

iTEC

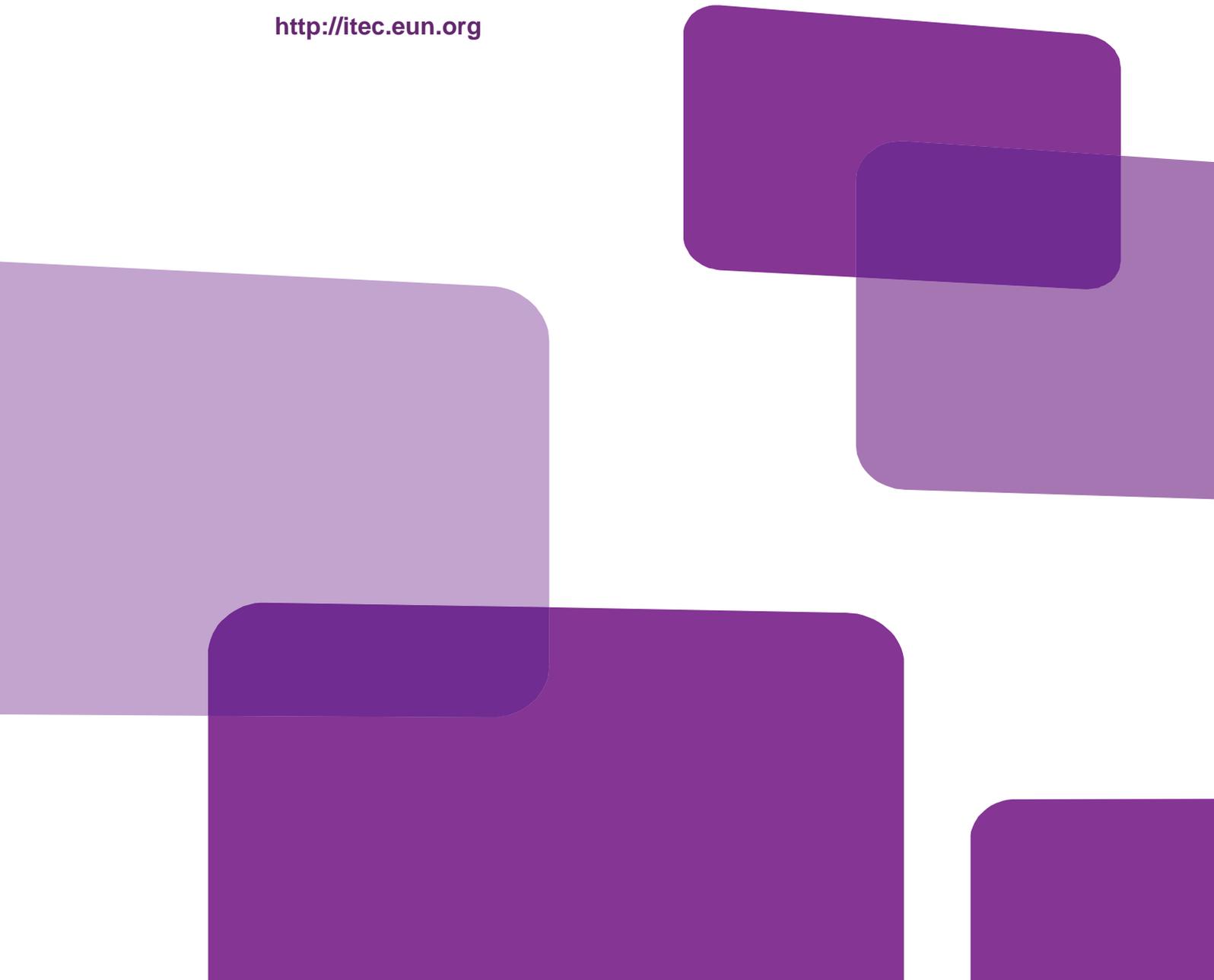
Designing the future
classroom

Cycle 1 Evaluation Report

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31st August 2012

<http://itec.eun.org>



Credits

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publisher

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<http://itec.eun.org>

Coordinated by European Schoolnet

The work presented in this document is partially supported by the European Commission's FP7 programme – project iTEC: Innovative Technologies for an Engaging Classroom (Grant agreement N° 257566). The content of this document is the sole responsibility of the consortium members and it does not represent the opinion of the European Commission and the Commission is not responsible for any use that might be made of information contained herein.



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EXECUTIVE SUMMARY

Cycle 1 of piloting has involved more teachers and generated more data than anticipated. 231 teachers from 17 countries participated in Cycle 1. Each teacher piloted a Learning Story with at least one group of students or cohort¹; in some cases teachers piloted a Learning Story with more than one cohort completing a separate questionnaire for each. 278 cohorts participated in Cycle 1. Although the teachers involved are mainly experienced and ICT confident, the majority perceived that the Learning Stories were innovative and led to an increased use of digital tools and different practices in the classroom.

A limitation of the data presented here is that teachers from nine countries provided data from less than 10 cohorts whilst almost 50% of the cohorts were from Lithuania and Hungary (see Appendix A). Simple weighting has been applied to address this variation but this does not account for the decrease in reliability that occurs with small sample sizes.

Two Learning Stories² were presented for piloting. The **Collecting data outside of school** project (<http://itec.eun.org/web/guest/la3>) requires teams of learners to collect data (scientific, multimedia) outside the classroom. The **Working with outside experts** project (<http://itec.eun.org/web/guest/la4>) requires teams of learners to collaborate with outside experts via communication technologies. Each Learning Story (LS) was underpinned by four core Learning Activities³ (LAs): teamwork, recording team newflashes, peer feedback and mental notes about learners.

The **Collecting data outside school** project was undertaken by 203 cohorts; **Working with outside experts** was undertaken by 37 cohorts; teachers suggested that they had combined the two Learning Stories (LSs) for 11 cohorts; in Lithuania 21 cohorts piloted one of the original scenarios developed in WP2, Online Repositories Rock. Information on which LS was piloted was not received for 6 cohorts.

Experienced and ICT confident teachers felt that the LSs were innovative (either the main idea and/or the pedagogical strategies and/or the digital tools used) and that participation had been worthwhile. The majority of teachers feel that the LSs have the potential to lead to innovation in the classroom. Further analysis, accounting for country and LS chosen (discounting data from a country when fewer than five teachers piloted a single LS), suggests the following:

- **Collecting data outside school** has the potential to lead to innovation in: BE, FR, HU, IT, LT, PT, SK

¹ Also referred to as a class or classroom

² Learning Stories are narrative descriptions of innovative pedagogical approaches to learning and include the use of technological tools

³ A Learning Activity is a concrete description of a learning sequence

- **Working with outside experts** has the potential to lead to innovation in: AT, FI, HU

A summary of the findings is now presented in relation to five evaluation questions.

1. To what extent does each iTEC Learning Story and relevant iTEC technologies benefit learning and teaching (for teachers, for learners, for others)?

Implementation led to new pedagogical practices particularly in relation to collaboration and teamwork, engagement with experts, and outdoor learning. iTEC teachers were very positive about the experience and enjoyed the opportunity to experiment and take risks. Participation had a positive impact on teachers' use and understanding of digital tools (which was surprising given that they were generally experienced and innovative teachers). Students used digital tools to support data capture, communication and collaboration. Students from seven countries felt their use of technology involved new digital tools and/or had increased.

- Most teachers perceived that the LSs had introduced a range of different pedagogical strategies and opportunities to do things differently in the classroom. A small number did not agree but this is not surprising given that the majority of those participating in cycle 1 were experienced teachers who already used ICT regularly to support teaching and learning.
 - The LSs facilitated engagement outside school either through outdoor learning or engagement with experts and other community members.
 - The LSs increased opportunities for collaboration, supported by digital tools.
 - Teachers perceived that opportunities to experiment had been beneficial thus enhancing teacher creativity.
 - Teachers perceived that creative learning increased as students were engaged in creative activities, developed their creative skills and expressed themselves in new ways.
 - Increases in student autonomy and participation led to changing roles in the classroom. As student responsibility increased, teachers were surprised at how successful and comfortable adopting the role of a facilitator was.
 - New forms of assessment such as peer feedback were not explicitly mentioned very often in case study data (despite being a core learning activity). However, survey data suggest that the LS had enabled teachers to assess in new ways.
 - The LSs led to increased opportunities for communication and a perceived improvement in students' communication skills.
 - Case study data suggest an increased use of technology, particularly for data capture, communication and collaboration. Students from seven of the 12 countries providing raw data (Estonia, Hungary, Israel, Italy, Portugal, Spain, and Norway) felt their use of technology involved

new digital tools and/or it had increased. This is not surprising given that 60% teachers made use of the TeamUp widget.

- Students perceived that group work had been beneficial (through sharing tasks and supporting each other), and that their autonomy had increased.
- There was a positive impact on teacher attitude, largely attributed to a more positive view of student-centred learning and being inspired by iTEC resources to experiment with new approaches.
- Despite being confident users of ICT prior to the start of the pilot, the majority of teachers felt that their ICT skills had improved.
- Teachers perceived that as a result of participating in the piloting process they would use ICT more often in the future.
- Most teachers felt that student motivation had been enhanced through participation. Students from six countries felt that lessons were more fun and interesting.
- Teachers reported that the LSs have the potential to have a positive impact on student attainment but also other outcomes such as the quality of learning, and skills such as reasoning and questioning, as well as making teaching and learning more efficient. Students from six of the 12 countries providing raw data (Austria, Hungary, Lithuania, Slovakia, Spain, Turkey) felt that the learning approaches introduced were more effective.

2. To what extent is each iTEC Learning Story and relevant iTEC technologies sustainable, transferable and scalable?

- The majority of teachers in Belgium, France, Hungary, Italy, Lithuania, Portugal and Slovakia who implemented the **Collecting data outside school** project were confident that the Learning Story had the potential to lead to innovation in the classroom.
- The majority of teachers in Austria, Finland and Hungary who implemented the **Working with outside experts** project were confident that the Learning Story had the potential to lead to innovation in the classroom.
- The majority of teachers in Hungary, Lithuania, Portugal and Slovakia who implemented the **Collecting data outside school** project were confident that they would implement the same Learning Story again.
- The majority of teachers in Austria and Hungary who implemented the **Working with outside experts** project were confident that they would implement the same Learning Story again.
- The majority of teachers in Germany, Hungary, Italy, Lithuania and Portugal who implemented the **Collecting data outside school** project were confident that they would recommend the Learning Story to other teachers.
- The majority of teachers in Austria, Finland and Hungary who implemented the **Working with outside experts** project were confident that they would recommend the Learning Story to other teachers.

- Data relating to scalability is limited but (unsurprisingly) training, technical support (preferably in school) and ICT infrastructure are considered to be essential; further consideration should be given to the best ways to gather evidence in relation to this in future cycles.
- It could be argued that the **Collecting data outside school Learning Story would have the widest appeal to teachers across Europe**, as most teachers chose it
 - Countries in which the LSs were most positively received and warrant further consideration in relation to mainstreaming are Hungary, Lithuania and Portugal. In all three the **Collecting data outside school** was piloted.
- It should be noted that the number of cohorts participating in all countries in Cycle 1 except Hungary and Lithuania was very low.

3. What are the enablers of and barriers to adoption of each iTEC Learning Story (including appropriate iTEC technologies)?

Enablers

- Experienced and enthusiastic teachers. Teachers' confidence in ICT and levels of ICT skills meant that they required little support. (This of course has implications for mainstreaming.)
- Collaboration between teachers and opportunities to support each other face-to-face as well as through online communities. Two teachers (one from Estonia and one from Turkey) indicated that networking with teachers beyond their own school had been particularly helpful.
- The TeamUp widget, particularly the group allocation facility and the student feedback function (newsflashes).
- Short exemplar Learning Stories (LS) provided by Work Package 3 as part of the resources for Cycle 1.
- Flexibility of LSs and fit to curricula, policies and practices. Both LSs were perceived to be easy to adapt to meet local needs.
- Intuitive technologies such as iPads which were perceived to be easy for (less experienced) teachers to use.
- Collaboration and communication tools such as Skype, email, online forums, social media. Skype and email were particularly important in relation to **Working with outside experts**. Online forums and social media were important in relation to co-ordinating the pilots.
- Training and support was an important enabler, particularly face-to-face workshops which 10 of the 17 National Pedagogical Coordinators⁴ (NPCs) specifically noted. Local online communities (as opposed to the central

⁴ National Pedagogical Coordinators are responsible for running iTEC pilots at national level and collecting evaluation data on behalf of WP5. They are supported by National Technical Coordinators who are responsible for ensuring that all required technical training and support is made available to teachers.

Teacher Community⁵) were also identified as enabling the co-ordination and support of the pilots. In Austria, United Kingdom, Estonia, and Hungary, video tutorials, on how to use the iTEC technologies for example, were identified as particularly useful.

- In two countries (Estonia and Hungary), students having ICT skills was seen to be an enabler.
- Engagement outside school. In relation to **Working with outside experts**, engaging with experts was seen to be motivating for students, particularly if the expert is a good communicator. Securing parental engagement was also an important enabler. Explaining the project aims and collaborating with parents was noted as being helpful in Turkey and Italy.
- School ethos and culture (as reported commonly in similar research). In particular, a supportive head teacher and a culture of valuing and encouraging innovation (through school policies and practices) were considered to be important.
- Unsurprisingly, well-resourced schools with reliable ICT infrastructure, good home access, one-to-one access (Turkey) and prior experience with technologies were seen to be enablers.

Barriers, challenges and drawbacks

- iTEC Technologies
 - The Teacher Community was a major challenge for many teachers and acted as a barrier for some. Teachers had difficulties registering, finding information and navigating the site, uploading documents, registering the classes which would be participating in the pilot (a separate process), and accessing the evaluation surveys.
 - There were a number of technical challenges in relation to TeamUp, including compatibility with browsers and recording both audio and video. Some schools did not have cameras or recording equipment which prevented them from using the Newsflash functions.
 - Security issues relating to TeamUp were noted in two countries in relation to storing students' personal details online.
 - Accessing TeamUp in English (rather than national language versions) was a challenge for some students.
- Insufficient ICT infrastructure, particularly noted in Estonia, Hungary, Norway and Slovakia. It includes lack of ICT equipment, broken equipment, lack of technical support, lack of Internet access or unreliable access, limited access to ICT equipment (having to book ICT suites) and lack of one-to-one access for students.
- Difference in provision at school and at home. Issues noted by teachers were that some students had no access at home, older software, or no Gmail account (required for site registrations).

