limiting the time span within which the meetings are held, affording limited time space to the course. On the other hand, the regular meetings help to engage the participants in the activities of the course, enhance the cohesion of the group and create a shared work approach among the participants.

- **The "open venue" model.**

The second model is based on longer meetings that take place during out-of-school hours in a suitable location, which could be a school, the premises of an NGO, a youth centre or a public venue offered by a local institution (e.g. by the local municipality). This model gives more time to the participants to complete a learning activity within a single meeting. On the other hand, extended meetings may be tiring and discouraging for the participants, especially concerning ICT training sessions. Overall, however, longer meetings can work well for groups of highly committed youth who are willing to spend their free time for the project.

3.2 The activities implementing the 7 steps

The activities that implement the INVOLEN methodology follow the 7 steps described above. Anybody who would like to run an INVOLEN project should study

carefully the sequence of these steps, with the help of the **INVOLEN Guide for Learning Facilitators and the INVOLEN Toolkit for Learners**.

Step 1

A very important step is to form the group of volunteers and learning facilitators who would carry out the project. To put together an INVOLEN group it is useful to be sure who the target groups are:

- Teenagers, of secondary school age (12-17 years old)
- Seniors, over the age of 55
- Learning facilitators: schoolteachers with an interest and/or experience in environmental education and a working knowledge of computers and mobile phones; and other education leaders or non-formal learning mediators working outside schools, in NGOs, youth centres or adult education centres. Experts in environmental conservation and ICT can support the learning facilitators in their tasks.

The initiative can be taken by a teacher or environmental expert, with the support of a formal organisation providing environmental education to young people, such as school, a youth centre, an environmental NGO or an adult education centre. The supporting organisation should provide the meeting rooms, the necessary equipment (computers and mobile hand-held devices), organise the necessary field visits and secure permission from parents for the under-age participants. It would be advisable to involve at least two learning facilitators, who should combine different skills between them, including ICT, environmental conservation, intergenerational learning and hands-on learning. The seniors can be recruited by approaching the young participants' grandparents, volunteers active in environmental conservation or days centre of old people in the local area. The recommended size of the group is 12 people, including 7 youth, 3 seniors and 2 facilitators, one of which should be and ICT expert. However, the size may vary according to interest and availability, as the pilot testing of the methodology has proven. It is not recommended, however, to include more that 15 volunteers, young and old, because personal involvement of each one of them in the gaming process will be difficult to guarantee.

Step 2

It is strongly recommended to conduct a competence and learning needs assessment prior to the commencement of an INVOLEN project, addressing all types of participants, i.e. youth, seniors and learning facilitators. Three types of competences are necessary for the successful completion of an INVOLEN project, i.e.

- good understanding of the needs of protected natural areas, practices of environmental conservation, how volunteering can make a contribution and what kind of voluntary activities the participants can be involved in;
- ability to use ICT, with a focus on the use of mobile phones and games design;
- good understanding, especially from the side of the facilitators, of intergenerational learning objectives, practices and expected results.

The exploration of these needs can easily take place in a focus group, during a discussion about the project and its requirements, about a nearby protected area or an area that presents a particular environmental interest, about the experience of the participants regarding volunteering and about their experience with video games and interactive gaming using mobile phones. The focus group is best steered by a person outside the project. The focus group members fill in specially designed questionnaires before they go, to allow the facilitators to form a more concrete picture of the skill needs of the participants and adjust the learning course accordingly, as well as seeking external help regarding training needs that cannot be covered by them.

Step 3

A planning meeting is necessary before the start of the course.

The learner's group comes together after the focus group to plan their INVOLEN activities:

- How they can improve their skills: what are the competence needs that they should concentrate upon (ICT and game design, conservation practices etc.).
- How many meetings they need to improve their skills – time span of the learning course.
- What kind of conservation activities are suitable for the selected area and feasible – what kind of expert help they need.
- How the field visits will fit into the learning activities.

The planning meeting is important in two ways: firstly by assuring that the three different groups of participants, i.e. youth, seniors and facilitators, confirm their availability during the INVOLEN project's duration and agree on a detailed programme of work, including frequency of meetings, duration of meetings and overall time commitment; and secondly, by establishing communication amongst the participants and reiterating the need for mutual, participative learning.

Steps 4, 5, 6

These steps together form a course of learning activities, which we call the "INVOLEN course". The course includes two types of learning activities:

- Six work units, each consisting of one or more meetings held in a seminar room or classroom, including one or two visits to the protected area selected by the group to focus on.
- Conservation activities to be performed jointly by young and old.

The seminar-type meetings, field visits and conservation activities make up a sequence of learning activities that, according to the experience gained from the pilot testing of the INVOLEN methodology, can be organised efficiently in 6 "work units" as follows:

Unit 1: Introduction to the course; including an expert's presentation of the protected area the team has chosen to concentrate upon, discussion of the needs for protection and conservation of this area.

Unit 2: Field visits; at least two visits are necessary, one at the beginning and one at the end of the course, to carry out conservation activities, collect visual material for the game and playtest the game.

Unit 3: ICT-training; introducing participants to game design platforms (e.g. of the type of ARIS or similar) and to game development processes, with examples.

Unit 4: Storytelling; the seniors narrate stories recalling events or legends from older times, concentrating on the selected protected area and the prominent issues then and now.

Unit 5: Scenario building; the intergenerational team of youth and seniors get inspiration from the seniors' stories and the information presented from environmental experts about the protected area, and build the scenario of the game.

Unit 6: Game development; this is the most challenging piece of work. The choice of a game platform and the transfer of the scenario to create a game are core tasks in this Unit, which includes three steps:

1. Construction of a draft game. The group members prepare a prototype which must be then tested for functionality.

2. Playtesting on location. The draft game is checked during a field trip to the protected area the game is located in (see also Unit 2).

3. Adjusting and revising the game, eliminating bugs and improving its functionality, to obtain the final consolidated version.

Step 7

The ongoing evaluation of the course, preferably at the end of each Unit, is very important for the team, because it enables the facilitator to make sure that the learning objectives are achieved; and to carry out adjustments as necessary, to remedy any problems or shortcomings that may arise. It is recommended to use a questionnaire for this task, including questions that measure satisfaction with the course, achievements and inter-group (youth, seniors, facilitators) collaboration by the participants.

4. Examples of INVOLEN projects

4.1 Pilot testing the INVOLEN methodology in 5 countries

The INVOLEN methodology has been pilot-tested in 5 countries: Greece, Italy, France, Slovenia and Hungary. The 7 steps of the INVOLEN methodology were applied in all countries, starting with the recruitment of the volunteers' group, the assessment of skill and training needs of the target groups, and running the course of learning activities and game development. A unique element in the piloting testing was the training provided to the learning facilitators in all countries, to meet their skill and training needs. The training was offered in a face-to-face seminar and a number of webinars, the latter concentrating mostly on the game development methods and the use of the ARIS platform.

The five pilot groups and their games

Five pilot groups were formed, one in each participating country. In total, 44 secondary school students, 18 seniors and 19 facilitators were involved in the core learning groups. These were supported by 49 students who performed various complementary tasks or were partly involved in the pilot course, and by 12 further experts and management staff who flanked the project and provided ad hoc support to it. In total 142 persons were involved, 81 of which attended the full pilot course and contributed to it as full members of the national teams, while 61 individuals participated in an ad hoc complementary role.

7 games were created in total, 6 of which used the ARIS platform (http://aris-games.org/legacy) and one used the Enigmapp platform (www.enigmapp.fr).

The ARIS pilot games were developed using ARIS 1.0 Editor and can be played via the ARIS Legacy App available for download at: http://arisgames.org/legacy/. Players can reach the appropriate games using the "Search" field of the Application by entering the name of the game.

