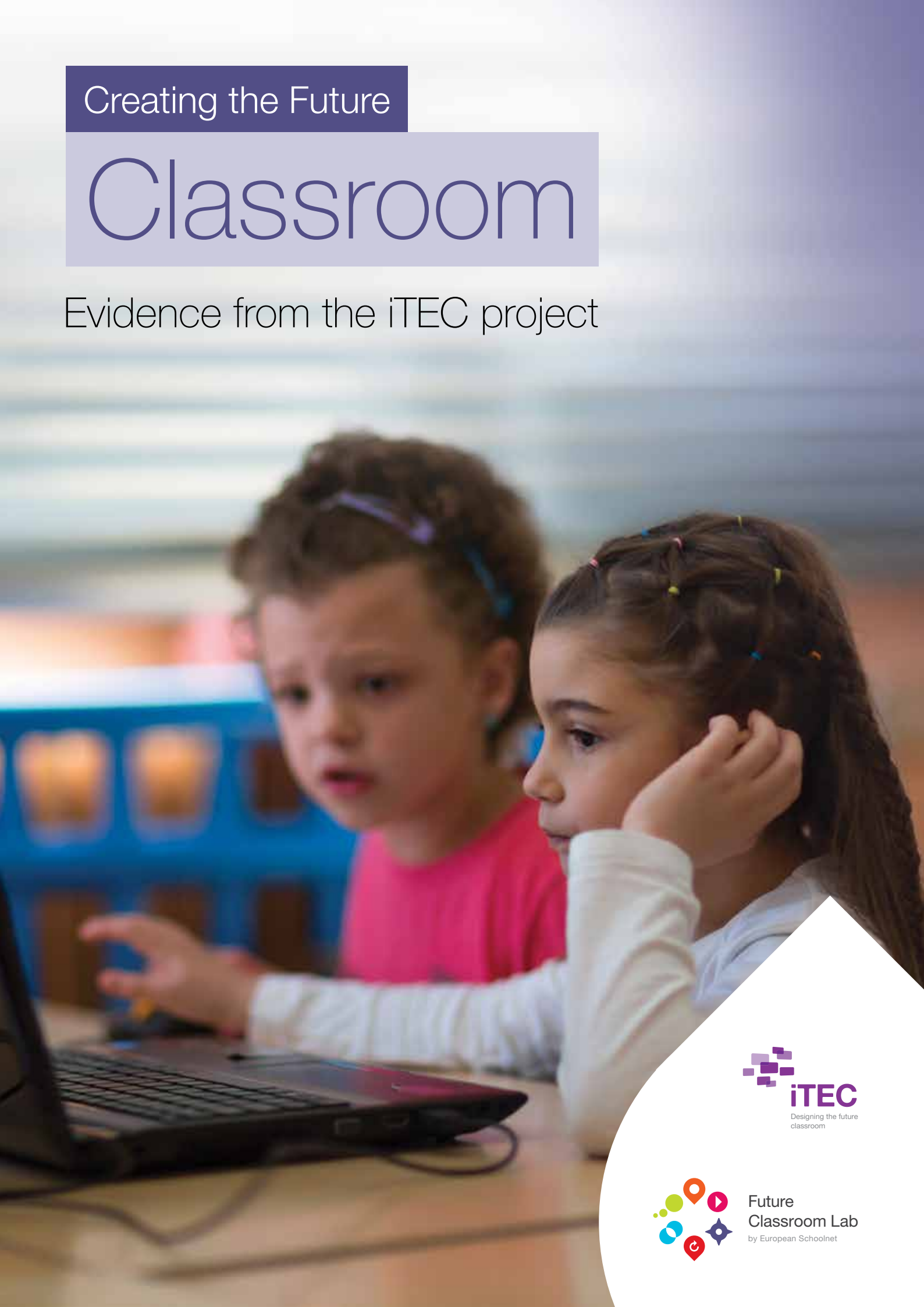
Creating the Future

Classroom

Evidence from the iTEC project



iTEC
Designing the future classroom

Future Classroom Lab
by European Schoolnet

Creating the Future Classroom: Evidence from the iTEC project

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Introduction

iTEC (Innovative Technologies for an Engaging Classroom) was a four-year research and development project funded by the European Commission involving 26 partners: ministries of education (MoEs), technology providers and research organisations. iTEC aimed to transform and scale-up the use of technology in learning and teaching in compulsory education. Through iTEC, educational tools and resources were piloted with some 50,000 students in 2624 classrooms across 20 European countries [1].