⁵ The Teacher Community was a central, online environment designed to support NPCs and all participating teachers providing information and facilitating discussion.

- Other technical issues such as compatibility between student smartphones and school computers, specific tools such as Google+, lack of teacher technical skills and appropriateness for younger age groups.
- Insufficient time to undertake projects (constrained by length of pilot). 27% of responses to the survey identified lack of time or timing issues as the main problem faced in the implementation. Information was received later than expected and after curriculum plans had been finalised for the year. Some teachers noted that they would normally run projects (such as those offered in Cycle 1) over a period longer than the four months allocated for the cycle.
- Lack of support and training (experienced by a minority). 14% of responses to the survey suggested that teachers had received no support from the NPC/NTC and 2 case study teachers also mentioned the lack of training/support (technical, face-to-face, supporting documentation, exemplars). Teachers who could not speak English also felt disadvantaged as they were aware that this prevented some access to peer support via the Teacher Community.
- Lack of perceived innovation from a minority of teachers, who perceived that there had been no changes to pedagogical strategies or use of technology. In the survey 2% of responses suggested that the LS offered no benefits. Ten individual teachers from five countries perceived that the LS did not have the potential to lead to innovation in the classroom. It is not surprising to receive these views given the number participating in Cycle 1 and the bias towards innovative and experienced teachers.
- Students adapting to unfamiliar pedagogical approaches, particularly group work and collaboration. They experienced difficulties relating to organisation and management, division of tasks, and reaching shared consensus. Some students said that they prefer working on their own.
- Parental concerns relating to attitudes towards technology, out of school visits and interacting with experts. Parents were concerned that spending time using technology and the different pedagogical approach was not beneficial. In both countries where this emerged as a particular issue (Spain, Turkey), by the end of the project parents were pleased with the outcome and the opportunities that their children had enjoyed.
- Policy issues such as particular rules about taking students off site during school hours in some countries. In Norway there are currently regulations regarding the use of mobile telephones. In France, the administration requirements in relation to seeking permissions from authorities, schools and parents took a lot of time.

4. To what extent is each Learning Story and relevant iTEC technologies fit for purpose? (usability; connection to current practice; what works and what doesn't work)?

- Generally the Learning Story/Learning Activity resources were perceived to be fit for purpose, only requiring translation in relation to localisation. However, in

two countries (Belgium, UK) the documents were considered to be lengthy and unwieldy.

- The Learning Stories and Learning Activities were sufficiently flexible such that teachers could select aspects to suit their needs.
- The Teacher Community was not fit for purpose (as described above). It was redeveloped for Cycle 2.
- TeamUp suffered from a number of usability/technical issues. However, given that it was presented as a prototype and that teachers were positive about its potential, it should be developed further. Indeed, this happened and an updated version was presented in Cycle 2.

5. What are the benefits and shortcomings of the piloting process (including the development of technical and pedagogical knowledge and skills)?

- The Teacher Community was used by NPCs but there was little use by teachers primarily due to problems with registration and navigating the site. However, teachers recognised the potential benefits of such provision.
- In many countries local online communities were used effectively to facilitate piloting but did not enable teachers to network internationally.
- Localisation of resources involved selecting and presenting relevant material, which was translated into the local language. Some NPCs felt that iTEC project documentation was overlong and unwieldy.
- Face-to-face meetings were perceived to be beneficial both by NPCs and teachers. Teachers in the case study interviews indicated that they enjoyed meeting other teachers and seeing examples of LS implementation in practice.
- E-learning resources such as video tutorials were also well-received. For example, in Estonia tutorials on how to use TeamUp were created and uploaded to YouTube.

Introduction

The data collection and analysis undertaken by Work Package 5 at the end of a cycle represents the end product of a process to which many iTEC colleagues make substantial inputs. The Ministries of Education play the leading role in the setup and oversight of the pilots and the collection of the data.

To organise access to schools by native-speaking educationalists, familiar with national policies and priorities, each Ministry has identified a National Pedagogic Coordinator (NPC) and a National Technological Coordinator (NTC) who arrange and support the pilots. In a number of countries it has been possible to identify persons able to combine these two roles, but where this has not been the case, the co-ordination of the piloting process and the data collection visits for the evaluation are undertaken by the nominated NPC.

The nine scenarios (narrative descriptions of innovative pedagogical approaches to learning including technological tools) developed for the first cycle by Work Package 2, followed a design methodology that builds on the Delphi method. This involved a group of experts and stakeholders who followed a series of prescribed steps and worked together to construct scenarios which reflect the interests of the group and are designed to encourage and support the introduction of new practices.

Work Package 3 (WP3) then pre-piloted the scenarios with teachers (in 18 classrooms across 7 countries) following a participatory design methodology, with focus groups, and other activities, to produce prototypes for piloting with Learning Activities and Learning Stories. These along with tools and other resources are thus also the outputs of an iterative process with a high level of user engagement, drawing on the significant pedagogical and technological expertise available to the consortium. In iTEC, a Learning Story (LS) is a narrative overview of learning developed from the more abstract educational scenario. A Learning Story may include several Learning Activities (LAs) and shows how they might work together. The learning activity, a concrete description of a learning sequence, can be supported, either partially or completely, by a set of provided technological tools.

WP3 also designed and implemented “TeamUp” as a technical prototype and they also produced a brief visual user manual to accompany it. This was the only iTEC technology provided for Cycle 1 to use in the implementation of the LS. This tool enables teachers to generate teams of students, either teacher-defined or randomly generated. Teachers and students can generate topics or themes and then the students can indicate their preference. Teachers can also identify other relevant characteristics such as gender. Teams can then be formed based on the team size required, and whether or not students should be matched to their chosen topic or assigned to groups based on certain characteristics. TeamUp also offers the facility for teams to record 60 second newsflashes about their progress.

The NPCs and their pilot schools are supported by Work Package 4 (WP4) who have established the online teacher's community, plus a helpdesk for support with registration, technical problems etc. They also provided induction briefings and mid-pilot follow-up interviews. Drawing on the experience of Cycle 1, WP4 are also providing additional support for the learning activities, and guidelines for the operation of subsequent cycles. The complementary work on teacher skills and competence development for classrooms of the future is also undertaken within WP4.

Although they are education experts, NPCs are not professional researchers and support for the data collection element of their role has been provided by Work Package 5 (WP5) through induction briefings and the provision of a detailed Evaluation Handbook that has been updated to reflect the experience gained in Cycle 1. Data collected in Cycle 1 included, in each participating country, 2 teacher online surveys (about their current uses of ICT and about the implementation of the Learning Story), 3 case studies (lesson observation and interviews with teachers, students and the head teacher) and interviews with the NPCs.

Technical support for the pilots is provided by Work Package 6 (WP6) who conducted both a developers' workshop and a workshop for NPCs and NTCs ahead of the first cycle and developed a set of training materials to support and motivate the NPCs, NTCs and pilot teachers. Topics include the set-up of the iTEC Moodle platform, how to set up a shell environment and the embedding of external resources and services

What follows in this report are the findings of the evaluation of Cycle 1 pilots in relation to benefits, enablers, barriers, challenges and drawbacks. In conclusion, evidence to support sustainability, transferability and scalability is presented together with recommendations for project partners and policy makers.

Context

17 countries participated in Cycle 1: Austria, Belgium, Czech Republic (Associate Partner), Estonia, Finland (Associate Partner), France, Germany (SMART partner), Hungary, Israel, Italy, Lithuania, Norway, Portugal, Slovakia, Spain (SMART partner), Turkey, United Kingdom (Promethean partner).

278 sets of questionnaires (About You and Your School, Teacher Questionnaire) were completed (see Appendix B). 16.8% were from Hungarian teachers and 30.5% were from Lithuanian teachers. In some countries, only a very small number of teachers provided survey data (in many cases the total number of teachers participating in the pilot was low). To account for the different numbers of teachers responding to the surveys from each country a weighting factor has been applied (where appropriate) to counteract the weighting that arises through uneven

representation when reporting aggregated teacher perceptions. However, this does not account for the decrease in reliability that occurs with small sample sizes (applicable to the majority of countries engaged in Cycle 1 pilots). This is a limitation of the data reported here as variability between countries is likely to be high given cultural and resourcing differences.

13 countries participated in pilot case study data collection which included lesson observations, interviews with the teacher, head teacher and students. Each NPC chose three teachers as case study teachers. The case study teacher also produced a multimedia story documenting the piloting experience. The NPCs produced a case study report for two of the three case studies that they conducted, and provided transcribed and translated raw data for the third case study.

Respondents were experienced and ICT competent teachers with only 9% having been in the profession for five years or less, and 32% having more than 20 years' experience. In addition 76% of teachers were based in schools that were also involved in other similar initiatives, indicating school level support of innovation and change. The majority of these teachers use a range of technologies regularly (at least weekly) including office productivity tools, browsers and search engines, data management tools, and communication/collaboration tools. Furthermore, data from the NPC interviews confirms that in many cases teachers were known to be competent users of ICT and innovators. Many NPCs indicated that this choice was deliberate to maximise the chances of success in the first cycle.

Following pre-piloting and development by Work Package 3, iTEC presented two Learning Stories for piloting in Work Package 4. The **Collecting data outside school** LS requires learners to collect data (scientific, multimedia) outside the classroom (which includes the school grounds). Teams of students plan a project, collect the data and analyse it, documenting their progress. The **Working with outside experts** LS requires teams of students to collaborate with outside experts via communication technologies. Prior to the event the students are required to design the focus of the task, interaction protocols and the responsibilities of the expert. Experts may provide feedback to students and/or contribute to assessment processes.

The **Collecting data outside school** project was the most popular Learning Story. Seven NPCs chose a single Learning Story (LS) to present to the teacher. Of these, six NPCs chose the **Collecting data outside school** project giving reasons such as: fit to the curriculum and practice, scope for variety and adaptability, and because prior experience of the LS had been gained through pre-piloting. Two NPCs felt that organising access to an expert would be time-consuming and therefore not practical in the short timescale for piloting. Only one country offered just the **Working with outside experts** LS, partly because it was the only aspect which was innovative for the two (experienced) teachers involved. Ten NPCs offered both Learning Stories to the teachers and allowed them to choose whichever one they preferred. In some cases, teachers reported that they had combined both LS options together.

Some countries chose to start Cycle 1 on a small scale, identifying and selecting teachers from known networks of innovators with prior experience of projects. In Hungary and Lithuania, open calls for participation were circulated resulting in higher than anticipated levels of participation. Although this was positive, it did cause some issues for the NPC/NTCs. For example, the Hungarian team were not able to follow progress of all individuals and had to employ more people to provide technical support and guidance. In Lithuania, high attendance at workshops meant that two teachers had to share a computer for hands-on training.

The **Collecting data outside school** project was undertaken by 203 cohorts; **Working with outside experts** was undertaken by 37 cohorts; teachers suggested that they had combined the two Learning Stories (LSs) for 11 cohorts; in Lithuania 21 cohorts piloted one of the original scenarios developed in WP2, Online Repositories Rock. Information on which LS was piloted was not received for 6 cohorts.

Exemplars: the multimedia stories

All case study teachers were required to produce an iTEC Multimedia Story (iMmS) in order to capture and share their experiences of their engagement with the iTEC Learning Stories and Learning Activities. Other iTEC teachers were offered the opportunity to write a multimedia story as long as it followed the iTEC guidelines set out in the iMmS Guidance Handbook that was made available on the Teacher Community site.

Further guidance and support was offered via online video tutorials that provided information about how teachers could share their stories on the Teacher Community site. However, because teachers experienced problems when registering with the Teacher Community, only a limited number of iMmS were uploaded on the site. In most cases where teachers experienced problems, NPCs ensured that the iMmS were shared on local networks.

Teachers were offered the choice of how to tell their story; a diary-style blog, which they were expected to begin to write at the start of their iTEC experience, or a reflective journal-style presentation, which they were expected to write at the end of their experience.

29 case study teachers wrote a multimedia story from 11 of the 14 countries which participated in the case studies; 20 chose to write journal-style presentations and 9 chose to write diary-style blogs.

Outlines of two case study teachers' iMmS are provided below (one presented as a blog focusing on the **Collecting data outside school** LS and one as a presentation focusing on the **Working with outside experts** LS). These provide vignettes of how the LS were adopted and implemented in practice.

Meeri Sild, Estonia: Outdoor Learning in the English curriculum

The blog is written in Estonian; Google translate provided some assistance with understanding the teacher's and students' experiences. The blog covers a period of seven weeks. Meeri begins with an outline of the training received at the start of her involvement in iTEC. She includes a link to a set of video tutorials about TeamUp that were developed and presented by the NPC.

Her first few entries describe the setting up of iTEC lessons for an English class. She says that "although the students were a bit doubtful", they liked "the idea that you can learn outside the classroom." She explains that she had discussions with the students about what topics they could cover outdoors and that they agreed on an exploration of their locality beyond the classroom. Their themes were:

- Emotions
- The Old Town
- Architecture
- Labels in English
- Graffiti: Art or Not

They also discussed how they would capture their environment under these heading and agreed that photographs could be put into group presentations. The students used Fliptime (3), Prezi (1) and Photo Peach (1) for presenting their findings; all are accompanied by music. Meeri expresses her surprise that the students did not complain about the TeamUp groupings. In her final two entries, Meeri allows the student voice to express their experiences; in the penultimate entry she includes links to their presentations and in the final entry she provides a downloadable student review of their iTEC experiences. Most evident from the presentations is the students' creativity and expressiveness.

Didem Yilmaz, Turkey: Working with outside experts in the English curriculum

Didem tells the story of how she and her 48 students used TeamUp to engage in 12 hours of iTEC teaching and learning (8hrs in school; 4hrs outside the school). The groups of students planned activities (which included meetings with experts related to their group's topic) around the following themes:

- Tourist attractions
- Holiday activities
- Protecting our school
- Improving one's look
- Practising English
- How to improve English

The students shared their plans and communicated with each other via blogs and Facebook. As well as uploading videos and documents to their blogs, they also recorded “announcements to the voice thread and voki avatars.” In her iMmS presentation, Didem includes links to the students’ blogs and shows screenshots of their communications. There are also photographs of her students talking to experts in their own workplaces. Students also used Skype to talk to experts as well as meeting them face-to-face. The students reviewed each other’s work and provided feedback via the blogs. There is evidence in the students’ work of social networking and collaborative learning.