The Enigmapp game can be played using the Enigmapp application available (for Android) at: https://play.google.com/store/apps/details?id=com.enigmapp.android and (for iOS) at: https://itunes.apple.com/ca/app/enigmapp/id536567950. The games are accessible by inserting the "Game Code" in the "Quick access" option of the Enigmapp main menu, or by scanning the QR code of the game in the "Quick access" option of the Enigmapp main menu.

In **Italy**, the I.C. Micali secondary school in Livorno hosted the INVOLEN project. Two classes were involved in the project, from which 8 pupils were selected to participate actively while the rest followed the activities of the project closely.

Four seniors and 4 facilitators, including two schoolteachers and two external experts, specialising in environmental issues, were also involved. 28 meetings were held, with an average duration of 2 hours each, including 3 planning meetings and two half-day field trips. The protected area selected was the Provincial Park of Monti Livornesi, close to Livorno.

Intergenerational learning:
Although the bonding between generations took some time to materialise due to shyness and inhibition from both sides, as the project progressed the cooperative spirit developed and the joint work became lively, proactive and productive. The lessons that were learnt during the piloting point out to the importance of achieving the right balance in the pilot group, so that neither the youth nor the elders groups are over or under represented; while the effectiveness of the course depended on the organisation of the meetings, the technical equipment available and the time commitment of ICT experts and facilitators.

Experiencing nature
The conservation activities performed by the group were officially commissioned by the manager of the Provincial Park of Monti Livornesi, aiming to create attractive drawings for the information panels to be placed along the new paths in the Colognole area. The panels were intended to be instructive and encourage visitors to show respect for nature. Among the main learning outcomes we noted a better knowledge of the protected area and its problems, including neglect, management of garbage, acoustic pollution, protection of rare species, etc.

The game
"Boar Marley's Adventure" was built on a collectively created scenario and aimed to increase the players' respect and sensitivity toward nature. The objective of the game is to help Boar Marley (the main character- a symbol of the local fauna) get rid of the bad vices he has acquired from humans and make him "clean". So, moving along a path in the Colognole aqueduct area, the player reaches geolocalised points of interest in which he virtually meets various characters and answers their questions in order to collect the inventoried objects. The game also gives information about the aqueduct, vegetation, protected species etc. The game was developed on the ARIS platform.

In **France**, a youth centre located in Belz, offered facilities and support for the pilot course. The pilot group included 7 youth aged from 11 to 14 years, 3 seniors and 4 facilitators. The dune area of Gâvres Quiberon was chosen for the pilot project. Located beside the sea in the south of Morbihan, close to the town of Belz, this area houses a variety of rare flora and fauna. It is also a haven for birds and bats. The group meetings were organised fortnightly on Wednesday afternoons for 3 hours, a time when the young people regularly came to the youth centre. In total, 17 meetings were held in 6 months: two of these meetings were field trips in the protected area of Gâvre Quiberon.

Intergenerational learning:
To achieve the necessary bonding between the generations, several joint activities were organised: a site visit, information and research on history, and video interviews of the seniors (filmed and edited by the young people). The pilot course

gave the opportunity to youth and seniors to change roles and learn from each other. For the game design, the young participants worked in pairs, further developing a story told by the seniors. This strengthened the relationships between young and old, and created a shared pride in taking part in the project. The young people, in parallel to their enthusiasm for the new ICT application, developed an interest in the history and conservation of the protected area.

Experiencing nature

Regarding the conservation of the protected area, initially the project staff organised a visit to the area, providing detailed information on the efforts that have been made to protect it. This visit also allowed the group to take photos, which were used in the game. While in the protected area, the group took the opportunity to gather litter and clean the beach. The group members took part in the observation of nests and natural shelters of birds and bats.

The game

"Théomaque's adventure" tells the story of a young sailor - Théomaque (a name arrived at by combining the names of different people in the group) who returns home after several years at sea and discovers that his house has been destroyed by storms. Certain objects precious to him have gone and he decides to set off to find them. His search takes him from Saint-cado to Erdeven beach and on the way he meets some older people who offer great help in finding his things and, at the same time, teach him about the importance of the area. The game was developed on two different platforms: one version on ARIS, and a second version on Enigmapp.

In **Greece**, the pilot course was integrated in the environmental education course of a secondary school in the town of Gerakas, the 3rd Gymnasium of Gerakas, located in the wider Athens area, in the basin of Mesogeia. 12 students, 3 seniors and 4 facilitators were involved in the core group of the course, flanked by 8 more experts, management staff and seniors who supported the course on an ad hoc basis. 15 meetings of one hour each on average were held, including one planning meeting and two half-day field visits. The protected area selected by the team was the Vravrona wetland, on the coast of Eastern Attica, including the mount of River Erasinos and the adjacent archaeological site.

Intergenerational learning:

Due to the large size of the group, which included 15 volunteers, the participants were divided in smaller groups and each sub-group worked independently. Initially, 5 sub-groups were formed, which eventually were amalgamated in two and undertook the development of one game per group. The junior and senior pilot group members were in the beginning rather shy to approach one another. The field visits to the Vravrona wetland created a good opportunity for both groups to develop shared interests through a common experience. Both groups developed respect for one another, on top of acquiring nature conservation skills and familiarity with the technology of game design – at different level each

group. Some management problems inevitably occurred, as so many people with different time schedules had to be synchronised. Many group participants changed roles during the implementation and adjusted their contributions to the needs and dynamics of the team.

Experiencing nature

Three conservation activities were carried out: cleaning up the beach to save the birds' nests; bird watching; and bird monitoring. The purpose of the first activity was to raise the volunteers' awareness on the effects of environmental pollution on the bird population; while the second and third activities aimed at collecting data on bird populations. All conservation activities were supervised by the Hellenic Ornithological Society, a partner of the INVOLEN project.

The game

Two games were created by the intergenerational team. In both games the player

meets different characters who assist him/her to save the Vravrona wetland and its animal and plant species.

The game "Vravrona" was designed to familiarise players with the natural environment of the area, raise their awareness on the area's environmental problems, and encourage them to think about solutions to these problems. The player becomes an "official" explorer, moves along a specific path, and receives information tips in the form of "Ecotips" while trying to discover the origin of the pollution problems of Erasinos River.

The game "An adventurous journey in Vravrona" was designed to raise the players' awareness on the significance of the biodiversity of the area. The main character Lisa, tries to solve the mystery of an ecological crime in the Vravrona wetland. Lisa, with the help of her animal friends is trying to prevent the erosion of the wetland and the disappearance of the precious wildlife of Vravrona.

Both games were developed on the ARIS platform.

In **Slovenia** an NGO, NEC - Notranjski Ekoloski Center, took the lead the gather together the intergenerational group of volunteers, and provided the necessary facilitators and environmental experts for the pilot course. 20 people were involved in total, including 4 seniors, 7 youth, 2 facilitators, 3 NGO staff and 4 other volunteers who were interested in the INVOLEN project and agreed to cooperate with the group. The special focus of the INVOLEN piloting was one of the three Slovenian regional parks, the Notranjska Regional Park in the southwest part of Slovenia, bordered by the steep slopes of the Javorniki mountain range. The pilot group had 7 afternoon meetings in Cerknica and all of them were 4 hours long. The participants attended the meetings regularly, and held one field visit that aimed to explore the environment of the selected protected area in the Notranjska Regional Park.

Intergenerational learning:

To establish bonding, stimulate cooperation and exchange of skills among the participants, basket making was introduced in the first unit. The elders transferred their knowledge and experience about basket weaving and told the younger participants stories about how things were in "the good old times". The younger participants also established contacts with local people, interviewed them and recorded more stories and legends about the protected area. The concept of "rewarding the volunteers" was introduced in the meetings, and coffee breaks

and snacks of local homemade food with delicious taste and attractive look were offered. Among the learning outcomes, we note the learners' understanding and valuing of traditional customs; understanding about the Earth's resources; developing social contacts; helping each other; developing tolerance; learning about protected and vulnerable species in nature.