The resulting iTEC approach to transforming learning developed Future Classroom Scenarios (narratives of classroom innovation), engaging Learning Activities (descriptions of discrete activities) using innovative digital pedagogies, and inspiring Learning Stories (exemplifying sequences of Learning Activities). These resources support teachers to innovate, providing detailed examples of how learning and teaching can be more personalised, authentic and engaging, using digital tools. During the project, research and development activities also led to the creation of prototype technologies designed to support the iTEC approach.

There are three main outputs of iTEC:

- a scalable scenario-led design process for developing digital pedagogy;
- the Future Classroom Toolkit and accompanying training provision;
- an extensive library of Future Classroom Scenarios, Learning Activities and Learning Stories.

'Innovation' is understood in iTEC as 'an idea, practice, or object that is perceived as new by an individual' [2, p11] that benefits learning and teaching. It is necessarily context-dependent and therefore no single tool or practice is perceived as 'innovative' in every classroom. Through 'diffusion' [2], individual, small-scale changes can lead to more substantial innovation. Thus, innovation can be viewed as a process of incremental steps. The iTEC approach focuses on pedagogical innovation enabled through, rather than driven by, technology.

This evaluation report synthesises the evidence of the impact of the iTEC project on learners and teachers, and the potential of the iTEC approach for system-wide change, looking at:

- iTEC processes, tools and resources (case studies, user/teacher surveys, focus groups);
- Classroom perspectives (case studies, teacher/learner surveys);
- National perspectives (case studies).

The evaluation was designed to support the development of iTEC outputs, as well as assess the impact of the iTEC approach on learning and teaching. Therefore, formative rather than summative evaluation was necessary, underpinned by qualitative data collection. Learning Activities and Learning Stories were sources of inspiration for teachers to own and adapt, rather than a fixed series of prescribed actions, resulting in wide-ranging interpretations and implementations. Given the diverse nature of the pilots, the project could not set out to provide quantitative measures of impact on student performance. However, regular surveys of teachers and learners yielded perceptions about the impact and future potential of the iTEC approach. Teachers' opinions about whether or not a Learning Activity and/or Learning Story 'works' for them are important (reflecting their experiences, context and understanding of the complexities of the classroom), as are indications of intended future use [3]. Case studies of classroom implementations included observations of lessons, providing an opportunity to triangulate teachers' claims against observed practices. Data (collected from September 2011 to June 2014) includes:

- 68 implementation case studies;
- 1399 teacher survey responses;
- 1488 student survey responses;
- 19 teacher focus groups;
- 16 national case studies.

More detail on the evaluation approach is provided in the full evaluation report [4].

In order to encourage system-wide uptake of the iTEC approach, the project provided continuous training and support both within and beyond the end of the project. For example, under the umbrella of the European Schoolnet Future Classroom Lab initiative [5], a five-day, face-to-face training course was developed. This includes a suite of iTEC modules and materials that can be localised and adapted for use at national and regional level [6]. The course was also adapted for online delivery in the style of a MOOC (Massive Open Online Course), as part of the new European Schoolnet Academy initiative [7].

1: How did the iTEC approach impact on learners and learning

The iTEC approach concerns Future Classroom Scenarios and the systematic design of engaging and effective Learning Activities using digital pedagogies. The approach can meet the needs of European and national educational policy aspirations (e.g. Europe 2020) for increasing employability and life-long learning through developing students' digital competency and wider 21st century skills.

The findings below summarise the impact of implementations of the iTEC approach on students. Classroom implementations typically involved students undertaking projects lasting around six weeks. Evidence was gathered from surveys (teacher, n=1399; student, n=1488; n=total number in the sample), national case studies (n=16), teacher focus groups (n=19) and implementation case studies undertaken during the last three cycles (n=68).

iTEC in practice: Redesigning School Learning Story, C3, UK

This Learning Story required students to think about spatial design and the different motivations of people who use a particular learning space. The aim was to design a new space for future use based on identified current challenges in relation to school-based activities. Implemented in a UK secondary school as part of a Product Design course, it took 10 lessons over 5 weeks. Students were divided into groups of three using TeamUp (an iTEC prototype learning technology). Before they started, students agreed the class ground rules and their team roles. The teacher created an Edmodo group (a social learning network designed specifically for formal education) to allow students to share their work, receive group messages and access resources. Students were presented with a design brief and then used their own tablets to record photos, videos, make notes and record their thoughts and reflections throughout the project. Students without tablets were loaned portable video cameras. Students created a prototype and then discussed their design with future users. Based on the feedback, students created their final design prototype, which they presented to their class. Perceived innovation included students working as producers, increased collaboration, easier collection of multimedia data and students developing a better understanding of the design process.