Some of Didem’s concerns that she shares at the end of her presentation include:

- Our curriculum topics are hard to be hand in hand with this kind of learning story.
- Not every single student has Internet access at home.
- Some parents don’t let students go outside on their own.
- As our classes are so crowded, it is difficult to mentor each of them individually.

EQ1) To what extent does each iTEC Learning Story and relevant iTEC technologies benefit learning and teaching (for teachers, for learners, for others)?

Benefits

Data from the survey and case studies were examined to identify evidence relating to perceptions about the benefits of the LSs. They are presented here in relation to pedagogy (including technologies as a pedagogical tool) and in relation to teachers’ and students’ attitudes, ICT skills and knowledge.

Pedagogy

Teachers perceived that the LSs had introduced a range of different pedagogical strategies. In an open question in the survey about the benefits of the LS, 21% of responses referred to changes in pedagogical practices or the introduction of new approaches. Furthermore, 80% of survey responses (weighting applied) agreed that the LS led to new pedagogical practices (Figure 1) and opportunities to do things in the classroom differently. 86% of survey responses (weighting applied) suggested that the LS presented exciting opportunities to do things differently in the classroom.

Student interview data also supported teacher perceptions. Most students referred to the benefits of group work (sharing tasks, supporting each other) and increased

autonomy/responsibility. Students from Hungary and Spain felt that learning they had been more active as learners. Students from Portugal enjoyed project work. Students from Slovakia felt that learning had been more creative.

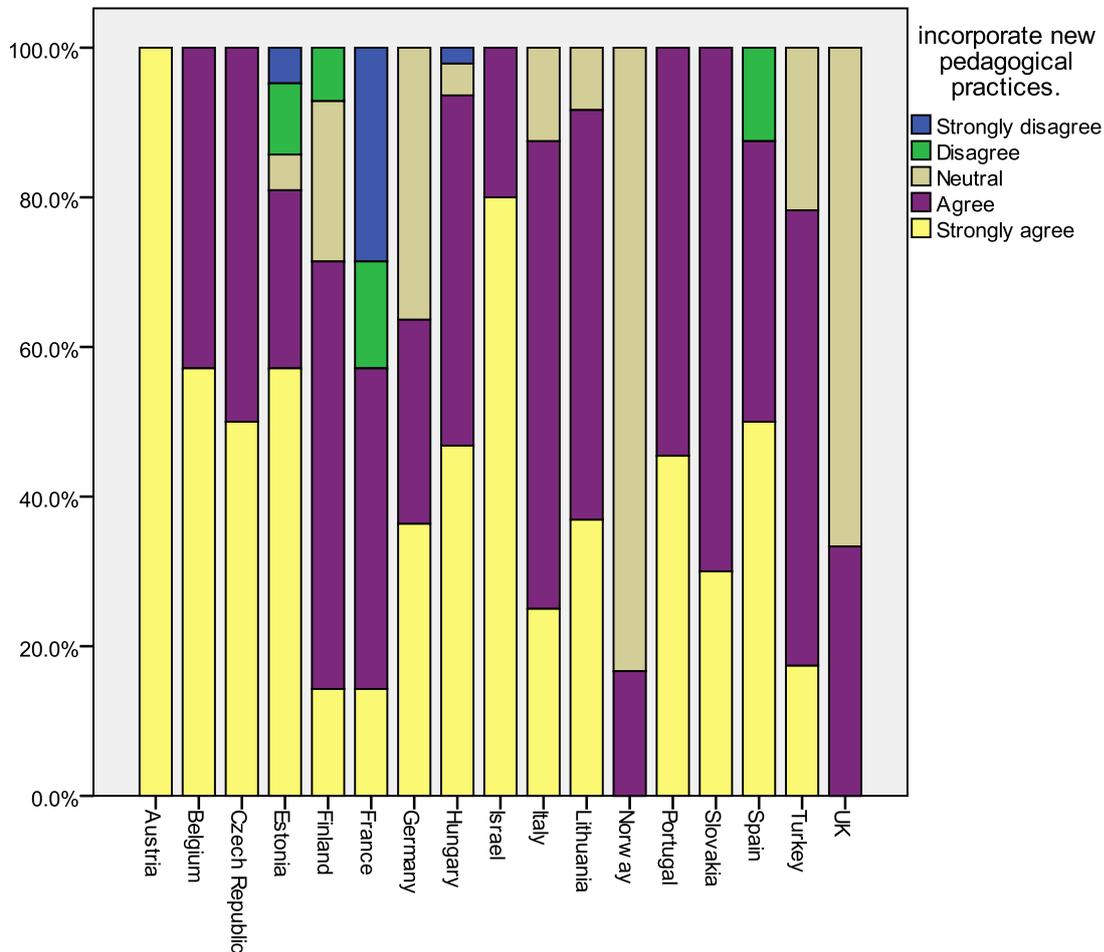


Figure 1: The implementation of the LS enabled me to incorporate new pedagogical practices (% of responses by country)

Of course, not all teachers felt that the LS enabled them to incorporate new pedagogical practices. A small number of teachers from 11 of the 17 countries disagreed or were neutral about this. Most notably, indifference or disagreement came from the majority of responses in Norway (5 of 6) and the UK (2 of 3), and at least a quarter of responses in Finland (4 of 14), France (3 of 7) and Germany (4 of 11). The remaining countries were Estonia, Hungary, Italy, Lithuania, Spain and Turkey. It should be noted that given the bias towards innovative and experienced teachers, it is not surprising that, for some, the experience did not involve new pedagogical practices.

Unsurprisingly, there were lots of references in the case study data to **engagement outside school**, either due to bringing in experts or to visits outside school. A small number of teachers (in relation to 11 cohorts) combined the two aspects. With regards to bringing in the experts, it was noted that it is important to set up the

encounters carefully, thinking through the pedagogy. In addition, the relationships between students and experts were seen to be important and needed careful guidance. For example, in Austria two controversial debates between keynote expert speakers were considered to have facilitated engagement and rich discussions. Students enjoyed the opportunity to interact with experts and felt that the experiences enhanced their knowledge and understanding.

Here there are people who come into the class... people who are journalists, photographers, illustrators... I, I really like it because we discover lots of jobs, which we didn't really know about before. (France, student interview)

As well as engaging students, visits outside school were considered to support a community based approach to teaching and learning (positively addressing integration and inclusion issues) as well as grounding learning in every day experiences.

Students had to go to the city and search for development of population in the capital city through the centuries and they also have to notice geographical features (the narrowest street in the city, ...). The students were divided into groups by TeamUp. They have to interview citizens. The interviews were developed by students. They used PCs at school and at home. They used cameras to take pictures to demonstrate their research. (Slovakia, case study report)

The majority of responses (88%) suggested that the LSs led to more opportunities for **collaboration** and 89% indicated that students had used digital tools to support collaboration (weighting applied) (Figure 2).

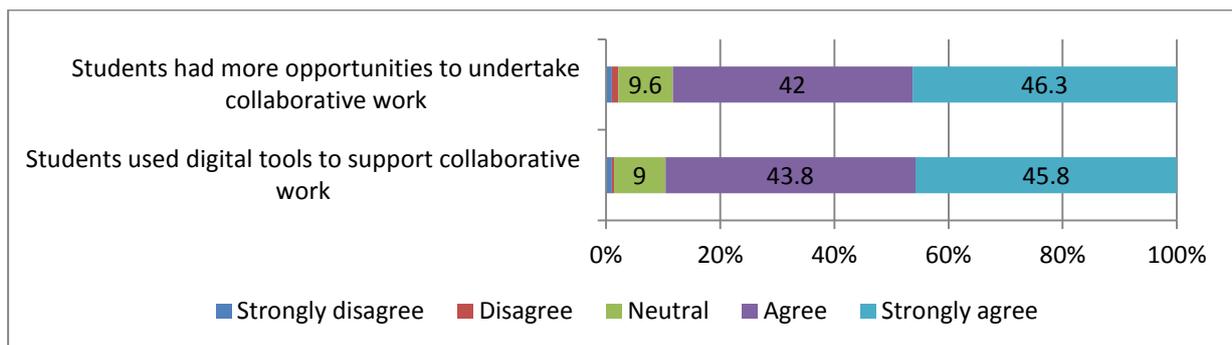


Figure 2: Perceived impact on collaborative work

However, this is not surprising given that a LA on collaboration was embedded in both LSs. There were some challenges but it was generally seen as positive by teachers and learners. Students enjoyed working in groups and felt that TeamUp had contributed to this. In an open-ended question in the survey on benefits, 24% of responses identified increased collaboration/teamwork. Many specific benefits of this approach emerged from the case study data including enhanced motivation, knowledge building and development, improvements to the social side of learning (for example, relationships and interactions, classroom ethos). Teachers in France

referred to interactions being ‘real’ and students improving their relationships with their peers with whom they had not worked before. Students found it more fun than other (traditional) approaches which, for example, a Turkish student described as ‘monotonous’.

ICTs support the learner as a whole. Not only cognition, but also affection, emotionality. Those are the aspects that are important in our schools. [...] Without ICT we could not even think of building alternative learning environments where every student feels included and participant as a whole. Where every student can contribute as an individual but in a way we reach common objectives and we share and exchange our attitudes and efforts. (Italy, head teacher interview)

My participation in the project has changed my pedagogical approach because I could achieve the student-centred education and students’ collaboration. (Turkey, teacher interview)

What I really like are the things we do, well, we’re not alone, by ourselves... We’re in groups, everyone has things to do. If, for example, at the end, we write texts to say who came, when, to say what we’ve done, so it’s with several people... it’s better than being alone and not knowing what to do. (France, S interview)

Teaching creatively is associated with innovation and doing things differently in the classroom together with its impact on student motivation (Figure 3). 70% of responses (weighting applied) agreed that participation in Cycle 1 piloting enabled them to develop their own creative skills. 5% of survey responses to an open ended question in the survey mentioned increased variety in the classroom as a benefit. 77% of responses agreed that there was a positive impact on students’ attitude and 82% agreed that students were deeply engaged in their work (weighting applied).

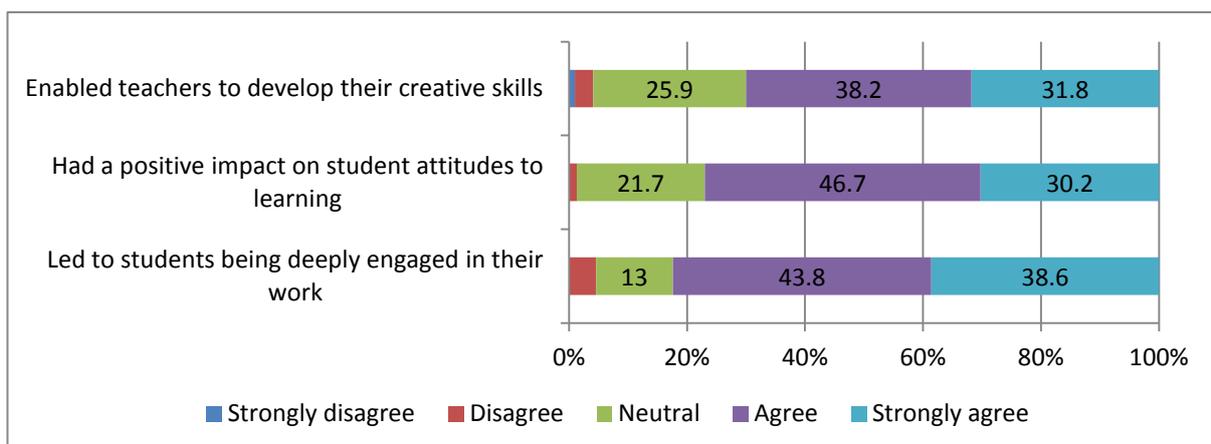


Figure 3: Impact on teaching creatively

One of the benefits emerging from the case study data was opportunities for experimentation. Experimentation and innovation, and making learning interesting

are seen by Jeffrey & Craft (2004) as aspects of teaching creatively. In the survey data, 32 teachers mentioned that the LS made the teaching and learning more interesting, and/or that it was innovative.

The iTEC project is important because it enables the experimentation of new learning scenarios therefore models alternatives to the traditional approach. So the pupils have the opportunity to experiment new ways of learning and be protagonists in changing contexts and integrating new and old resources. (Italy, head teacher interview)

...despite all the obstacles, I don't see myself getting stale, because I've tried and [...] I'm convinced there will be good results. I'm going to carry on experimenting to see, and I'm sure I will change my practice in that sense. (Portugal, teacher interview)

The survey data suggest that teachers felt that the LS led to **creative learning** (Figure 4). 88% of responses (weighting applied) suggest that the LS enabled creative activities to take place and enabled students to develop their creative skills. In addition, 87% of responses (weighting applied) suggest that the LS enabled students to express themselves in new ways. It is surprising that there were few references to this in the case study data. However, creative learning is linked to engagement, innovation, active learning and student participation which did emerge from the case study data.