Experiencing nature

The group had one field visit that aimed to explore the environment of the selected protected area in the Notranjska Regional Park. The seniors shared their experiences with the team about private properties' management, landscape maintenance and farming carried out with respect to the indigenous flora and fauna.

The game

"Dolenja vas in touch with ancestors" talks about an old karstic village and describes how people were using water in a sustainable way. The player is welcome to the village and told to explore it, in order to try and find how local inhabitants used water resources in the past. The player meets a character (Lili), and she gives him a tip to go and find a water tower and a fire station. When the player finds the tower, he gets its description and an explanation why it was built there and how the tower was used in the past. Later, the player has to find also some other features, like a trough, a bridge with a special shape and a webpage. The game also includes information about the activities of the local community and talks about the "dance on water" (a special event that local inhabitants organise every summer). The game was developed on the ARIS platform.

In **Hungary**, 3 secondary schools, 2 primary schools and one NGO, all located in the wider area of Győr, cooperated to run the pilot testing. 19 students were recruited, between the 5th and the 10th class (aged between 12 and 16), but eventually 10 students attended regularly, working together with 3 seniors and 2 facilitators. Most of the pilot group meetings were held outside the school hours with a very strict schedule, on Friday afternoons and Saturday mornings. 8 meetings of an average duration of 3 hours each were held, including one field visit. The protected area of the Dead Rába, which is a part of the Fertő-Hanság National Park, located south-west of Győr, was selected for the pilot-testing.

Intergenerational learning:

Students from different ages were mixed to learn together, create a game and enjoy a new experience. This experience developed a strong bondage among the students, as all of them were encouraged to express their ideas and contribute to the activities of the course. The bonding between the generations proved to be a longer process, definitely aided by the story-telling activities and the field visit. The pilot participants worked in small groups during the game development phase, with a clear task allocation amongst them. The most noted shortcoming during the pilot course was the absence of the seniors during the game development meetings, strictly due to personal constraints, although they had already provided input for the game through their stories.

Experiencing nature

The field visit was led by an expert on the area and one of the seniors, and took the form of a guided tour of the Dead Rába, explaining to the course participants the ecosystems and showing to them the most typical animals and plants. During the field visit, the participants had the opportunity to try practical conservation activities that could be pursued by them as volunteers in the long run: for example, they were taught the frog-saving method, which all participants could practice in the future.
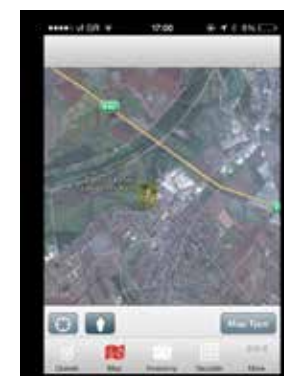
The game

"The discovery of the Dead Raba" uses as its main characters four animals, which are specific to the protected area: the gopher, the unka frog, the otter and the merops. In order to make the game interesting, several conversations are held with the animals. During each conversation the player receives information about the area, either in the form of a video, or as a description or a simple showing. After the player has read or watched the information, he/she can be awarded a present, provided by the animals. Special attention has been provided to the order of appearance of the animals; the information they provide; and the presents they give. The game was developed on the ARIS platform.

4.2 The INVOLEN competition

The INVOLEN methodology was implemented more widely through a European competition, which attracted 30 registrations from intergenerational groups in the five participating countries, i.e Italy, Greece, France, Slovenia and Hungary. The official announcement of the competition was made in a workshop held in each participating country, bringing together mostly teachers and headmasters of secondary education and environmental NGOs with environmental education activities. Before and after the workshop a publicity campaign was launched in each country, addressing schools, regional secondary education authorities, youth centres, NGOS active in environmental education, management authorities of National Parks and other protected natural areas, environmental education centres and local authorities. The target organisations were contacted by email and telephone, while a campaign in the social media was launched at the same time, using the facebook page of the project. A competition blog was also created in each country by the project partners, which advertised the competitions, provided the online registration forms and other competition documents, including the submission templates and the evaluation form that had to be submitted by the leading facilitator of each competing team together with the game. The INVOLEN Toolkit and the INVOLEN Guide were made available to all contestants online. All the documents were provided in the national language of each country, and the communication with the contestants was made similarly in their own language.

Out of the 30 initial registrations, 22 games were submitted by the set deadline, of which 20 were accessible and could be evaluated. 335 participants were directly involved in the implementation of the INVOLEN methodology, including 189 youth, 88 seniors and 58 facilitators, while hundreds more were involved indirectly in the playtesting of the games and in providing support to the teams through interviews, information, technical input and publicity. The evaluation of the submitted games was carried out by an independent jury in each country,

on the basis of a list of criteria, which were common among the five countries. One winner was declared per country, and the five winners were invited to the end-of-project conference in Florence, Italy, to present their games and compete for the European Winner's award.

The objective behind the competitions was to test whether the INVOLEN methodology could be applied by intergenerational groups and facilitators in different settings, without the amount of support that was provided by the project partners during the pilot testing. Online support was provided through the Helpdesk, which recorded over 100 questions and answers during the time span of the competition. All competing teams were sent the Guide for Learning Facilitators and the Toolkit for Learners, in their own language, and limited face-to-face support was offered where possible. Examples of support activities include:

- Setting up the Helpdesk in each country, in the language of the competing teams. The Helpdesk was set up as a Google+ group and as a Facebook group in each country, while a central Helpdesk in English summed up the FAQs of the five countries.

- Setting up emailing lists for the registered competitors and sending regular emails to encourage communication with the Helpdesk.

- Organising virtual meetings (mostly through skype) with the facilitators of the competing teams, on their own initiative.

- Answering phone calls to clarify mostly technical aspects of the game construction.

- A workshop offered to 8 teachers of secondary schools in Athens, immediately after the national workshop, to explain the ICT part of the INVOLEN methodology and offer examples of intergenerational learning activities. 3 of the participating teachers registered their teams (out of the 8 registrations).

- A limited number of visits to schools or youth centres, which asked for it, were made in Greece, France and Hungary by the partners' staff.

However it was noted that the teams which received face to face support did not have an advantage over the rest, as shown by the results of the competition: 4 out of the 5 winners had not sought, and did not receive, face-to-face support, but used the Helpdesk, emails and the INVOLEN literature (especially the INVOLEN Guide and Toolkit). In the large majority of entries, the competing teams worked autonomously, confirming the initial hypothesis of the INVOLEN project team that the INVOLEN methodology can be used effectively without face-to-face support.

The results of the competition are impressive regarding the variety of solutions employed in the games, but also regarding the wealth of material produced to support or complement the games: 46 new stories of seniors were added to the library created initially by the pilot-testing groups, bringing the stories to a total of 69; and over 50 conservation activities were performed by the intergenerational teams. It is quite revealing to read the description of the experiences the competing intergenerational teams had during their field visits to the protected area they chose for their INVOLEN game.

Experiences from field visits

This is how the facilitators of the competing teams described their experiences during the filed visits.