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Key Finding 1:

Teachers perceived that the iTEC approach developed students' 21st century skills, notably independent learning; critical thinking, real world problem solving and reflection; communication and collaboration; creativity; and digital literacy. Their students had similar views.

Teachers and students agreed that engaging in iTEC Learning Activities developed students' skills for:

(The percentage of teachers (n=573-594) and students (n=1444-1488) in agreement, C4-5.)

Similarly, teachers (n=595-826, C1-3) agreed that iTEC Learning Activities enabled students to:

- engage in active and independent learning (84%);
- express their ideas in new ways (89%);
- communicate with each other in new ways (85%);
- communicate with their teacher in new ways (81%);
- use digital tools to support collaboration (91%).

When students (n=1293, C5) were asked what 'the best thing about iTEC' was, the most frequent responses were increased technology use (37% of students) and increased collaboration (24% of students).

> ...the fact that classes became more appealing, and that it developed pupils' critical thinking. They began learning to listen, argue, which was something they were not used to doing; they learnt to address their own views in a relative manner and to accept the ideas of others. Then they began gathering different points of view, reflecting and making decisions. This is very innovative and beautiful to see in the pupils who managed to get there.
> (Portugal, teacher)

> Working in a group [was the best thing about iTEC]. It is something that is useful in the world, but is not taught in schools. Working in this project with other people has been very constructive.
> (Italy, student)

Key finding 2:

Student roles in the classroom changed; they became peer assessors and tutors, teacher trainers, co-designers of their learning and designers/producers.

According to the teachers surveyed, the most common way in which iTEC made a difference to their pedagogy was that student roles changed (24%, n=586, C4-5). This was also noted as an important pedagogical innovation in nine of 16 national case studies.

Students were involved in assessment and giving feedback to their peers (10 of 21 case studies, C4-5). Students engaged in peer tutoring and acted as 'experts' within the classroom – indeed as teachers and authors (15 of 60 case studies, C3-4). In some cases, students acted as teacher-trainers, particularly supporting teachers in their use of technology (2 of 10 teacher focus groups, C4; 3 of 21 case studies, C4-5). In other cases, students became co-designers of their learning experiences, developing new approaches to learning and assessment with their teachers (2 of 10 teacher focus groups, C4; 4 of 21 case studies, C4-5).

Three of the first four cycles included student design and/or creation of artefacts (beyond simply presenting knowledge digitally for assessment). An important feature of the iTEC approach for many teachers was that it offered students more authentic learning experiences closely reflecting situations they were likely to encounter in the workplace and in later life (76%, n=594, C2-3): working in teams, with external partners, and producing work which would be used beyond the school.

> As a teacher my role was different: I felt like a team leader and an innovator instead of being a teacher.
> (Finland, teacher)

> It's very nice to know that [the teaching resources we have created for our peers] affects someone in the world. But then again, it's a bit stressful and confusing to know that someone is going to use what you've created, and it also makes you want to improve it.
> (Israel, student)

> Most of the challenges...have been solved easily working together with the students. That may be another game changer of iTEC! Students are welcomed in the process of designing the change in the classroom.
> (Austria, teacher)

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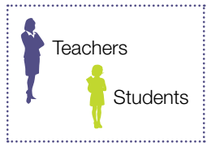
Key Finding 3:

Participation in classroom activities underpinned by the iTEC approach impacted positively on students' motivation.

In common with other research on digital pedagogy, positive impact on student motivation was one of the strongest themes emerging from the data.

Teachers and students agreed that engaging in iTEC Learning Activities positively impacted on students':

(The percentage of teachers (n=826-1399) and students (n=1444) in agreement, C1-5.)