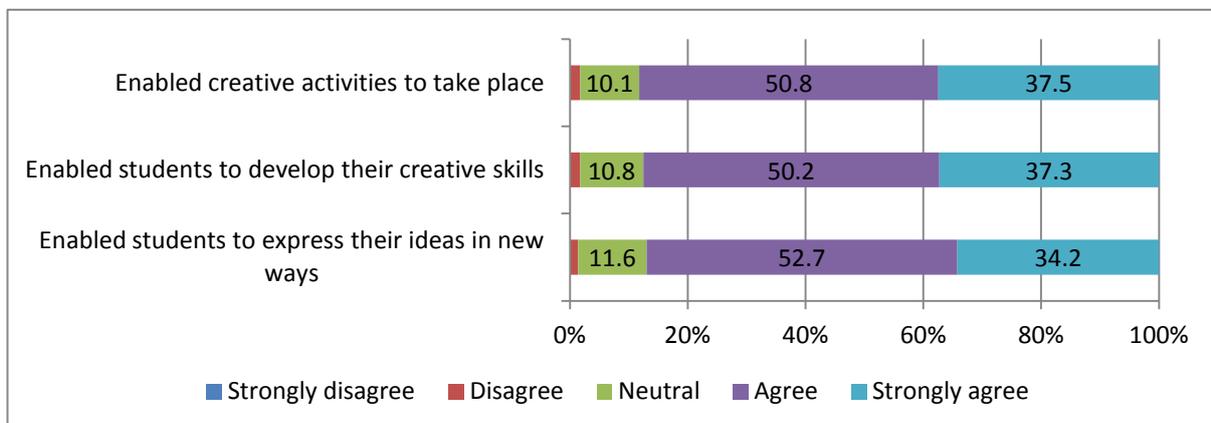


Figure 4: Impact on creative learning

With regards to **student-centred pedagogical strategies** (Figure 5), a range of themes emerged around active learning, learning to learn, knowledge building, student autonomy, drawing on students' interests, and student choice. 88% of responses suggest that students were actively involved whilst 70% suggested that students could work at their own pace (weighting applied).

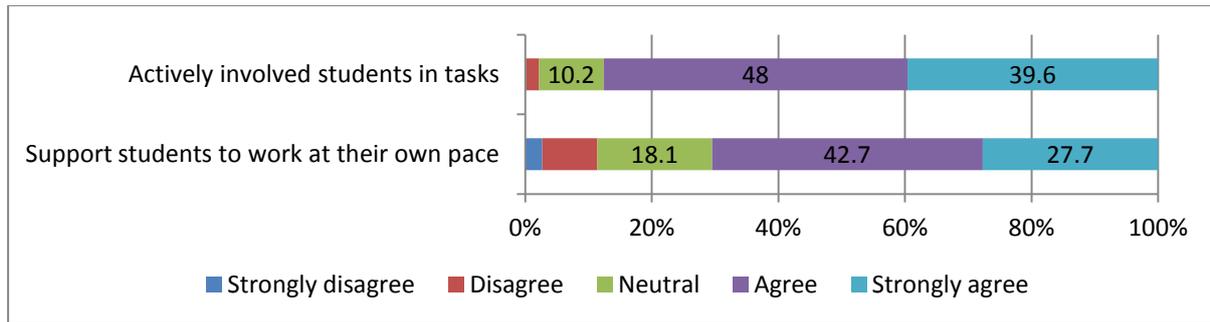


Figure 5: Impact on student-centred approaches

In the survey data in response to an open question on the benefits of the LS, 7% of responses referred to promoting active learning, 8% referred to promoting student-autonomy and 4% mentioned facilitating authentic tasks. Student choice and participation was a commonly occurring theme in the case study data. The LSs were considered to facilitate opportunities to draw on the students own cultures and interests. Students enjoyed the additional responsibility for their own learning and enjoyed sharing their knowledge with each other. Students in Norway even contributed ideas about how to do things differently in the classroom according to one case study teacher.

The students that were interviewed explained that the commitment and motivation they felt was due to the fact that they were given much responsibility and freedom of choice and were dominant in the preparation of materials for the lessons. (Israel, case study report)

Students feel very proud of themselves because they have worked alone, because they have been able to collaborate and because now they think that they are able to have a conversation with an expert. (Spain, teacher interview)

According to the school head teacher, experiments like this bring a positive new approach in schools, where teachers are no longer mere 'bearers of knowledge', and pupils 'become partakers of the construction of their knowledge' ('there isn't a lesson ready to receive'). (Italy, case study report)

As there is task-sharing in the groups we learn to take responsibility and it becomes easier to exchange information from each other. (Turkey, student interview)

Student autonomy and participation relates to the **changing roles** of teachers and students in the classroom (Figure 6). 79% of responses (weighting applied) suggested that the LS had enabled teachers to explore different teacher/student roles and relationships in the classroom. As student responsibility increased teachers in iTEC were surprised at how successful and comfortable adopting the role of a facilitator was.

...the students, after ten minutes of getting used to it, structured the lessons on their own and were very engaged by that. The role of the teacher was to completely step back and serve as a coach only if needed. Much to the surprise of everyone, the teachers were not that much needed during the committee meetings. (Austria, case study report)

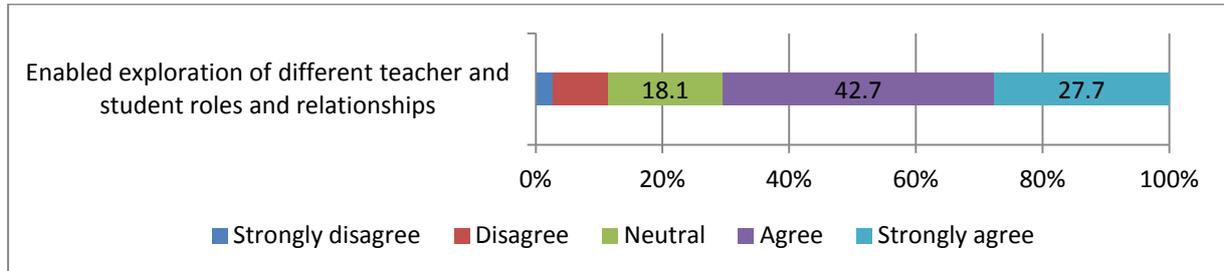


Figure 6: Impact on roles and relationships

For those undertaking the **Working with outside experts** LS, some case study teachers felt that making contact with experts raised students' self-esteem. In some cases young people were recast as experts. Student voice was mentioned fairly frequently in the case study data in relation to decision making, voicing opinions and being listened to. In the open question on the benefits of the LS, 3% of responses referred to different teacher-student relationships and 1% mentioned that peer-support was a benefit. Case study teachers also noted that collaboration had a positive impact on relationships between peers. In addition, peer feedback (students in the role of teachers) was useful.

Teacher student interaction can be realised everywhere and every time and this gives learning freedom to the students. Students could easily follow each other's work and found peer feedback valuable. (Turkey, head teacher interview)

New forms of assessment such as peer feedback were not explicitly mentioned very often in the case study data despite peer feedback being one of the Learning Activities. However, in the teacher questionnaire 80% of responses (weighting applied) suggest that the LS had enabled teachers to assess students in a new way (Figure 7).

Once in history lesson we were in the club, everybody was some historical person and teacher asked us questions and we had to react as the person would. This was assessed and it was very interesting. (Slovakia, student interview)

A discussion forum was started on [the VLE] for the students to give positive feedback on the materials. Students were given ground rules that they should given constructive feedback and positive comments. They really enjoyed using the forum to give comments about the resources and each other's resources. (United Kingdom, teacher evaluation)

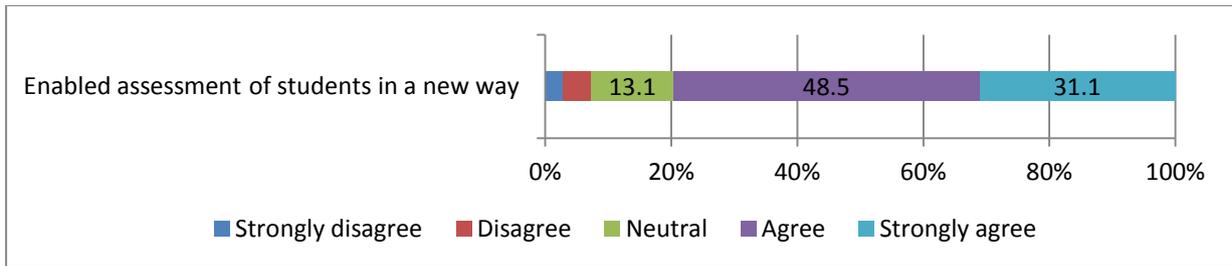


Figure 7: Impact on assessment

The LSs were perceived to have led to improved **communication** (Figure 8). 74% of responses (weighting applied) suggest that the students communicated with each other in new ways. 64% of responses (weighting applied) suggest that the students communicated in new ways with the teacher. 53% of responses (weighting applied) suggest that the students communicated in new ways with the wider community. When considering only the responses from teachers who implemented the **Working with outside experts** Study 83% (no weighting applied) of responses suggest that the students communicated in new ways with the wider community.

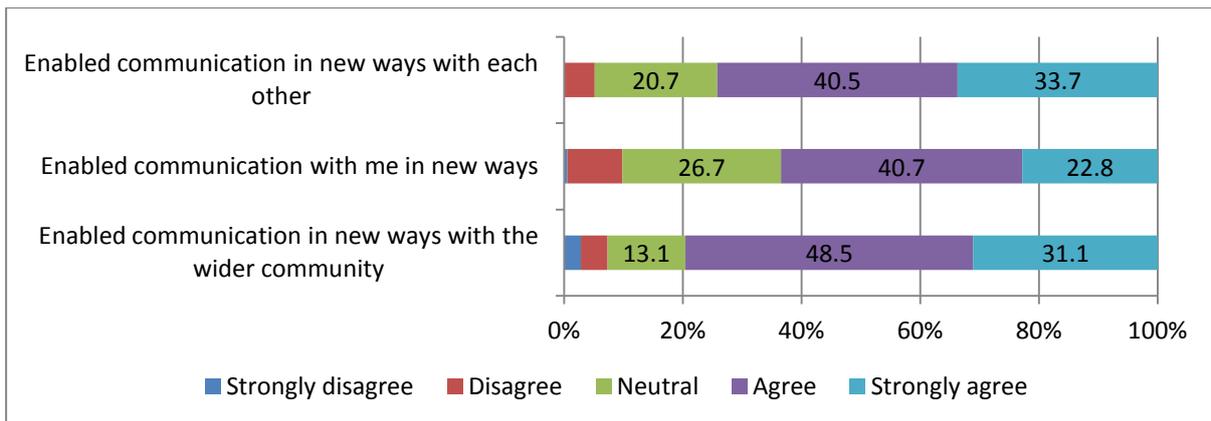


Figure 8: Impact on communication

As well as forms of communication, survey and case study data suggest that there were increased opportunities for communication and that students' communication skills were improved. Teachers mentioned the increased use of technology to facilitate communication outside the classroom, particularly social networking sites such as Facebook. Teachers also noted that communication with their peers had been beneficial.

I think that I have also improved myself as a teacher. We are able to enrich our works with the works and examples of other teachers. By giving feedback to each other about our sharings on twinspace and Facebook group we have the chance to improve our works. (Turkey, teacher interview)

Of course, **technology** was part of the teachers' repertoire of tools to support the implementation of the LS, irrespective of which one they opted for. Case study data

suggest an increased use of technology particularly for data capture, communication and collaboration. This is not surprising given the nature of the LSs and the adoption of TeamUp (by teachers of 60% of the cohorts) which was seen to support student collaboration and group work (Figure 9). Students from seven of the 12 countries providing raw data (EE, HU, IS, IT, PT, ES, NO) noted that their use of technology in the classroom had increased and/or involved new digital tools.

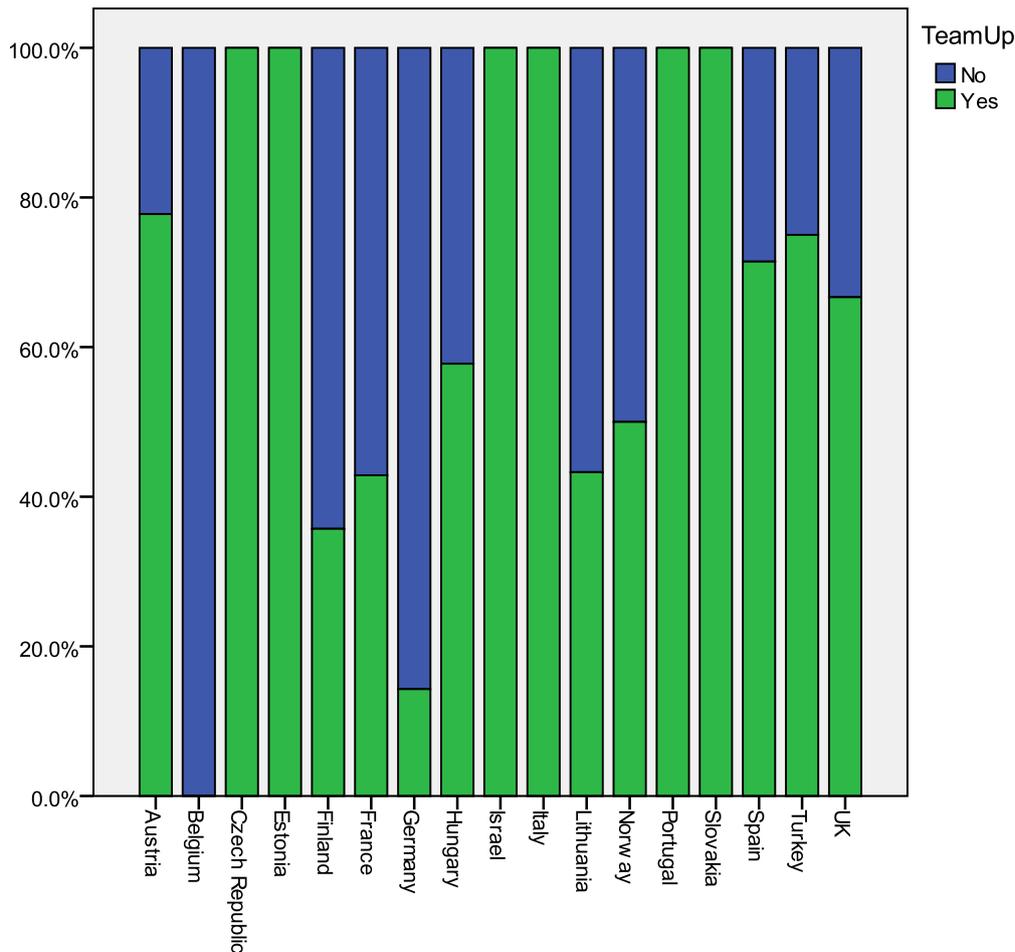


Figure 9: Use of TeamUp (% of teachers in country)

TeamUp was used by most/all teachers in Austria, Czech Republic, Estonia, Israel, Italy, Portugal, Slovakia, Spain, Turkey, and the UK (based on one response only from each teacher). At least half the teachers in Hungary and Norway, and over a third of teachers in Finland, France and Lithuania. Although TeamUp was seen to be a barrier by many teachers and National Coordinators because of initial teething problems, once solved most people were positive about the tool. Of the teachers who used it, almost one third of teachers felt it was easy to use and offered benefits compared to other digital tools. One in five teachers agreed it was essential and offered benefits compared to other digital tools. Students in Slovakia noted that TeamUp had been useful for allocating teams.