"Our chosen protected area can be found in a beautiful territory – and we wanted to take some initiatives to protect it… we collected garbage and we did some gardening, while we listened to our seniors' stories. We also played such games, that the seniors used to, when they were young... and we observed and videoed the animal species of the area. To our greatest pleasure, we also witnessed the arrival of the stork." HU

"First, we walked along the nature trail in the forest aiming to make a record of the various species present, and emphasise nature's treasures and values)... our next activity was the painting of the fence and tables along the nature trail. On the occasion of the Earth Day, we planted an oak tree in our school… and we took part at a birdwatching event, organised by the Pálfája Educational Center, where the children helped with the organisational tasks." HU

"The field visit was at the Archaeological area of San Genesio. The voluntary activity of our team was cleaning up the site of the archaeological excavations from the earth and leaves brought in by the winter rains, in the presence of the two experts of the area." IT

"Our school is located inside the protected area in the National Park of Tuscan Archipelago. Our visits took place during school hours, enjoying the proximity to places included in the game. The voluntary activity was organised together with the Proloco of Capraia and the National Park: cleaning up a stretch of coast located in Cala Mortola." IT

" We participated in a tour organised especially for us by the Guard of Conservatory of Natural Areas, who was hosting us, in the Centre Region. Knowledge of the site of the pond Benette and forest Senonches will leave its traces for a long time in the minds of our young people… because they learnt a lot about the flora and fauna of the site and the preservation of nature." FR

"We organised an excursion to the selected Natura 2000 area and we examined the field, looked at interesting plants and karst features and learnt about invasive species. We looked at knotweed (Fallopia Adanson) which has recently started to spread in our country. We removed some of it but we know that this is a very persistent plant so more of such actions will be needed." SL

"Together with other volunteers, the students of our team cleaned part of the Park (a protected peri-urban site). Following a specific route within the Park, we collected rubbish and, using nets, we cleaned up the water in the canals. The students did this with great enthusiasm and commitment." GR

The winning games

The 5 games that won the national competitions in Italy, Greece, France, Slovenia and Hungary are summarised here.

Italy: Aegylon game

A young seagull, falls from his nest in Punta dello Zenobito. Giovanni, ex-prisoner takes care of him and gives him the name of Gullyver.

Gullyver loves flying on the sea, but one day is swept up in a vortex of air and suddenly finds himself in the vicinity of Cala Rossa, surrounded by little animals watching him. He discovers that he has gone back to year 1540 and that Capraia Island is in danger because of the Corsair Dragut who is ravaging the country, threatening their habitat. Dragut fishes without respecting the inhabitants of the sea; he occupies caves with coffers and weapons; he destroys paths of the island and the San Giorgio Fortress. The animals would like peace and calm as before, and ask Gullyver to help. Gullyver agrees to help them. Answering the questions, the player frees each character allowing them to return to their own habitat, while Dragut loses «land» on the island. A final question will allow Gullyver to return to the current time. The game was developed on the ARIS platform.

Created by the team lead by Istituto Comprensivo "G.Micali" - Capraia Isola.

France: "Belnac adventures" (the European winner)

The game is a playful and educational discovery of the heritage of the city of Carnac and its environment (Natura 2000 area), in the form of a treasure hunt.

"Belnac plays in the park, he thinks of the presentation that he has to make about the story of his town Carnac, but he has nothing to say... By looking at the dolmen, he remembers a legend which his grandfather told him: if we rubbed a stone of a dolmen while singing, our problems would be solved.

So, let's go to the dolmen!

Belnac meets a small character, going out of the dolmen...

«Who are you?» asks him the little boy.

«I am the Breton goblin Resoutou, what do you want?».

«I need you to help me making a presentation on the history of Carnac».

« Ok let's go! I will take you to a visit in 9 stages!»

During his trip, Belnac will discover his environment between prehistory and now and the richness of the area: the fragility of the ecosystem, changes in the landscape, the place of men, legends, migratory birds and the plant "Baccharis" invading the coast. The game was developed on the Enigmapp platform.

Greece: Construction of a Bird Observatory at Polifitos Lake

The game aims to familiarise the player with the fauna of Lake Polifitos and raise his awareness regarding the protection of the area. This is achieved through a "task" which the player undertakes: to help build a Birds' Observatory, so that many people can visit the Lake without disturbing the life of birds. The player is guided to discover 6 different bird species living in the area, he is provided with information in the form of text and video and wins "gifts" which he can then exploit for the construction of the Observatory. To be able to use the gifts, the player should give correct answers to 6 questions, which are related to the information previously provided about the chosen birds. Then, the player can help to calculate the contour of the Observatory and solve some environmental problems in the surrounding area. The characters are: Tsiou-host, 6 birds-friends of Tsiou, Mayor, Fisherman. The game was developed on the ARIS platform.

Created by the team led by the High School of Aiani, Kozani, Greece.

Slovenia: Magic of nature

Magic of nature is a game, located at the beautiful intermittent lake in Notranjska Regional Park, which is important natural environment as it is part of the Natura 2000 network of sites. In the 17th century already Janez Vajkard Valvasor

wrote that the area is a great miracle of nature. Here you can find corncrake (Crex crex), which according to the classification of IUCN belongs to a globally threatened species or vulnerable species (V). The player of the game is invited to help assist the corncrake to survive and to act in favour of nature conservation. The game was developed on the ARIS platform.

Hungary: The pasha's chest

Hassan pasha finds the hidden treasure chest of a nobleman, but the key is lost. No matter, how hard he tried to crack the chest, he failed. Only a single piece of parchment shows the location, which can take us closer to the solution. Help the pasha to open the chest: look at the treasure map, follow the route, solve the riddle and find the key!

In this game, the key is a password, and the treasure chest is a password-protected compressed file. To see what is inside the treasure chest, you need to resolve problems in the protected area of the Hernád-valley, and find the password.

Prepared by: Mészáros Lőrinc Primary School, Megyaszó, Hungary

To play this game, you will only need a QR code reader and a GPS. More information on how to play the game, and the full description along with database can be found on the link below.

http://involenmegyaszo.blogspot.hu/

5. Tools and guidance for an INVOLEN project

A number of supporting products have been developed on the basis of the piloting experience, including a Guide for Learning Facilitators, a Toolkit for Learners, a database of "stories" narrated by senior learners and conservation experts linked to the pilot-testing locations or the competition locations; a database of games; skill needs assessment questionnaires; and evaluation questionnaires for the ongoing evaluation of an NVOLEN project. These products are freely available in the INVOLEN website www.involen.eu to all those who would like to try out the INVOLEN methodology.

5.1 The Guide for Learning Facilitators

The Guide for Learning Facilitators is mostly addressed to teachers or other facilitators of learning and intergenerational exchange and offers a step-by-step guidance on how to implement the INVOLEN methodology. The Guide outlines the 7 steps described briefly above and provides examples and explanations, so that the learners' group can be stirred to a productive and satisfactory learning outcome.

The Guide starts with an outline of the INVOLEN methodology, and a definition of the basic concepts it builds upon, namely intergenerational learning, volunteering and

nature conservation. Then it goes on to define the target groups of the INVOLEN methodology, and offer advice about recruitment methods. It continues analysing the 7 steps of the methodology, starting with the assessment of the competence and learning needs of the target groups, and continuing with the outline and structure of the INVOLEN course, explaining each of the 6 Work Units, and specifying for each of them the preferred location, whether experts are needed, the objectives of the meeting, its length and the education outcome. Practical advice about how to organise the meeting room, the necessary equipment and how to manage time is also provided. A separate section is devoted to an introduction to location-based games, and the Guide is completed with 5 examples of INVOLEN methodology implementation, offering detailed descriptions of the protected area in each case, the learners' groups, the management of the course, the intergenerational learning experience, the design and development of the game, and its implementation in ARIS or an alternative platform. The annexes include the questionnaires for competence needs assessment and for the ongoing evaluation of an INVOLEN course.

5.2 A Toolkit for Learners

The Toolkit for learners complements the Guide, offering examples of the "tools" that can be used to implement the INVOLEN methodology and create an INVOLEN game. The toolkit addresses all the target groups, namely facilitators, youth and seniors.

The Toolkit starts with an introduction to the INVOLEN project, and offers briefly some background information about volunteering, intergenerational learning and nature conservation, focusing on NATURA 2000 sites. It then goes on to offer examples of conservation activities, not necessarily to encourage their copying, but rather to give ideas to those involved in a new INVOLEN project.