> I did not think I would accomplish a lot with them but the way they practised speaking French today is really good...They are often hard to motivate. If you do this with the whole class and make some traditional exercises, they experience it as boring... Doing this in a more creative fashion, I notice that they learn a lot, that they speak and do more.
> (Beigium, teacher)

> Pupils love activities connected with using modern tools and creating a [digital] game was a thing that was really motivating for them. So from my point of view, the greatest thing was the interest.
> (Czech Republic, teacher)

Key Finding 4:

The iTEC approach improved students' levels of attainment, as perceived by both teachers (on the basis of their assessment data) and students.

67% of teachers (n=1399, C1-5) agreed that the iTEC process improved students' attainment in subjects, as evidenced by assessment data (also: 27 of 68 case studies, C3-5; 5 of 10 teacher focus groups, C4). Teachers were asked why they thought this was so and among the 232 responding, the most frequently given reasons were increased: student motivation (31%); collaboration (13%); and use of technology (10%). In addition, 80% of students (n=1444, C5) agreed that the knowledge and skills they had gained through iTEC would help them to perform better in assessments.

> My French is not very good, I cannot read and speak it that well. But in this course it went better because I was being filmed. I wanted to do it really well.
> (Belgium, student)

> 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)

> iTEC has led to significant improvements [in students' learning outcomes through creating a deeper] understanding of a topic located in the curriculum and [relating it to] daily life with the use of technology.
> (Turkey, teacher)

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2: How did the iTEC approach impact on teachers and teaching?

The majority of European teachers are using technology primarily for lesson preparation; use in lessons with students is still limited despite infrastructure having improved substantially in many countries (source: Survey of Schools: ICT in Education). There is therefore a growing need for teachers to be supported in developing their competence in using technology in lessons and the iTEC project showed that this can be achieved through learning design.

This section focuses on stakeholder perceptions of the scenario-led design process, the development of innovative teaching practices and the impact of the iTEC approach on teacher motivation and attitudes. Evidence was gathered from case studies and surveys: scenario development (11 national coordinators, 15 participants, 16 national case studies), Learning Activity development (11 national coordinators, 5 case studies), teaching approach, motivation and attitudes (teacher survey, n=1399; implementation case studies, n=68).

Key finding 5:

The Future Classroom Scenario development process was viewed as innovative by policy makers, teachers and stakeholders, but further work is needed.

The aim of scenario development is to inspire teachers to become proactive 'agents of change'. The scenario development process involves a wide range of stakeholders; accounts for current trends in society and technology; provides a template for documenting scenarios; and offers a selection process for scaling-up the most effective of these. The initial version of the Future Classroom Maturity Model (originally called the 'Innovation Maturity Matrix') provided a self-review framework of five stages of innovation and five dimensions: outcomes, pedagogy, learner role, management and underpinning technology. It was developed to review technology integration and to evaluate scenarios.

The initial resources for scenario development were a set of printed documents, trialled with national coordinators and iTEC partners, and then piloted in national workshops (300+ participants). The toolkit was subsequently reorganised to make the resources more accessible, and published online.

The scenario development process was perceived as innovative by policy makers in eight countries (7 of 16 national case studies, scenario development case study). Valuable aspects were perceived as: identifying trends, the Future Classroom Maturity Model, guidance for adapting existing scenarios and the scenario selection process (national coordinator focus group, scenario development case study). In six countries, the initial version of Future Classroom Maturity Model was perceived as a means to stimulate thinking about innovation. However, another six countries already had similar tools for self-review in place and a further three noted potential challenges when introducing a maturity-modelling tool such as lack of school autonomy or lack of knowledge/motivation.

> The most far-reaching change relating to the iTEC process is perceived to be the structured approach to documenting and sharing best practices facilitated through the scenario development toolkit.
> (Hungary, national case study)

> The [Future Classroom Maturity Model] served as a basis for reflection and participants had the chance to position their schools regarding the different stages and to think about ways of moving forward and above.
> (Portugal, national coordinator)

> Involving teachers in the [scenario development] process has been a good experience for those teachers. It has proved to be an effective way of motivating teachers and as such has augmented their continuing professional development.
> (Norway, national case study)

Teachers and coordinators noted that the scenario development process as it stood at this stage of the project required simplification, improved presentation, further guidance and exemplification.

Key Finding 6:

Teachers and coordinators perceived that the Learning Activity development process has potential to develop innovative digital pedagogies in the classroom, but further work is needed.