Technology per se was not seen as the core focus of the project – most teachers understood that it is the way in which technology is integrated and the pedagogical strategies that such tools facilitate that is important. Students and teachers mentioned that the technology was motivating, but they also spoke about working together and collaborating as equally important. In addition, technology was seen to make linking home and school easier.

The teacher experienced that her pupils were very much motivated by the use of technology. [...] Pupils love the possibility to use technology and they told us that the English class is unique from this point of view: they don't use web 2.0 tools in other classes, neither do they have online access to learning materials. (Hungary, case study report)

I did not need to use Internet and computer out of curricular purposes with the application of this kind of learning. I was chatting and communicating for social purposes. Now I do not need social networking sites. Rather, I am doing school homework with my friends on the Internet. Also, I'm using social networking sites to share information purposes with my classmates. (Turkey, student interview)

Teacher attitudes, ICT skills and knowledge

Participation in Cycle 1 pilots led to a positive impact on **teacher attitude**. Teachers were generally enthusiastic about being involved in iTEC and found that it was motivating in relation to their professional development. 66% of responses (weighting applied) agreed that the experience had made themselves more enthusiastic about their jobs (Figure 10).

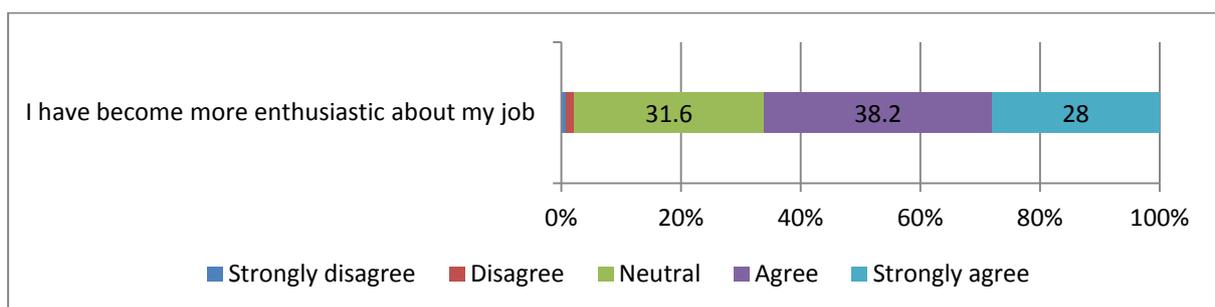


Figure 10: Impact on teacher attitude

In the open-ended question about benefits, 3% of responses mentioned increased teacher motivation specifically as a benefit. In the case study data, the shift in attitude was largely attributed to a more positive view of student-centred pedagogies. Teachers mentioned that being involved with iTEC inspired them to experiment with new approaches, that they found this stimulating and that it helped them to develop

professionally. Much of this development was related to changing relationships and pedagogies of student-centred learning.

There seems to be a definite change in the teacher’s attitude towards teaching, in the sense that he now envisages using a more student- and problem-based approach. (Portugal, case study report)

Case study and survey data suggest that most teachers in Cycle 1 seemed to be confident users of ICT. Despite high levels of expertise prior to the experience, the majority of responses (75%, weighting applied) suggested that teachers had developed their **ICT skills** and their understanding about how to use it to support teaching and learning (Figure 11). 5% of responses suggested that teachers’ development of ICT skills was a benefit of implementing the LSs. 75% of responses (weighting applied) suggested that teachers’ knowledge of the pedagogical use of ICT had increased. 78% of responses (weighting applied) suggested that teachers’ understanding of the potential of ICT had developed. 69% of responses (weighting applied) suggested that teachers’ understanding of the different ways that students learn had developed. 45% of responses (weighting applied) suggested that teachers had also used other digital tools which they had not used before. Finally, 88% of responses suggested that teachers will use ICT more often in the future.

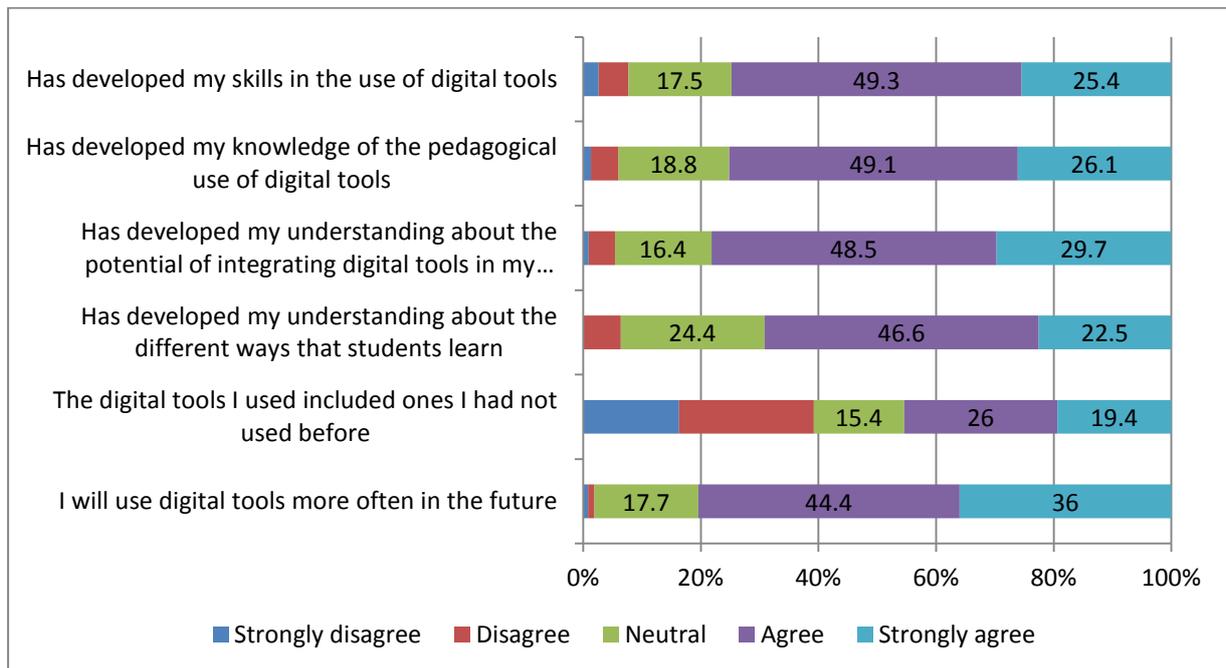


Figure 11: Impact on teachers' use of ICT

My pedagogical approach has not changed, but received another aspect. I am a teacher always looking for different ways of teaching, in order to vary and to ensure that students do not get bored in class, will not be set back in schoolwork and find more interest in the lesson. Combining different methods, different tools and expanding my horizons in the field always helps to learn better and better. (Italy, teacher interview)

Student attitudes, ICT skills and knowledge

The student experience in Cycle 1 had a positive impact on **student attitude**. As with much research on the use of ICT to support teaching and learning in the school sector, most staff involved in the Cycle 1 case studies refer to the LS making learning more motivating and fun for their students. 77% of responses (weighting applied) suggested that teachers felt that the LS had a positive impact on students' attitudes to learning (Figure 12). In the survey, 20% of responses mentioned increased motivation in the open-ended question on benefits. Students from six countries described how their experience of the pilot had made learning more fun, exciting and varied.

The impact on students' **ICT skills** was not clear cut. Some students said they had learnt new skills, others not, some were surprised at what they had learnt because they thought they knew a lot already. Some students felt they had been encouraged to use ICT for educational purposes rather than just for leisure purposes. 9% of responses to an open-ended question on benefits of the LS mentioned that students increased their digital skills.

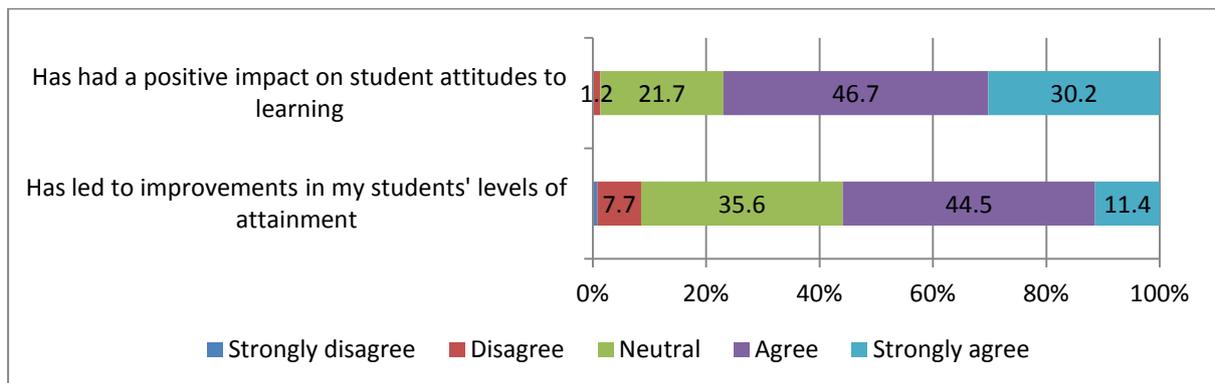


Figure 12: Impact on student attitude and attainment

56% of responses (weighting applied) agreed that the LS had led to improvements in students' attainment (supported by their assessment data) (Figure 12). Case study data suggest a potential positive impact on **student attainment**, although with acknowledgement that it was hard to tell at this stage. In the open-ended question on benefits, 18% of responses referred to improved outcomes (quality of learning, knowledge, improving skills such as reasoning and questioning, effectiveness/efficiency in relation to learning). Students from six of the 12 countries for which raw data were provided (AT, HU, LT, SK, ES, TR) felt that their learning had been more effective.

We had possibilities to improve our practical skills. We liked working together, collaborating, creating web-pages, photos, film. We have got a lot of positive

assessment, high scores – it's especially inspired us. (Lithuania, student interview)

Bearing in mind that the students were enthused, motivated and, looking at the resolutions, very productive, one can argue that their motivation and attainment reached a new level which should be conserved and knowing that it beautifully fits with the curriculum there are not structural obstacles expected. (Austria, head teacher interview)

Students enjoyed the activity. They enjoyed working outside and working in teams. The raise of interest for studying in this active way was evident. The approach is definitely innovative; the head of school said that this way of teaching is very innovative, students enjoy it and they remember much more when they have their own experience. (Slovakia, case study report)

EQ2) To what extent is each iTEC Learning Story and relevant iTEC technologies sustainable, transferable and scalable?

Drawing on the data relating to pedagogical benefits and technological benefits, for most teachers it seems that there was a sufficient degree of innovation particularly from the perspective of the students' experience. Either the main idea (outdoor data collection or bringing in an expert via communications technology) was novel and/or the pedagogical aspects (group work and collaboration, peer feedback) and/or the technology (TeamUp, other novel tools). If the LS and iTEC technologies are perceived to offer benefits to a teacher they are more likely to be adopted again in the future.

Overall, 59% of responses suggested that the LSs definitely have the potential to lead to innovation in the classroom and 36% of responses suggested that the LSs probably have the potential to lead to innovation in the classroom (weighting applied). Reasons given included: new pedagogical practices (34%), new digital tools (27%), enhancing motivation and engagement (22%), enhancing collaboration (13%) and promoting creativity (5%). Concerns noted included: lack of conditions to support implementation, not appropriate for younger age groups, potential difficulties in some subject areas, and lack of students' experience and motivation. Only 3% of responses suggested that the LSs do not have the potential to lead to innovation in the classroom (weighting applied) commenting that the LS was not innovative or was too time-consuming.

Using a different approach to analysing this data, taking into account the Learning Story implemented, country and the responses from individual teachers only (rather than for all the classrooms), the following picture is revealed⁶ (Table 1).

Table 1: Potential of Learning Story to lead to innovation in the classroom

Learning Story	Majority of teachers confident	Teachers positive but cautious	Small number of teachers disagree
Collecting data outside school (180 teachers)	BE, FR, HU, IT, LT, PT, SK	EE, FI, DE, ES, TR	EE, FI, LT, TR
Working with outside experts (39 teachers)	AT, FI, HU	TR	TR
Online Repositories Rock (14 teachers)	LT		

Sustainability

Intending to use again in the future is a measure of potential sustainability and innovation – assuming that teachers will only adopt a practice if they perceive that it is beneficial to do so. Overall, 53% of responses suggested that teachers would definitely implement the LS again in the future and 45% of responses suggested that teachers would probably implement it (weighting applied). In explaining their choice, 32% of responses noted that the LS enhanced student motivation and engagement, 42% responses referred to a range of other benefits (promoting communication and creativity, variety, a positive impact on learning outcomes). Concerns noted included not being able to cover the curriculum fully, the need for motivated students, the need for effective group interaction, the lack of students' ICT skills and poor reliability of digital tools. Only 3% of responses (weighting applied) suggested that they would not implement it again, giving various reasons including the amount of time required, the age of the children (grade 2) and simply not liking the ideas and/or technologies. These responses give some indication of the challenges which could be faced if a LS is promoted more widely to a country's teaching population (rather than early adopters and innovators) who are not necessarily open to change and innovation.

As above, using a different approach to analysing this data, taking into account the Learning Story implemented, country and the responses from individual teachers only (rather than for all the classrooms), the following picture is revealed⁷ (Table 2).

⁶ Data have only been included if there are at least five teachers in one country piloting a single Learning Story

⁷ Data have only been included if there are at least five teachers in one country piloting a single Learning Story

Table 2: Likelihood of implementing the Learning Story again in the future

Learning Story	Majority of teachers confident	Teachers positive but cautious	Small number of teachers disagree
Collecting data outside school (180 teachers)	HU, LT, PT, SK	BE, EE, FI, FR, DE, IT, TR	FI, PT
Working with outside experts (39 teachers)	AT, HU	FI, TR	TR
Online Repositories Rock (14 teachers)	LT		

In Israel, a head teacher felt that innovation required support by external consultants and in Lithuania, that innovation such as this requires longer term support. In Italy it was noted that local support through IT technicians is essential and that MoEs should facilitate this through funding.