A separate section is devoted to examples of seniors' stories, quoting some typical stories from the pilot-testing of the INVOLEN methodology, which were also used to create the scenario of the pilot-games. Then 5 games are presented, including a description of the scenario of each of them and a "guided tour" of the different steps the player has to follow when playing the game.

The Toolkit also reviews briefly the available platforms for game development, although it should be stressed that the scene is changing so rapidly on this aspect, that it is necessary to confirm that the established platforms are still on offer free of charge, or whether new platforms have been brought out. Special attention is placed on the ARIS platform, which was used for the development of the pilot games. A number of annexes is provided, offering examples of volunteer management techniques, methods for collecting seniors' stories, an overview of the online training offered to facilitators, and a "reference list" of the work units used in the pilot testing of the methodology.

5.3 The online Helpdesk

The online Helpdesk was developed to assist the competition entrants. It includes a large number of Frequently Asked Questions, thus providing examples of the technical problems encountered by the teams building INVOLEN games. The operation of the Helpdesk during the INVOLEN competition has shown that it is feasible to start and run an INVOLEN project and construct interesting and exciting games, using the online guidance that the INVOLEN website offers, especially through the Guide and Toolkit, but also through the databases and -certainly- the Helpdesk itself. The FAQs listed in the Helpdesk give a good sense of the aspects that may need clarification and take the new teams a step forward with technical issues.

5.4 Database of stories

A database of seniors' stories used for the construction of the pilot games and the competition games is available online. Every story is uploaded using a common template, which, besides the narrative part of the story, specifies its location, the story-teller, the protected area it is associated with, and its use in a certain game. In total 69 stories have been compiled in the database 23, of which are associated with the pilot-testing of the INVOLEN methodology and 46 with the European competition.

5.5 Database of games

The games constructed during the two phases of INVOLEN implementation, namely the pilot testing of the methodology and the wide implementation through the competition, are brought together in the INVOLEN website. 26 games appear in the Resources menu of the website, including the name of the game, a brief description of the scenario, a screenshot and the link where the full game can be accessed. It should be stressed here that all these games, being location-based, cannot be played through a computer, but can be only played on the location where they have been created. However, one can follow the steps of the game online and navigate along the unfolding of its plot.

6. What we learned from the implementation of the INVOLEN methodology

The pilot-testing of the INVOLEN methodology and the European competition in the 5 countries of the project offered a rich array of "lessons" than can further guide the implementation of the INVOLEN methodology. These lessons have been derived from the experience of the project partners, who closely monitored all implementation efforts; and by the written evaluation provided by the focus groups, the pilot -testing participants and the European competition participants. All members of the focus groups and the pilot-testing groups completed evaluation questionnaires, i.e. youth, seniors and facilitators, while the groups that entered the competition evaluated their experience through their principal facilitator, who completed an online questionnaire. The results of the evaluation, and some characteristic comments are briefly presented here.

6.1 Assessment of the competence and learning needs of the target groups

During the pilot application of the INVOLEN methodology, 7 focus groups were held in 5 countries, with a total of 148 participants, including 112 young people, 19 seniors and 17 facilitators. The results of the discussions and the analysis of the questionnaires revealed that the needs of the target groups varied from country to country, but some common points were identified, which were used to enrich the methodology. A summary is presented below:

The young people of secondary school age showed, as expected, great interest in the use of location-based game platforms, having sufficient competences in the use of ICT; next to that, they showed interest in conservation issues and especially the conservation needs in the selected protected areas, in which they could contribute to. Young people also showed willingness to work with seniors, although they could not visualise how this would happen and therefore the need for defining and implementing a structured interaction methodology was confirmed.

The senior volunteers had in general a good knowledge of the protected area

although they needed to update their knowledge concerning contemporary conservation issues; and further, they needed to understand better the background of these issues and the causes of the problems created. In general, their ICT competences were limited, but they showed strong interest to learn how to use a smart phone/tablet. Regarding intergenerational cooperation, seniors' needs were complementary to the needs of youth: the seniors wanted to learn how to help young people, and how to make the best use of the experience and knowledge they had gathered over the years.

The facilitators admitted, in general, that they had limited competences in the field of intergenerational learning, and an obvious need for training on this subject. They have also admitted a rather limited knowledge of conservation issues in the protected areas, and expected help from local experts in order to gain a deeper understanding of the prevailing conservation issues, including the distinction between traditional and modern conservation methods. The questionnaires also showed that medium-level ICT skills were very important for facilitators, including a good understanding of location-based games and the game platforms in particular, given that they would supervise and support the young volunteers in their game development tasks.

All target groups had limited experience of volunteering, and consequently this important component of the project had to be explained further to them during the meetings that followed.
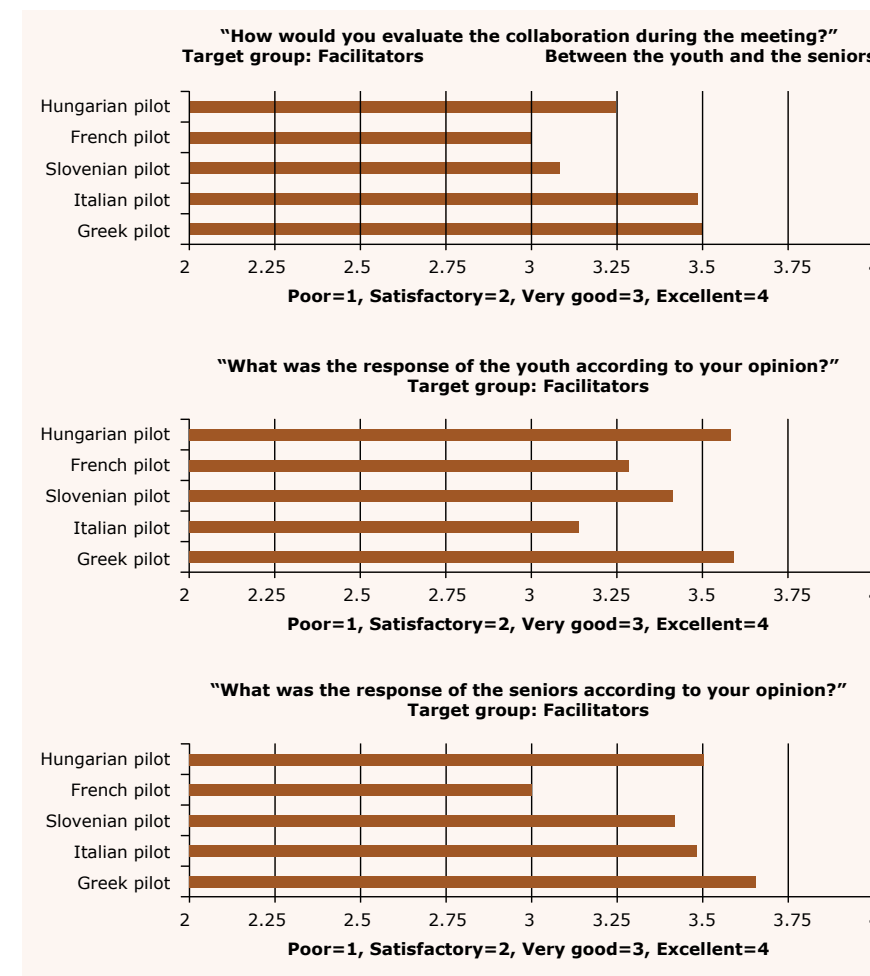
6.2 Pilot testing

The pilot-testing participants have admitted the benefits of the intergenerational learning processes, as they had experienced them during the implementation of the methodology. The relationships formed between the two groups of youths and seniors and the exchange of knowledge and experiences confirmed one of the core objectives of the project. Moreover, the learning benefits accrued by the piloting participants have been demonstrated in their answers to the evaluation questionnaires completed by them. Such benefits include:

- increased awareness about environmental issues and desire to help solve such issues;
- feeling of being useful to society;
- eagerness to demonstrate to others the problems and solutions that relate to environmental conservation;
- appreciation of the value of young and old working together and enjoyment of the intergenerational learning process;
- increased respect by the young participants for the knowledge of older people, being able to rise above the generation gap to come to enjoy the company of seniors; and
- new knowledge of educational gaming and the development of IT skills that are central to such a learning activity.
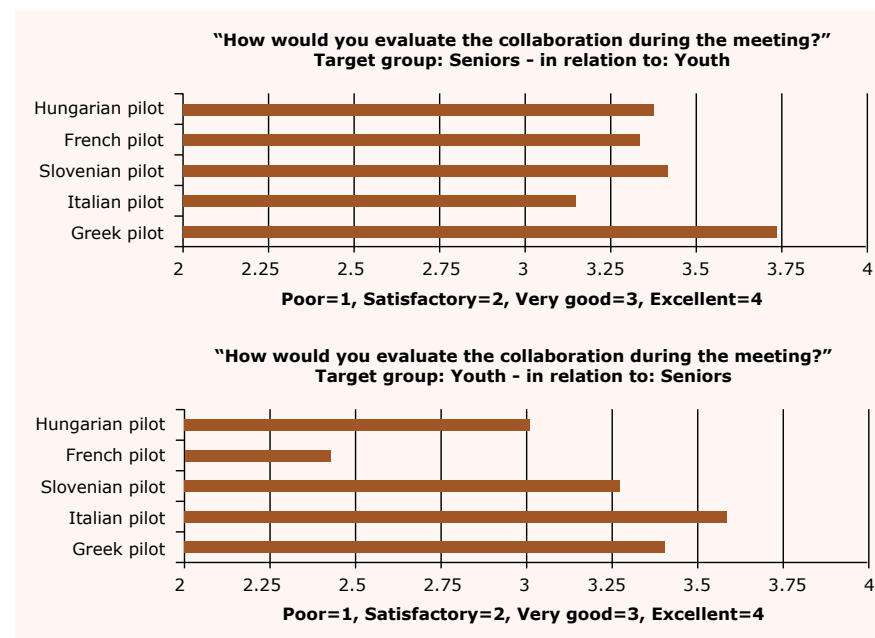
The cooperation between the members of the group was also a very important factor for the success of the implementation of the INVOLEN methodology. The results of the evaluation of intra-group cooperation, as perceived by the group facilitators, youth and seniors, are overall very positive. They show that, as confirmed by the qualitative information derived by the evaluation questionnaires, the two groups – youth and seniors- needed time in the beginning of the course to "break the ice" and establish communication and mutual trust. Moreover, the field visits and joint conservation activities performed in the protected area helped greatly to establish bonding between the generations.

According to the facilitators' assessment, we note a more positive picture of the overall collaboration during the meetings in the cases where the pilot course was organised within a school (GR, IT) or with the close collaboration of schools (HU). Taking the two options separately, it seems that the course facilitators who originated from schools had a more positive opinion about the seniors' response to the course, compared to facilitators who operated in the context of a youth club or an NGO; while their perception of the response of the youth did not seem to be influenced by any of the two "models" of implementation, i.e. inside or outside a school.

"How would you evaluate the collaboration during the meeting?"
Target group: Facilitators   Between the youth and the seniors

Poor=1, Satisfactory=2, Very good=3, Excellent=4

"What was the response of the youth according to your opinion?"
Target group: Facilitators

Poor=1, Satisfactory=2, Very good=3, Excellent=4

"What was the response of the seniors according to your opinion?"
Target group: Facilitators

Poor=1, Satisfactory=2, Very good=3, Excellent=4

The assessment of collaboration between the two sub-groups, as provided by the members of the sub-groups themselves, shows a more reserved stance taken by the youth and a more enthusiastic one by seniors. In four out of five countries, the seniors perceived their collaboration with youth more enthusiastically than the facilitators of their group; while in three out the five countries the youth perceived their collaboration with seniors less positively that their group facilitators, and in

two countries more positively. This volatile perception of the young participants is interpreted more positively in their written comments, which reveal appreciation of the senior's contribution to the pilot course.

"How would you evaluate the collaboration during the meeting?"
Target group: Seniors - in relation to: Youth

Poor=1, Satisfactory=2, Very good=3, Excellent=4

"How would you evaluate the collaboration during the meeting?"
Target group: Youth - in relation to: Seniors

Poor=1, Satisfactory=2, Very good=3, Excellent=4

Positive results

The positive assessment of the pilot-testing course by the participants is clearly shown in some typical comments:

Piloting facilitators

"...a great groupwork capacity despite the heterogeneity…The interaction between students and seniors was amazing and everybody could share knowledge and competences: creativity, informatics expertise, knowledge about nature."

"The youth were enthusiastic about playing the games with the elders and they were pointing out to the older participants the parts of the scenarios where the seniors' stories were used"…"when the channels of communication between generations are open, the interest in exchanging experience is rising."

"...a great opportunity (for the participants) to do something for the environment", "absolutely positive results of the learning process for the young people" and "we were impressed by the IT skills the young volunteers developed and we could do nothing but praise their engagement and creativity."

Seniors

"In the beginning I observed a lot, then during the field visit, I started collecting rubbish and the youngsters joined in and we all started communicating."

"Despite all the stereotypes about them (youth)..., some of them have a strong motivation... and were able to identify the environmental issues and express them through the game."

"We gained a positive view of life from the youth who offered their laughter and freshness and joy to us."

"It was really satisfying that the young ones appreciated our stories and used them for the scenario of the game …. "It is important to be able to transmit values and memories of the natural heritage to the younger generations."

Youth

"The seniors were very helpful – they were like a human encyclopaedia and they were not boring at all… they think wisely,…we can learn from them."

"Many things of the elders' life are similar to ours, even if they do them in a different way."

"I learned a lot about pollution, bird nesting, farming, how to live without polluting the environment, fertilisers and pesticides, protected parks …and we can visit a protected area or a park and not get bored - with technology we can make this (experience) more fun."

"The older people care a lot about the environment, they have helped to clean the area and …they told us good and interesting stories."

"I feel proud to have participated in this project and I want to continue developing games such as the one I made for the project…it makes you feel a creator."

Challenges

There were, however and some challenges, noted by both facilitators and the other participants:

• It was quite a difficult task to fully achieve the learning outcomes for all the participants, because the demand for ICT skills (ARIS games and Apple devices) was something really new to them - often the more competent ones tended to leave the rest behind.

• There was initially a lack of motivation by some young participants, but this was remedied during the field visits and their involvement in the research about the area, both of which helped to keep up the students' interest in the project.

• The older participants were not comfortable with the ICT part of the course, although they admitted that they gained some knowledge of the digital world during the project.

• The balanced participation of seniors and youth in the design of the game was a real challenge, as the youngsters tended to take the lead and move forward - the collaboration between the two groups of youth and seniors in general decreased during the game development phase.

Practical aspects

With regard to the practical aspects of the implementation, the initial planning for small-sized groups of up to 7 youths, 2 facilitators and 3 seniors, including input from conservation experts in the appropriate sessions, has been confirmed as optimal. A regular schedule of meetings every 7-10 days also proved to be the best option, in order to maintain the engagement level of participants and to provide a steady learning pace. However, larger groups and shorter meetings are also possible if a tight schedule is imposed and discipline is maintained during the meetings in order to fully exploit the available time.