Learning Activities provide concrete descriptions of discrete activities. For example:

> Reflection: After the end of each of the other Learning Activities, post and share audio updates of perceived challenges (use tools such as: TeamUp, VoiceThread, AudioBoo, Bambuser).

The Learning Activity development process starts with a set of scenarios. Through collaborative workshops with teachers and others, the process:

- identifies challenges and opportunities relating to scenario implementation;
- identifies suitable resources (tools, services, content, people and events) to address challenges and support implementation;
- documents the resulting Learning Activities.

The resources for Learning Activity development were piloted in national workshops with in excess of 400 participants, the majority of whom were teachers.

Feedback from a small number of teachers (n=15) involved in these workshops suggested the Learning Activity process has potential to develop innovative and creative teaching practices in the classroom. Teachers were positive; they enjoyed participating in the workshop (8) and the process (6); having opportunities to think differently about their practice (6); being creative (4); and collaborating with others (including those from other schools) to design learning (4). Aspects which workshop facilitators (n=8) felt worked well were: sharing experiences and working in groups (4); and encouraging people to think about challenges (2).

However, as with the Future Classroom Scenarios development process, at this stage of the project it was perceived that the Learning Activity development process needed to be simplified, with flexibility increased and the presentation improved. The piloted version was perceived as too time-consuming and complicated for regular use, particularly for a single lesson (3 teachers, 2 national coordinators). National coordinators (5 of 11) noted that teachers found the collaborative design process difficult to engage with, being more used to planning lessons alone.

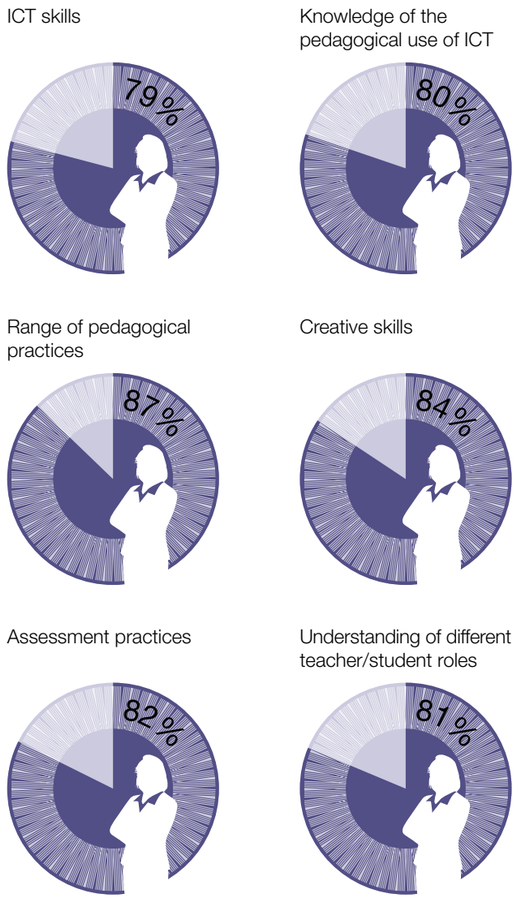
> Our teachers are not used to cooperating, so the most difficult aspect to understand and to explain to teachers is that they have to make decisions in a group.
>
> (Slovakia, national coordinator)

> It has been very inspiring... I still have to step beyond my comfort zone and that is challenging, but I realise it is good for me because I need to know these new things about teaching with technology... this is one way to train myself and to get familiar with it.
>
> (Finland, teacher)

Key Finding 7:

Teachers perceived that the iTEC approach enhanced their pedagogy and digital competence.

Facilitating iTEC Learning Activities enabled teachers to develop their:



(The percentage of teachers (n=826) in agreement, C1-3.)

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Implementing Learning Stories in the classroom encouraged teachers to innovate and experiment (C3-5: 21 of 68 case studies; C4: 4 of 10 teacher focus groups). This finding was echoed by students: 88% (n=1488) agreed that their teacher used different methods to help them learn.

Teachers (C4-5: n= 583) were asked to rate how different their pedagogy was when implementing a Learning Story in comparison to what they were doing previously; 28% indicated that their pedagogy had changed substantially.