We think schools that go into this process should get some help by Organizational School Consultants in order to be able to have change processes be systematically focused and implemented. (Israel, head teacher interview)

The school principle noticed that it could be very nice if such projects could be not only one "injection" of innovation, but also there could be support for much longer time. (Lithuania, case study report)

Transferability

The case study data suggest that it might be too early to tell if either of the LSs would be transferable or scalable. Although there was commitment to do this there were also concerns particularly the time needed to bring about systemic change and the likelihood of resistance to change from some teachers, partly because the time investment required.

Bearing in mind, that the elements of external expertise, use of information technology, debate and reflection were part of this particular learning story [**Working with outside experts**] there is evidence to support the fact that this is a very innovative pedagogical approach which not only increases the factual and procedural knowledge of students but also addresses social competences and reflection. See the motivation of students being very high, this is a scenario which ought to be used on a more regular basis and, as far as our

teachers are concerned, will be, since it fits with the school strategy in each case. (Austria, case study report)

Case study data suggest that in some schools other teachers have adopted some aspects of the LS. 54% of responses suggest that the LS should definitely be made widely available to other teachers whilst 43% of responses suggested the LS should probably be made widely available (weighting applied). Reasons given for this included innovation through increasing pedagogical strategies in the classroom and thus variety for students, and how the LS opened up new opportunities in the classroom. Only 3% of responses suggest that the LS should not be recommended to other teachers (weighting applied) giving reasons such as a lack of interest from colleagues, not liking the LS and that it would need further development.

I see the benefit in implementing learning scenarios not only in our school, but also at every school. I consider that it will be useful for other schools to participate in the practices of learning scenarios. I think it should be disseminated. (Turkey, head teacher interview)

Once again, using a different approach to analysing this data, taking into account the Learning Story implemented, country and the responses from individual teachers only (rather than for all the classrooms), the following picture is revealed⁸ (Table 3).

Table 3: Likelihood of recommending the Learning Story to other teachers

Learning Story	Majority of teachers confident	Teachers positive but cautious	Small number of teachers disagree
Collecting data outside school (180 teachers)	DE, HU, IT, LT, PT,	BE, EE, FI, FR, SK, TR	FI, LT
Working with outside experts (39 teachers)	AT, FI, HU	TR	
Online Repositories Rock (14 teachers)	LT		

Scalability

Limited data were collected on issues relating to scalability. The case study data suggest that requirements for mainstreaming (unsurprisingly) are perceived to be:

- Training
- Technical support (preferably in school)
- ICT infrastructure

⁸ Data have only been included if there are at least five teachers in one country piloting a single Learning Story

Of course these require funding. There seems to be little commitment to whether or not the LSs should be scaled-up in a systematic way from participants of Cycle 1 beyond disseminating the LS widely, which arguably requires little effort.

However, many of the challenges such as time and organisational issues may constrain scalability, particularly in large schools:

I met the head teacher during the case study interview and she looked very enthusiastic and very fond of the project but then she said that she has 100 teachers and only 2 teachers are involved in this iTEC project. So she thinks that it could be quite a problem to start with 100 teachers, that they would go outdoor. If they have to do such kind of teaching. (Slovakia, NPC interview)

Considering the evidence by country and by Learning Story, the numbers of teachers piloting **Working with outside experts** and Online Repositories Rock are low. There is insufficient evidence to recommend mainstreaming despite the positive responses from those participating.

As **Collecting data outside school** was the most popular choice it suggests that this would appeal to a wider range of teachers than **Working with outside experts**. (Online Repositories Rock was only offered to teachers in Lithuania.) For **Collecting data outside school**, the majority of teachers in just three countries were confident that the Learning Story would lead to innovation in the classroom, and that they would implement the Learning Story again and that they would recommend the Learning Story to other teachers: Hungary (40 teachers piloted **Collecting data outside school**), Lithuania (50 teachers piloted **Collecting data outside school**) and Portugal (11 teachers piloted **Collecting data outside school**).

EQ3) What are the enablers of and barriers to adoption of each iTEC Learning Story (including appropriate iTEC technologies)?

Enablers

Experienced and enthusiastic teachers

When asked what the enablers were, the majority of NPCs referred to the enthusiasm and dedication of the teachers who had volunteered to participate. In some cases NPCs approached existing networks of teachers and schools, already known to be innovative and this was also cited as an enabler of successful piloting in iTEC. Teachers' confidence in ICT and levels of ICT skills meant that they required little support.

They used teacher's laptop to create newsflashes. Because of the Flash Player it was difficult to use some tools but the teacher managed to find other

tools that worked well. The students said that they have no problems with new tools. You just have to explore the environment and the teacher is always there to help. (Estonia, case study report)

...the ICT teacher [...] was enthusiastic about participating in iTEC and having the opportunity to upgrade her teaching. She called this encompassing learning: everybody can learn with everybody. (Israel, case study report)

In Hungary and Lithuania, collaboration between teachers was seen to be particularly helpful.

...they are really active in this respect and they are acting as the life and soul of this thing. (Hungary, head teacher interview)

Teachers like to work individually. In this case they needed to collaborate. But this is not a challenge, but advantage. (Lithuania, head teacher interview)

The potential of local communities (engaging more than one teacher from a school) as an enabler was also identified by some of the NPCs.

Technologies and resources

Despite the technical problems with TeamUp, it appears to have been well used and popular with students and teachers in some countries.

Along the iTEC lessons, the teachers were witnessing a process of growth among their students, for example they told us that TeamUp helped the students to overcome personal and social difficulties that arose during the groupwork in a much mature manner. (Israel, case study report)

The boys found that TeamUp was a very useful tool. TeamUp solves the problem of having to decide with whom to stay, 'the software decides for you and we quarrel less.' If there's no agreement on something the teacher will correct and decide. (Italy, case study report)

The student feedback function (newsflash) of TeamUp was mentioned in particular in two countries (Portugal, Turkey), enabling teachers and students to follow team's progress more easily.

A variety of other technological tools were also used during the piloting to collect data (scientific measurement, photographic evidence), analyse data and create presentations and podcasts, and assess learning. In Belgium, the use of iPads (provided by the MoE to the participating schools) was perceived to be 'easy ICT' and so seen to be an enabler. For the **Working with outside experts** LS, Skype and email were used to facilitate communication with experts. The use of

communication/collaboration tools (Moodle, Promethean Planet, Facebook, google groups, learning platforms, blogs, twitter) was noted to enable the management of the iTEC pilots by NPCs.

Each group did experimental activities after that. They simulated the formation of sedimentary rocks and fossils. They also shared their findings via Google docs and the photos taken in Picasa. Students were asked to also share short video clips they had taken during the experiments but not many of them complied. (Portugal, case study report)

Students using different ways to communicate with the teacher, twitter for example. (Spain, case study report)

Surprisingly, mobile technologies were not referred to in the case study data very often despite such devices lending themselves to collecting data outdoors. However, this may be due to lack of availability, policy constraints and/or parental/teacher attitudes (or simply that case study teachers did not think to mention them).

In terms of resources, the short (text-based) exemplar LSs were considered to be an enabler. It was also noted that the ideas presented through the resources were simple and therefore not too demanding to accommodate.

Flexibility and fit to practice

The LSs were perceived to be easily adapted to meet the needs of national and local curricula, practices and policies. However, it should be noted that in some countries and for some teachers the LS put forward were not perceived to be novel.

The Learning Story fitted with the school policies and the curriculum. The head teacher said that the **Collecting data outside school** is quite popular in the school. So it was easy to adapt the story. It wasn't necessary to change anything. (Estonia, case study report)

Application of the learning story was well integrated with the vision and perception of the school pedagogically and well fitted the curriculum. [...] Classroom curriculum exploited knowledge of poets and the learning story let the students develop self-education and to take off with the proper tools and allow the learner to deepen and broaden the knowledge about the poet he chose. (Israel, head teacher interview)

It fits perfectly and can be incorporated quite naturally into work in the classroom. We support collaborative work and so for us it makes perfect sense. [...] It fits like a glove into the structure of our education project, in fact it reflects the kind of dynamics that we are trying to implement. (Portugal, head teacher interview)

Training and support

The training and support provided by the NPC/NTCs was seen to be an important enabler, with many teachers noting that their problems and queries were dealt with swiftly. Moreover, teachers felt that the NPC/NTCs were accessible and willing to help.

The help I got was from [the NTC] who answered all questions asked. Courtesy, efficiency and care. Sometimes, the human response has helped more than the question itself. (Israel, teacher interview)

Because, my communication with the coordinator has been very beneficial and it has been realised at the required level. I could have given up if the coordinator did not encourage my enthusiasm. (Turkey, teacher interview)

In particular, 10 NPCs felt that face-to-face workshops where teachers could have hands-on training, hear from pre-piloting teachers and discuss their ideas with peers through group work were particularly beneficial.

The support received via local online communities was also seen as an enabler. In Austria, United Kingdom, Estonia, and Hungary, video tutorials, on how to use the iTEC technologies for example, were identified as particularly useful. NPCs who reported spending a lot of time preparing resources such as lesson plans and summaries of project documents (in addition to translating materials provided by Work Package 3) felt that this investment had been an enabler of success.

Other enablers, according to the NPCs interviewed, included teacher experience of iTEC through pre-piloting, pedagogical as well as technical training, direct support from other iTEC partners (Aalto in Finland, Promethean in Turkey), being part of a high profile international project, and incentives such as payment and attendance at international events such as the Teacher Workshop at BETT (London, January 2012).

In Cycle 1, there was no suggestion that the Teacher Community had been an enabler although the potential of such a facility was recognised.

Student ICT skills

This was only referred to as an enabler in a couple of cases. Firstly, in relation to specific skills in Estonia and secondly in relation to home provision of ICT (itself linked to the middle-class catchment area of the school) in Hungary.

I asked how the students managed to create videos because they didn't have special lesson to learn it. It turned out that some students knew it already and others found friends who taught them. (Estonia, case study report)

Engagement outside school

Bringing in experts was seen to be engaging for students, particularly if the expert was a good communicator and related to the students well. In Austria, it was noted that the experts involved in the project treated the students as equals.

Another important factor according to him was and is that the experts present their content in a student-friendly way in order to be understood by the audience. An understandable expert and student autonomy directly resulted in a very high level of motivation of the students. (Austria, case study report)

So the fact of being guided by this whole project, of having people [experts] I could ask questions to, this put me at ease, it enabled me to go further in my teaching methods, or at least, in the setting up of the project. (France, teacher interview)

Whilst parental concerns were seen to be a challenge (see below), securing parental engagement was seen as an enabler. Explaining the project aims and collaborating with parents was noted as being helpful in Turkey and Italy.

Two teachers (one from Estonia and one from Turkey) indicated that networking with teachers beyond their own school had been particularly helpful.

School ethos and culture

In common with other ICT research, a supportive head teacher and a culture of valuing and encouraging innovation was seen to be an enabler. In Italy, the head teacher helped to identify an amenable olive oil mill owner to facilitate a trip out of school. The culture, support and appreciation are seen to motivate teachers.

School policies and practice has a lot to do with student-centred learning and inclusion of the technology. They have educational projects in each level. They think collaboration is important. They have [interactive whiteboards] in all classrooms and they think that technology is very important today. (Spain, case study report)

I definitely support these initiations when teachers can take part in out-of-school programmes and they will be able to reinvest their experience and knowledge in improving school system. I do believe that thriving of an institution really depends on stance and the openness towards innovation and development. (Hungary, head teacher interview)

I give positive feedback, and I also take up some of the things that have come up during my visits, I take them up in common And sort of praise the teachers then... ...and tell them how much good I have seen during my visits... (Norway, head teacher interview)

The approach is definitely innovative; the head of school said that this way of teaching is very innovative, students enjoy it and they remember much more when they have their own experiences. She said that they had to make some more space in the curriculum, in order to make it possible to implement such a project. (Slovakia, teacher interview)

ICT Infrastructure

Unsurprisingly, well-resourced schools with reliable ICT infrastructure, good home access, one-to-one access (Turkey) and prior experience with technologies were seen to be enablers.

Barriers, Challenges and Drawbacks

iTEC Technologies: Teacher Community, TeamUp

The Teacher Community was a major challenge in Cycle 1 for a variety of reasons. Teachers had difficulties registering, finding information and navigating the site, uploading documents, registering the classes which would be participating in the pilot (a separate process), and accessing the evaluation surveys. In addition, some teachers noted that more functionality in tools such as the blog would be beneficial. These challenges acted as barriers to uptake, as teachers did not always have time to identify the solutions. When they sought assistance from the NTC and the NTC raised the issue via the support forum, there was sometimes a delay in response depending on whether or not the problem was already known. However, teachers did recognise the potential of such a community, particularly developing international networks, and would not necessarily be deterred from trying again in the future.

These issues have been dealt with already and an improved version of the Teacher Community with a simplified structure and less demands on individual teachers will be launched for Cycle 2.

Initially there were compatibility issues with TeamUp in relation to the variety of browsers used by participating teacher. 29% of responses referred directly to TeamUp in an open question on technical problems in the survey, with 8% of responses referring specifically to camera problems and 5% of responses identifying recording problems. The recording facility was a particular problem as microphones and webcams were required and they were not available to some teachers. In

addition there were video/image editing/uploading issues reported by some teachers and security concerns voiced by teachers from United Kingdom and Lithuania. A couple of teachers mentioned that students found accessing TeamUp difficult because of language issues.

TeamUp was a challenge for the students and the teacher. Recording audio is not very common in schools. So they don't have special equipment such as web cameras, microphones. Students couldn't record newsflashes at home because they didn't have the microphones and skills to do it. (Estonia, case study report)

The problems we face are generally technical ones. For example, we saved our students on TeamUp, formed our groups but weren't able to make our newsflash records. The cameras on our netbooks didn't work. During our lessons we record some parts but it is almost impossible to upload those records in the netbooks as they are very slow so students do it at home. (Turkey, teacher interview)

The teacher had problems to use it both from school and from home. She was able to use TeamUp and the teacher community only partly and from time to time. The websites did not work properly and teacher did not know how to progress. She suggested providing the hands-on training and focusing on all problems that could occur. (Slovakia, case study report)

Security was a significant problem of TeamUp. We could not put personal details, pictures or newsflashes on the site given that anyone can access it. (United Kingdom, teacher evaluation)

Unsurprisingly, technical issues with iTEC technologies were perceived to have a negative impact on motivation for both teachers and students. In addition, it required a substantial investment in time from the NPC/NTCs which constrained opportunities to provide other support and guidance.