6.3 European competition

Finally the European Competition on conservation game development, which was launched with great success in the five participating countries, confirmed

the feasibility of the INVOLEN methodology and its suitability for application in secondary schools or NGOs across Europe. 20 games were submitted for evaluation, completed by an equal number of schools (two more games were submitted but were not accessible by the jury and were not evaluated). The evaluated games originated form Italy (5 games), Greece (5 games), France (2 games), Slovenia (4 games) and Hungary (4 games). An independent jury in each country assessed the submitted games and a winner was declared per country. The five winners were invited to present their games in the International Conference of INVOLEN.

The teachers/learning facilitators who were leading the competing teams answered an evaluation questionnaire which offers many insights to the application of the INVOLEN methodology by the target groups of the project, without the close supervision and support offered by the project partners during the piloting of the INVOLEN methodology.

The response of the teachers/facilitators was very positive. Although some of them admitted that they had some reservations in the beginning, especially regarding the creation of a game on mobile devices, mostly because this was an unfamiliar activity for them, they became enthusiastic during the process or the "journey" as some referred to it. Most facilitators declared that the game-based learning promoted by INVOLEN revealed to them an excellent pedagogical tool, while at the same time the experience was valuable because it led them beyond the conventional learning methods, and was also exciting and bridged the generations' gap.

The assessments of the competing teams' facilitators who answered the evaluation questionnaire are summarised below.

Regarding the intergenerational learning experience

All target groups particularly valued the intergenerational learning experience.

- All participating facilitators thought that the intergenerational learning experience met its purpose concerning intergenerational collaboration. 59% were absolutely sure, while 41% were rather sure.

- The large majority of facilitators, 95%, thought that the intergenerational learning experience met its purpose, concerning the use of technology. 50% were definitely sure, while 45% were rather sure.

- The majority of facilitators, again, thought that the intergenerational learning experience met its purpose, concerning the promotion of voluntary activities in nature. 59% of the facilitators were convinced about it, while 32% were rather convinced.

Do you think that the intergenerational learning experience met its purpose, concerning:
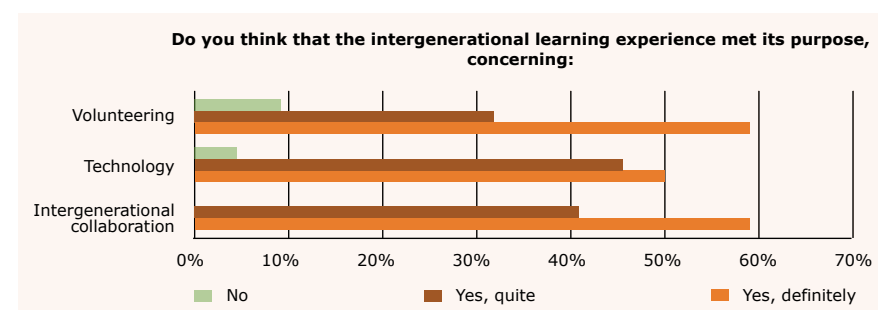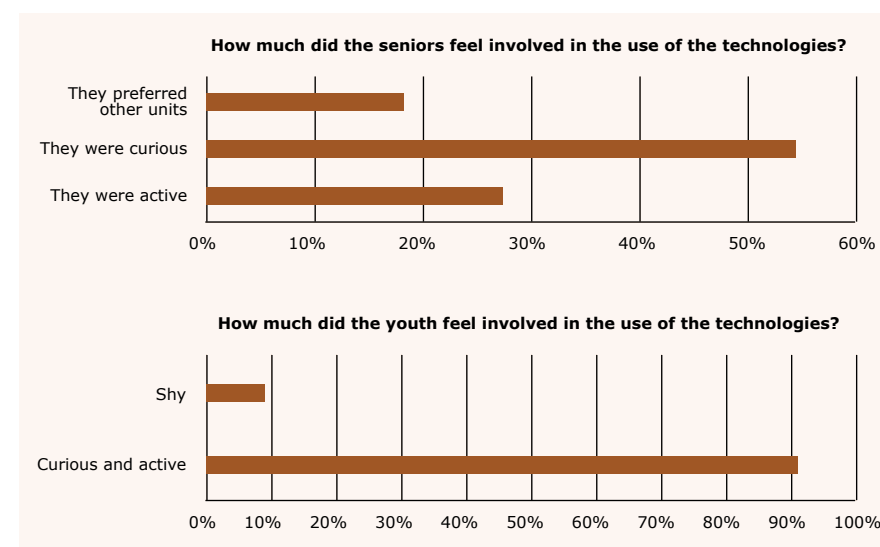
Comments include:

- "Seniors and youth came closer together, discussed and asked for more meetings. The youngsters asked many questions, and were attentive to seniors. The seniors were really excited with the young people and enjoyed the interaction with them greatly."

- "Intergenerational exchanges were very rich. The seniors were really impressed to see young people take an interest in environmental protection, heritage and legends of their local natural heritage."

- "The field visits, museums, interviews and exchanges with seniors, have been true moments of pleasure for all !!!!"

Regarding the team members' involvement in the use of technology

- The facilitators' assessment of the seniors' involvement in the use of technology was that 55% were curious to learn about new technologies, 27% were active in using new technologies and 18% preferred other Units, such as storytelling and scenario-building.

- The involvement of the younger participants in the use of new technologies was far more intensive, as one would expect: 91% of the facilitators noted that the young participants were both curious and active in the use of technologies, while only in two cases they reported shyness towards technologies.

How much did the seniors feel involved in the use of the technologies?

How much did the youth feel involved in the use of the technologies?

Comments include:

- "The youngsters discovered the possibilities of new technologies and their applications and developed a genuine interest in this, which opened new career possibilities."

- "The creation of the game was very exciting, because of its technical aspect, but also the human aspect of meeting with seniors and sharing their experiences."

- "New technologies motivate the youth; this is a medium that speaks to them and seems more modern than paper or books to learn. Yet this requires the same skills of reading and writing…"

- "The seniors preferred the storytelling and the activities carried out in nature. However, they were open-minded for new knowledge, but they let the youth take the leading role."

In conclusion, we can state that the intergenerational learning experience met its purpose, as confirmed by the evaluation of teachers/facilitators of the competing teams. Without underestimating that the intergenerational interaction was the most demanding aspect of the methodology and a significant proportion of seniors did not become actively involved in the ICT activities, their contribution was appreciated by the students and the senior's "socialisation" with ICT and game-based learning was a benefit that was admitted by most. On the other hand, the gaming process, applied on mobile devices, excited the imagination of the young students and created new prospects and motivation, especially when combined with intergenerational learning and course work.

Finally, all three target groups, i.e. youth, seniors and facilitators, enjoyed greatly the experience of taking part in the competition as a whole, as well as in the separate components of the INVOLEN methodology: 100% of the facilitators had this opinion without reservations.

The experience of the teachers/facilitators seemed to be particularly constructive, as this comment sums up:

"The experience was very rich. A great atmosphere at each meeting, a pleasure to meet and work together."

7. Sustainability of the INVOLEN results

The legacy of the project has been ensured by the wealth of its products, including various publications that provide guidance and explain the tools that can be used by learning facilitators and learners to embark in and implement an INVOLEN project. The Guide and Toolkit, the present publication, the Helpdesk, the website, the library of stories and the library of games, various reports, assessment questionnaires, conference and seminar presentations and proceedings, provide rich learning material, illustrated by examples of the learning process and end results of an INVOLEN project. Moreover, the learning materials and other learning support products of INVOLEN are perfectly suited to promote environmental awareness, cooperation and citizen participation in environmental preservation, while stimulating transfer of knowledge and mutual learning among citizens. In this sense, the project results are offered for wider public use, beyond the formal school system of all grades, to individuals interested in nature preservation and heritage interpretation, as well as to environmental associations, adult education centres, third age universities, public authorities etc.