It takes so much energy, these technological problems, that we cannot concentrate on what exactly teachers are doing, pedagogically. We are dealing with all these problems like 'I cannot login'. (Hungary, NPC interview)

Insufficient ICT infrastructure

Insufficient ICT infrastructure was a problem in a number of schools, particularly noted in Estonia, Hungary, Norway and Slovakia. It includes lack of ICT equipment, broken equipment, lack of technical support, lack of Internet access or unreliable access, limited access to ICT equipment (having to book ICT suites) and lack of one-to-one access for students. In the open question on technical problems in the survey, 8% of responses mentioned inadequate access to laptops or computers, and 8% of responses referred to slow Internet access.

I'll tell you what happened with my group, we had various problems with the Internet. The Internet at school is very slow and then we tried to solve the problems, diagnose the problems and look at the network connections. The science teacher lent us one of her computers today and in the beginning it wasn't working, then we went to the wireless network connections and logged onto the Internet and managed. (Portugal, student interview)

There were also some differences between home and school platforms (some children had no Internet access at home, older software, or no Gmail account) which were seen to be an issue by some teachers.

Other technical issues

Teachers identified a range of other specific technical issues. Three Finnish teachers, one Hungarian teacher and one Lithuanian teacher referred to compatibility issues between students' smartphones and the school computers which meant that uploading students' photographs was challenging. Individuals mentioned issues with specific tools such as Google+, Google docs, video editing software, Glogster. A small number of teachers referred to lack of technical skills and one specifically said that the technological tools were not appropriate for primary aged students.

It should be noted that in the open question on technical problems in the survey, 23% of responses stated that there had been none (although not all of these teachers may have used TeamUp and/or the Teacher Community). However, 17% of responses identified technical issues as the main problem faced when implementing the LS.

Time and curriculum constraints

Time was seen as a challenge, in relation to the timing of the iTEC support and project implementation. 27% of responses to the survey identified lack of time or timing issues as the main problem faced in the implementation. Many of the NPCs noted that information about the LS and requirements for Cycle 1 arrived too late, particularly as some teachers had already planned their curriculum for the whole year (often undertaken over the summer vacation). In addition, recruitment of teachers for a September start was difficult when NPCs were not able to confirm what they would be expected to do. This left NPC/NTCs with challenges in relation to support and training, and teachers with insufficient time to prepare. In some cases, NPCs delayed the start of the pilot to account for this but this had implications for the collection of evaluation data and should be avoided in the future.

The two LSs were also considered to require a substantial amount of class time with students. The length of the pilot, four months, was also perceived to constrain opportunities for teachers to engage fully in some countries. Because of the short

notice this meant that in some cases teachers had to rush the implementation or rely on time after school and for homework because they were unable to free up a sufficient number of lessons. The challenges that teachers faced implementing the LS presented in Cycle 1 also related to the LS requirements such as time to organise the visit or make arrangement with the expert, and time for reflection and peer feedback (learning activities suggested for the implementation). As well as time the logistics of organising time out of school (staffing, costs, buses, parental permission) and co-ordinating group meetings (Austria) were also seen as a challenge. 21% of responses identified organisational issues as the main problem when implementing the LS. In addition, in some cases the demands on time to teach students the appropriate digital skills was also seen as a challenge. ICT innovation is often constrained by the curriculum and this was of greatest concern in Turkey where the curriculum was described as being particularly rigid (but also in other countries).

Teachers in Norway (and probably elsewhere) are very much tied to their plans for each subject in a school year. Doing iTEC has to fit into these plans, and this could be a factor which put brakes on truly innovative practice. So, the teacher had few problems in fitting the pilot into school policies/plans. But she didn't really have a choice. (Norway, case study report)

Pupils found it relatively easy to learn the use of the tools, but the teacher had a slightly different opinion about that: she found that it is time consuming to teach pupils web based tools especially when they have no experience in them. She expressed her concerns about spending too much time of her English class on such issues. (Hungary, case study report)

Lack of support and training

It is well known that one of the key factors in successful ICT implementation is the support of the head teacher. Schools in iTEC without this support found implementation more challenging than it may have been otherwise.

Unfortunately the headmaster provides almost no support for the teacher, and he also doesn't seem to see much pedagogical potential in web-based tools or collaboration on the Internet. In this institution the power relations are such that every official message from us [NPC/NTC] thanking and appreciating the work of the teacher is needed. The teacher doesn't know about any ICT strategy in the school. (Hungary, case study report)

A minority of teachers indicated that they had received insufficient support in the piloting. 12% of responses to the survey suggested that teachers had received no support from the NPC/NTC and 2 case study teachers also mentioned the lack of training/support. Those expressing this opinion included all teachers from Israel and around a third of teachers from Germany and Turkey. One teacher also suggested that a lack of documentation and examples had been a challenge. Some teachers

indicated that more opportunities for face-to-face training would have been helpful. Some teachers would have found more technical training helpful. One case study teacher (Spain) noted that more examples of iTEC multimedia stories would have been helpful. Teachers who could not speak English also felt disadvantaged as they were aware that this prevented some access to peer support via the Teacher Community. It should be noted that these responses are personal perceptions and may relate to individual expectations, particularly if a teacher felt that they had not learnt any new technical or pedagogical skills.

Lack of perceived innovation

A minority of teachers expressed negative opinions about the implementation, perceiving that there had been no changes to pedagogical strategies or use of technology. In the survey six teachers suggested that the LS offered no benefits. Ten individual teachers from five countries perceived that the LS did not have the potential to lead to innovation in the classroom. Again, these are clearly down to the views of a small number of individuals and do not necessarily reflect cultural differences. It is not surprising to receive these views given the number of participating in Cycle 1 and the bias towards innovative and experienced teachers.

The teacher is already very innovative and they do different creative things. [...] The learning story wasn't innovative for the teacher. But she has the plan to introduce the learning story to other teachers at the school. (Estonia, case study report)

Both students and the teacher claimed that the iTEC classes were not too much different from the classes the teacher normally conducts. The project fitted well to the everyday work of the teacher, and although she gained some good ideas from the project, it meant no radical flip. The learning story is innovative within the school but not highly innovative in the teacher's own praxis. (Hungary, case study report)

Students adapting to unfamiliar pedagogical approaches

The case study data revealed that some students found it challenging to adjust to new pedagogical approaches, particularly group work and collaboration. They experienced difficulties relating to organisation and management, division of tasks, and reaching shared consensus. Some students said that they prefer working on their own. Others commented on the challenges of accepting individual styles and approaches. These challenges were overcome but added to the time pressures imposed through curriculum and timetabling constraints. A teacher in Portugal described the development of a simple management tool (a timesheet) to help to guide the students and make the best use of the limited time available.

Not many of the students were conversant with the technology they had to use; they are not used to working in teams on a regular basis and so had problems in organising themselves and in dividing tasks. (Portugal, case study report)

Parental concerns

These concerns emerged from the case study data and related to parental attitudes towards technology, out of school visits and interacting with experts. Parents were concerned that spending time using technology and the different pedagogical approach was not beneficial. Close communication with parents to reassure them that the curriculum content would still be covered helped to overcome this challenge. In both countries where this emerged as a particular issue (Spain, Turkey), by the end of the project parents were pleased with the outcome and the opportunities that their children had enjoyed. The **Working with outside experts** LS was perceived by some to be more of a challenge in primary school settings due to possible parental concerns.

In Spain, parents had to be consulted prior to the students using mobile devices.

To use mobiles at school that is not allowed, the school had to send a letter to the families and ask the parents for special permission to use the mobiles for this project. Students have been absolutely responsible in this and parents are happy that the students can use mobiles to learn in a responsible way. (Spain, case study report)

Policy issues

In some countries, national and local policies made some aspects of the implementation challenging. In some countries there are particular rules about taking students off site during school hours. In Norway, there are currently regulations regarding the use of mobile telephones. In France, the administration requirements in relation to seeking permissions from authorities, schools and parents took a lot of time.

... and there is a way to go for using pupils' telephones because we are not allowed to use them according to the municipal regulations that say that mobile phones shall not be used in teaching, but we know that this tool is worth its weight in gold, for example, using it to film... (Norway, head teacher interview)

It is a lot of letters to send, emails to ensure that everybody agrees and it is ok for us coming to the school and involving the teachers. It's more than we

expected in the beginning although we knew this would be hard. But it is a lot of work. (France, NPC interview)

In Slovakia, one head teacher noted that the low status of the teaching profession, affecting motivation with many teachers taking second jobs for financial reasons, was perceived to have constrained opportunities for innovative practice. In Germany (engaged via SMART), the lack of involvement of the MoE was perceived to be a small problem.

EQ4) To what extent is each Learning Story and relevant iTEC technologies fit for purpose? (Usability; connection to current practice; what works and what doesn't work)?

Generally, the Learning Story and Learning Activity documentation was considered to be fit for purpose, only requiring translation into the national language for the localization process. However, two NPCs felt that it was lengthy and unwieldy, expending considerable effort to reframe the resources for their teachers. A third tried the Learning Story out first, documenting the experience to share with participating teachers.

The **Collecting data outside school** project was chosen by the majority of teachers. It was perceived to be the most relevant for some national curriculum, and to fit curriculum needs as well as being flexible enough to adapt to suit local requirements. In Austria, **Working with outside experts** was also perceived to fit the needs of the national curriculum. In reality, teachers selected aspects of the Learning Stories and Learning Activities which were perceived to be most appropriate. Two of the most common concerns applicable to both Learning Stories were the length of the project (perceived to be difficult to accommodate due to curriculum constraints) and the lack of preparation time (attributable to the iTEC project rather than an issue particular to the resources).

Teachers in the survey were asked what they might do if they implement the LS again in the future. 44% of responses suggested that teachers would not change anything. Others suggested that teachers would involve more teachers, more students or different age groups, and different themes suggesting that the general approach was seen to be beneficial. 16% of responses suggested that they would allow more time for the implementation. Other comments included more planning, testing digital tools more thoroughly before starting, providing clearer and more focused guidance for students, narrowing the focus and reducing the scale of the project. In addition, individuals referred to using students' own devices, ensuring each group has an ICT confident student, making sure the division of labour in

groups is equal, ascertaining students' ICT skills beforehand, increasing homework and involving parents. 5% of responses suggested that they would not use TeamUp again in the future. One Belgian teacher commented that recording peer feedback via video or audio was not effective and that a wiki would be used to facilitate this in future implementations. A few teachers mentioned that they would not implement the **Collecting data outside school** LS again in winter months. Some teachers noted that they would work with smaller groups in the future. A Hungarian teacher suggested that students would not be allowed to use their own smartphones in the future because the quality of recordings was poor.

As described above, there were a number of usability issues in relation to the Teacher Community. Teachers had difficulties registering, finding information and navigating the site, uploading documents, registering the classes which would be participating in the pilot (a separate process), and accessing the evaluation surveys. It was not deemed to be satisfactory and was redeveloped for Cycle Two.

Also described above, there were usability/technical issues in relation to TeamUp including browser compatibility, cameras, recording, video/image editing/uploading, security and language issues. However, it was presented as a prototype tool and many teachers were broadly positive about its potential as a tool.

EQ5) What are the benefits and shortcomings of the piloting process (including the development of technical and pedagogical knowledge and skills)?

Training and Support

The Teacher Community was intended to provide a central point for accessing resources and documents, sharing experiences, and seeking support. It was used by the NPCs but there were many challenges for teachers including problems with initial registration, assigning classrooms, locating relevant document and uploading documents. Due to a technical problem in the online Teacher Questionnaire, only 130 of the 278 teachers were presented with questions about the Teacher Community (no teachers from Norway or Slovakia). Of these, only 30% of responses suggested that teachers had visited the Teacher Community regularly (at least weekly). There was very little use of the Teacher Community by teachers from Austria, Belgium, Estonia, Finland, France and Germany. However, many teachers recognised the potential benefits of an international community.

I think it is a very nice idea; I really like the idea of interacting with teachers from Europe. But for the moment, I've had difficulty, myself, in getting onto a forum, and daring to get into discussions [...] But I really like the idea of seeing how things are done in other countries in Europe. (France, teacher interview)

Many countries provided local online communities which were used to provide access to localised resources and support (Belgium, Estonia, Finland, Hungary, Lithuania, Portugal, Spain, UK). These communities were tailored to local needs and well-received but did not enable teachers to network with peers beyond their own country. Responses from teachers in Estonia, Hungary and Lithuania suggested they made more use of the local online community than their peers in the other countries with such facilities. As for the questions relating to the Teacher Community, a technical problem with the online survey meant that there were only 79 responses from 5 countries to questions about the local online community. Of these, 53% of responses indicated that teachers visited the local online community at least once a week and 65% suggested that the Teacher Community was useful (no weighting applied) (Figure 13).

But the local portal 'Koolieu' was of great support, because there are familiar teachers there. It was nice to communicate there and the site itself is much easier and more convenient to use than the international portal. (Estonia, teacher interview)

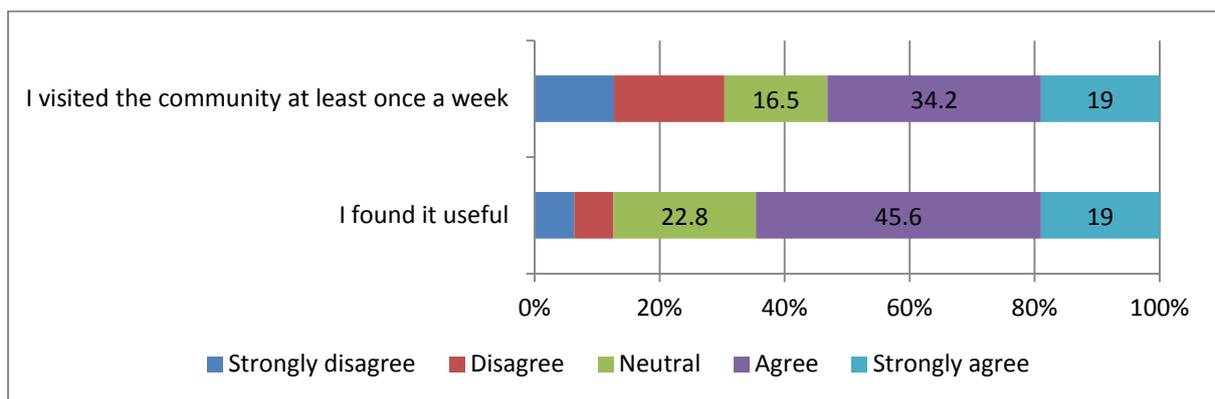


Figure 13: Use of Teacher Community

Localisation of resources (materials and guidance) involved selecting and presenting relevant material, which was translated into the local language. Of course this process may have affected the nuance of the messages being conveyed but is unavoidable. NPCs who oversaw this process (and in many cases undertook it themselves) had developed a good understanding of the key concepts within each Learning Story through participating in numerous workshops and receiving guidance and support from iTEC project partners. Localisation was not perceived to be an onerous task by many but some NPCs felt that iTEC documentation was overlong and unwieldy. Some countries (most notably UK, Belgium, and Estonia) reported spending a lot of time/effort into preparation for the pilot (revising the documents, preparing training videos and teaching resources). The Estonian NPC (also a classroom teacher) implemented the LS herself first and documented her experience to share with the Estonian teachers. This was very beneficial to these teachers and is recommended for any NPCs who are able to achieve this.

80% of responses indicated that teachers had received training and support from one or both of the national coordinators and of those 89% suggested that it was useful (weighting applied) (Figure 14). 43% of responses (weighting applied) indicated that teachers also received training and support from other people outside the iTEC project. Although asked to explain what form this took, only four teachers responding noting workshops run by commercial (technology) companies, support from national educational technology organisations and colleagues. Teachers found the technical training helpful and generally felt that the localised resources, training and support were timely and appropriate.

One very good thing is that the queries are answered quickly and there is a lot of support at this level and a lot of availability. So you do feel there is a willingness if you need to get in contact and that's very good. (Portugal, teacher interview)

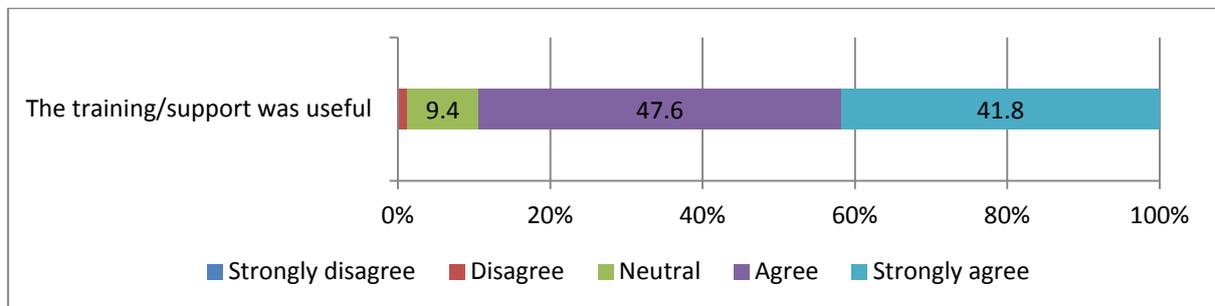


Figure 14: Impact of training and support

Face-to-face meetings with teachers were seen to be particularly beneficial by both teachers and NPCs. Teachers in the case study interviews indicated that they enjoyed meeting other teachers and seeing examples of LS implementation in practice. All NPCs suggested that they would run face-to-face meetings in subsequent cycles (some noting that they would increase opportunities to do so), with many highlighting such events as enablers of success.

What was really good to see was of course the concrete example the teacher from Tromsø showed us, and how he planned iTEC at another school [...] It was useful, but that is how we teachers are; we like to be inspired from other teachers, and see concrete examples. (Norway, teacher interview)

However, e-learning resources were produced in some countries to support the face to face meetings and they were seen to be helpful also. For example, in Estonia tutorials on how to use TeamUp were created and uploaded to YouTube.

Two thirds of responses (67%, weighting applied) suggested that teachers were able to adapt their chosen LS to suit their needs with little or no help.

Future iTEC Pilots

The case study data include suggestions for improving the implementation of the iTEC piloting process, largely around more support for participating teachers.

Case study data from Austria, Italy and Lithuania suggest more training for teachers with less experience of ICT would be beneficial as well as targeting training via “*smaller groups for different level of digital competence needed*” (Lithuania, teacher interview). As described above, many of the NPCs indicated that they were considering increasing the support they offered to participating teachers, particularly face-to-face workshops and e-learning support. Teachers (Turkey) noted that face-to-face training is preferable to virtual training.

For the teacher it would have been very useful, in addition to the initial workshop, a mid-term seminar, that would allow to discuss the practical issues which emerged during the trial. (Italy, case study report)

However, face to face trainings could have been more useful instead of those conferences held on Internet. If an expert had explained us how to use these technologies in the classroom that would be more effective especially for the smartboards. (Turkey, teacher interview)

In relation to participating in the evaluation, the CSR from Spain noted that a teacher felt that more examples of multimedia stories would be helpful. A teacher in Italy suggested that facilitating reflection at the beginning of the process as well as at the end could be helpful for the teachers concerned (case study teachers).

Suggestions for improving the iTEC piloting process included providing more examples and pooling ideas.

One of the teachers said that it might have been useful to have a kind of ‘idea bank’ where they could get inspiration from for their own implementation of the Learning Story. What they did was about the same they had done in the pre-pilot, and had they had access to such a database they might have done things differently. (Portugal, case study report)

Perhaps some concrete examples, really, of setting up the scenario... Even though I started by trying to have a look on the iTEC European Schoolnet website, to see if there were any first-hand accounts, anything specific... It’s perhaps still a bit abstract...[it would be good to have] very concrete things [like]: ‘Now then, what did he do for such and such an activity? And how did he set it up?’ That type of thing perhaps. (France, teacher interview)

Recommendations

Work Package 2

- Teachers would like ideas which are shorter and can be implemented in a single lesson. This could be considered in the development of educational scenarios.

Work Package 3

- Teachers would like LSs which are shorter and can be implemented in a single lesson. This could be considered in the development of LS and LAs.
- Teachers would like more choice of LS for piloting. (However, this is in tension with evaluation requirements).
- Some countries have noted that the documentation for Cycle 2 is shorter and have expressed a desire to receive full narrative exemplars of the LS in action (as in Cycle 1). Others found the documentation for Cycle 1 lengthy and unwieldy. Providing documentation in both formats may be beneficial although has resourcing implications.
- Conducting an online meeting with NPCs/NTCs at a midpoint in the cycle would enable feedback on the prototype tools to be elicited more rapidly and more fully.
- It would be beneficial to test prototypes more thoroughly before introducing them into large-scale pilots particularly in relation to different technical settings (browsers etc).

Work Package 4

- The Teacher Community needs to be easier to access (registration, navigation) and simpler to use (minimize administrative demands, clearer guidance on iMmS).
- NPCs and teachers need information sooner in the piloting cycle in order to plan and prepare.
- Teachers selected for future pilots should have a broader range of experiences of ICT and innovation.
- Technical support protocols for iTEC should be reviewed to maximize opportunities for rapid responses, particularly in relation to iTEC technologies when queries need to be passed on to other partners (ie via the Teacher Community forum).

- Demands on NPCs/NTCs and teachers from work packages need to be managed and communicated clearly, co-ordinated via WP4.
- Teachers would like more choice of LS for piloting. (However, this is in tension with evaluation requirements).
- NPCs/NTCs produced a variety of resources (video tutorials, summary information, online training) which in some cases were shared but not necessarily systematically. It would be helpful to develop protocols to facilitate more extensive sharing of NPC/NTC resources where possible.
- NPCs/NTCs should consider the enablers from Cycle 1 when planning the implementation of future cycles, particularly face-to-face support.
- Further work is required around incentivising teachers, focusing particularly on what benefits they may receive.
- A short overview of the iTEC project would be helpful for new teachers.
- NPCs should aim to involve between 15 and 40 cohorts (classrooms) each cycle.

WP5

- To gather more data on sustainability issues.
- To provide clearer guidance on the requirements and production of iTEC multimedia stories.
- Provide a short document outlining expectations for case study teachers.
- Provide a short document summarizing the results of Cycle 1 for teachers.
- To identify processes for disseminating evaluation results more rapidly.
- To ensure that a summary of evaluation procedures is presented at the beginning of the Evaluation Handbook to improve accessibility.

Higher Level Group and Policy Makers

- ▶ The **Collecting data outside school** LS has the potential to lead to innovation in the classroom in some European countries (see those listed below). As a minimum, it should be widely disseminated. It would be beneficial to revise the LS documentation drawing on work undertaken by NPCs in Cycle 1.
- ▶ The **Working with outside experts** LS was well-received by teachers who implemented it but data are very limited due to the small number of cohorts who participated. Given the low costs involved, wide dissemination could still prove beneficial particularly in some European countries (see those listed below).
- ▶ TeamUp was used to support implementation in 60% of the cohorts and was well-received by teachers who chose to use it, particularly with regard to the pedagogical issues that it can address in relation to group work. It would be beneficial to disseminate this widely.

- ▶ Evidence to support mainstreaming beyond wide dissemination is limited. The **Collecting data outside school** project warrants further investigation in Hungary, Lithuania and Portugal. However, it should be noted that the number of cohorts participating in all countries except Hungary and Lithuania was very low.
- ▶ Curriculum constraints and assessment mismatch may be barriers.
- ▶ Key enablers (in common with other ICT research): training/support, positive teachers' attitude, ICT competence, sufficient ICT infrastructure, teacher networks (locally, nationally, internationally).
- ▶ It would be beneficial to create opportunities for teachers to experiment.

Appendix A: Demographic data about the participants

Table 4: Overview of pilots and evaluation responses

Country	No. pilots	No. evaluations	No. teachers	Response rate (%)	No. Collecting data outside school	No. Working with outside experts	No. both	Unknown	No. Online Repository Rocks
Austria	20	9	9	45	1	8	0	0	0
Belgium	10	7	6	70	7	0	0	0	0
Czech Republic	4	4	2	100	0	4	0	0	0
Estonia	21	21	15	100	21	0	0	0	0
Finland	19	14	14	74	9	5	0	0	0
France	10	7	7	70	3	2	2	0	0
Germany	11	11	7	100	9	2	0	0	0
Hungary	47	47	45	100	41	6	0	0	0
Israel	8	5	2	63	2	3	0	0	0
Italy	12	8	7	67	6	2	0	0	0
Lithuania	84	84	67	100	60	0	0	3	21
Norway	12	6	4	50	6	0	0	0	0
Portugal	13	11	11	85	11	0	0	0	0
Slovakia	14	10	5	71	10	0	0	0	0
Spain	10	8	7	80	4	2	1	1	0
Turkey	42	23	20	55	10	3	8	2	0
UK	4	3	3	75	3	0	0	0	0
Totals	341	278	231	82	203	37	11	6	21

In Cycle 1, data collection and the demands on participating teachers were minimised as far as possible. As a result the evaluation instruments did not collect demographic data such as gender and subject taught. The intention was to collect this data from the Teacher Community registration information. However, as a result of technical difficulties in the registration process not all teachers were able to register and thus the information is incomplete.

76% of the 231 teachers who participated in Cycle 1 were female, with 24% male.

Of the teachers who provided detailed information about the pilot classrooms, 110 (76%) pilots were undertaken with secondary aged classes (including classrooms from 7 countries which provide integrated primary and lower secondary schools), 32

pilots were undertaken with primary aged classes and three pilots were undertaken across both age groups within integrated educational systems. Teachers indicated the subject areas for 144 of the pilot classrooms including:

- 40 in natural sciences (including specialised classes for Biology, Chemistry and Physics)
- 18 in foreign languages
- 16 in mathematics
- 15 in primary
- 11 in geography
- 8 in language and literature
- 6 in history
- 5 in special needs

Table 5: Overview of Teacher gender by country

		Gender		Total
		male	female	
Country	Austria	5	4	9
	Belgium	3	3	6
	Czech Republic	0	2	2
	Estonia	1	14	15
	Finland	6	8	14
	France	3	4	7
	Germany	3	4	7
	Hungary	6	39	45
	Israel	0	2	2
	Italy	1	6	7
	Lithuania	8	59	67
	Norway	3	1	4
	Portugal	2	9	11
	Slovakia	2	3	5
	Spain	4	3	7
	Turkey	8	11	19
	UK	0	3	3
Total		55	175	230⁹

⁹ It was not possible to identify one of the Turkish teacher responses and therefore the gender is unknown

Appendix B: Data collected

Table 6: Overview of data collected in Cycle 1

Country	No. pilots	No. evaluations	No. teachers	No. case study reports	Raw data	No. iMmS	NPC interview
Austria	20	9	9	3	3	0	Yes
Belgium	10	7	6	0	0	0	Yes
Czech Republic	4	4	2	N/A	N/A	N/A	Yes
Estonia	21	21	15	2	1	3	Yes
Finland	19	14	14	N/A	N/A	N/A	Yes
France	10	7	7	2	1	3	Yes
Germany	11	11	7	N/A	N/A	N/A	Yes
Hungary	47	47	45	2	1	4	Yes
Israel	8	5	2	2	2 ¹⁰	3	Yes
Italy	12	8	7	2	1	3	Yes
Lithuania	84	84	67	2	1	0	Yes
Norway	12	6	4	2	1	2	Yes
Portugal	13	11	11	3	1	3	Yes
Slovakia	14	10	5	3	1	2	Yes
Spain	10	8	7	2	1	2	Yes
Turkey	42	23	20	3	3	3	Yes
UK	4	3	3	1	0	2 ¹¹	Yes
Totals	341	278	231	29	15	30	17

¹⁰ Some raw data were received for two case studies; however, the sets were incomplete

¹¹ The iMmS from UK are presented in a single document summarising the evaluation notes from 3 teachers piloting across four classrooms