The sustainability of the INVOLEN methodology has been also asserted by the follow up to the pilot actions undertaken by the 5 participating schools/NGOs and by the follow up planned by the 22 participants in the European competition. 4 out of the 5 piloting schools/NGOs have applied the INVOLEN methodology during the school year following the pilot course, while 2/3 of the competing schools or youth structures have taken steps to continue using the INVOLEN methodology in various ways:

- By improving their game, expanding its content and offering it for wider use in cooperation with local authorities or education networks. Most facilitators who led competition teams stated in their evaluation sheets that the game was not created only for the competition, but equally important – or even more important - was the educational value and the social/community value of the process. Many examples have been offered for the wider implementation of the INVOLEN methodology:
  - ◇ A youth centre facilitator, intended to apply the INVOLEN methodology in a youth association's reunion, to discover the city of Nantes, France; while another Youth facility planned to introduce INVOLEN to all their youth centres during the summer 2015.
  - ◇ In another occasion, in Italy, the INVOLEN methodology was selected to be introduced in Summer Camps for children.
  - ◇ The Aiani school team, in Greece, made available their game to all Centres for Environmental Education in Northern Greece, which, in turn have been encouraged by the Education Department of the Region to use it in their curricula. Moreover, the national environmental network "Sustainable Technology" has adopted the "Building a Birds' Observatory" game a best practice example.
- By using the games for information and awareness raising of visitors within protected areas, making them exciting tools for tourism promotion and nature interpretation. An example of this is the use of the game "The Belnac adventures" by the Carnac tourism office, in France. Also tourist organisations in Slovenia considered the INVOLEN games an interesting tool through which they can promote tourism destinations, cultural and natural sites.
- Making new games in public events, such as festivals, to amuse and educate the younger visitors or to promote the aims of the event to the wider community of visitors. A charming example of this has been provided by one of the competition groups in Hungary, who prepared a new game for the National Chocolate Festival in Szerencs, in August 2015, addressing mostly children. The task of the young participants was to search for QR codes and answer a number of questions, asked in connection with the programme of the festival. The prize, chocolates, made the game particularly attractive to the young visitors, and the participation was massive!

- Introducing the INVOLEN methodology and the games as teaching material in the education of teachers: at least three teacher training colleges are considering introducing the INVOLEN methodology in their training programme in Hungary. In September 2015, the INVOLEN team of the Hungarian partner HAS presented their INVOLEN game in front of college students, teachers and professors, invited by the college of Nyíregyháza. Similar plans have been considered in Italy, in connection to teachers' training seminars, and in Greece, addressing Technological Education Institutes and the University of Western Macedonia (the local university of the INVOLEN competition winners' team).
- Using the INVOLEN methodology for ICT education in secondary schools and Vocational Training Schools: location-based game development on ARIS has been offered as an option to expand the ICT curriculum of secondary and post-secondary education in northwestern Greece, using the "Birds Observatory" game as an example.
- Local authorities have shown interest in adopting INVOLEN as a way of bringing closer youth and seniors in their towns: the Association of Local Authorities of Auray in South Brittany already expressed their wish to spread the INVOLEN methodology among the education and youth facilities in their territories. They have already discussed with the project partner la Ligue a project allowing youth and seniors to feel comfortable in their towns and villages, on the model of INVOLEN. In Slovenia, the Municipality Loška dolina established a

centre for intergenerational cooperation and they welcomed all the INVOLEN results and learning materials.

- Schools are using INVOLEN to build international relations with other schools in Europe and worldwide. One of the schools that took part in the INVOLEN competition, in Megyaszó, Hungary, is looking for partner institutions in Europe in order to further develop and use their game. They have developed a new logo, using the „IM" abbreviation (where „I" refers to INVOLEN, „M" to the settlement of Megyaszó) and a bilingual blog, inviting cooperation on game development from other schools (http://involen-megyaszo.blogspot.hu/). To build international relations, the team also uses Facebook, and have established cooperation with the deputy director of the Southern Cross Campus of New Zealand, working out a plan for joint game-development between the two institutions.

A few ideas of the IM logo:

- The INVOLEN partners have been invited to take part in events and conferences on environmental education, in a variety of occasions, including International Conferences (in France, Greece, Italy) and in the ARIS Global Symposium, in September 2015, where one of the INVOLEN competition games (the "Birds' Observatory") was presented and uploaded on the website of ARIS.

The teachers/facilitators who took part in an INVOLEN project were very positive about the future use of the INVOLEN methodology. 82% of the teachers who filled in the evaluation questionnaires when they submitted a competition entry, stated that they would definitely or probably use this methodology again and shared their information about future applications. 86% of the same teachers saw high possibility to use the game created for the European competition as educational material in their future classes, while another 86% planned to improve the game and make it available for wider public use.


Will facilitators apply the INVOLEN methodology in the future?
- 55% Definitively
- 27% Probably
- 18% No answer
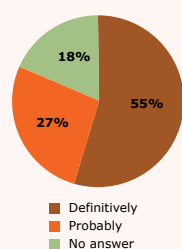
Will facilitators use the game created for the European competition as educational material in the future?
- 50% Definitively
- 36% Probably
- 14% No answer
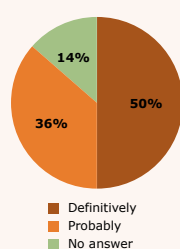
Will facilitators try to improve the game created for the European competition and competition and place it in wider public use?
- 41% Definitively
- 45% Probably
- 14% No answer
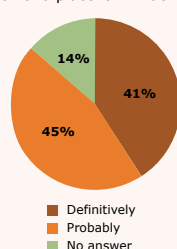
Typical comments written by the facilitators include:

- *"YES, definitely (...we will use it) - To raise and maintain the interest of the younger generations is getting harder with traditional methods. This is why it is important to adopt new methodologies" (...such as INVOLEN) in schools."*

- *"The methodology is innovative, interesting and challenging. It is surely worthy to use it in the future."*

- *"We would start again with pleasure that kind of experience!"*

Several facilitators involved in the competition have asked if there would be another INVOLEN competition, because the youth and seniors involved wanted to repeat the experience of the INVOLEN methodology and create more games. But more importantly, the majority of facilitators stated that that they would use the methodology in their future projects in their schools or Youth Centres, even without a competition. This has given great satisfaction to the INOLEN partners, who are also committed to disseminate further the INVOLEN methodology and maintain the online resources that support it for a long time.

The INVOLEN conference

A major event for the wider dissemination of the INVOLEN project was the end-of-project conference. The conference, held in Florence, Italy, in September 2015, served two aims: firstly to disseminate the results of the INVOLVEN project and stimulate discussion on the core themes of environmental education, intergenerational learning and ICT-related innovations; and secondly to present to a European audience the winners of the INVOLEN competition in Italy, Greece, France, Slovenia and Hungary, and pronounce the European winner. The conference gathered together 26 international speakers, who presented while the project partners their research on the conference themes; presented, discussed and debated the INVOLEN methodology; and diffused the project results. The scientific part of the conference gathered together an audience of 80 delegates, while the competition part gathered an audience of over 150 people, most of which were teenagers from secondary schools.

The highlight of the conference was the exhibition of the European competition entries, the presentation of the five winning games by the young people who made them, coming from five different countries, and finally the voting to pronounce the European winners. The voting for this was carried our firstly by the conference participants themselves, and secondly by an independent jury of 5 experts, who held international experience in environmental education, intergenerational learning and game design. By a combination of the results of above two sources of voting, the 1st, 2nd and 3rd prize were awarded. The results of the international competition can be visited in the website and the facebook page of INVOLEN.

All the papers presented in the conference have been brought together in a volume of conference proceedings, which has been published online and has raised substantial interest within the education community. We can thus say that the INVOLEN conference and its results have added one more building block to the legacy of the project and have supported its sustainability in the future.

Posters from competition games