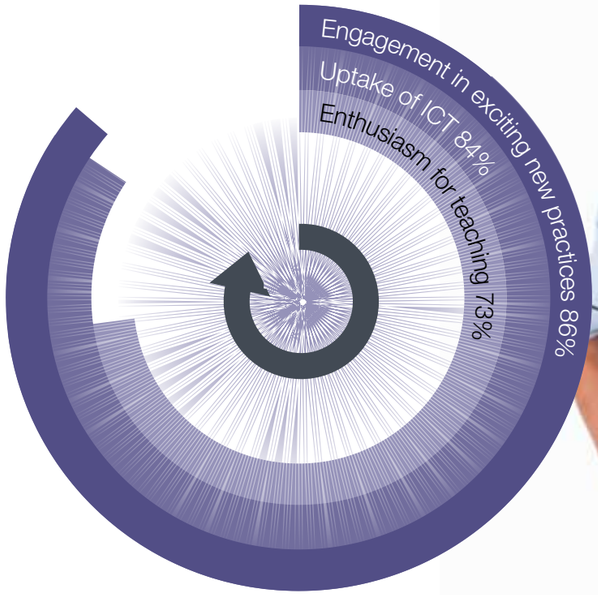
> The project invites me to use more new technologies and suddenly you feel more comfortable and they can be used more easily. This is what I found. (France, teacher)

> Learning Stories are innovative as it is, and it made me renew my pedagogy, […] Learning Story descriptions remind you to apply more details, which you may skip. For example reflection – it was very helpful to emphasise this Learning Activity. (Lithuania, teacher)

Key Finding 8:

Teachers became more enthusiastic about their pedagogical practices.

Facilitating iTEC Learning Activities impacted on teachers':



(The percentage of teachers (n=826) in agreement, C1-3.)

Qualitative findings supported the teacher survey data: teachers reported an increase in their own motivation (C3-4: 12 of 60 case studies; C4: 5 of 10 teacher focus groups).

> It has [increased my motivation], because for me, I needed to do something different and so in professional terms it has been good because now I don't see myself getting stale.
>
> (Portugal, teacher)

> Now I'm way more convinced of the need to push the school practice in this direction, because this enriches the students, offers new learning possibilities, and makes my teaching more interesting.
>
> (Italy, teacher)

Key Finding 9:

Teachers stated that they used technology more frequently; it was systematically integrated throughout the learning process rather than reserved for research or presentations.

Although teachers had already used technology to support student research or presentation activities, through iTEC they started making use of it in many more activities: to interact and communicate with students; facilitate team working; support design and production tasks; assess work; and encourage students' self-reflection. This can be attributed to the learning design process, which highlights the need to include digital tools in each Learning Activity, thus ensuring that digital pedagogy is developed.

Teachers incorporated a wider range of digital tools/services than previously, most commonly for data capture, seeking information, communication, collaboration, media sharing, media authoring and mobile learning. Teachers (n=583, C4-5) were asked to rate how different their use of technology was when implementing the Learning Story in comparison to what they were doing before. 30% stated that it had changed substantially. 86% (C4-5: n=585) indicated that their use of technology changed when implementing a Learning Story, most commonly due to the use of new digital tools (29%).

> With the help of this project I learned Google SketchUp and some other new things and I like them very much because before iTEC I had only known PowerPoint before but now I know many presentation tools, design and mindmap tools and I can even create my own blog. (Turkey, student)

> We used technology in every step: pupils searched for all the information about the content from internet, videos, by email or from experts who visited our school. They learned to send emails to experts. They also used iPads for the first time and shot a video and edited the video by using iPads. They reflected on their learning using TeamUp tool.
>
> (Finland, teacher survey)

Key Finding 10:

Teachers were introduced to digital tools they had not used before; some were more favourably received than others.

60% of teachers surveyed (C1-C3, C5: n=1047) indicated that they used digital tools/services that they had not used before.

The iTEC project also created a number of prototype tools to support learning and teaching, the design process, productivity and networking. The evaluation focuses on the user perspective, gathered through piloting. A full report on the research and development of iTEC prototype tools is also available [8].

iTEC prototype tools for supporting learning

TeamUp is a tool for allocating students to teams, either randomly or based on criteria (eg gender, topic preference). It also enables students to record short (60 second) reflections on their progress.

ReFlex is another tool designed to support individual student reflection through recording short audio clips organised on a timeline.

TeamUp was available to teachers in all five cycles. Teachers were largely positive about TeamUp and felt that it was an intuitive tool, which was useful for forming groups. The reflection feature was considered to offer students the opportunity to develop communication, critical thinking and reflection skills. Teachers felt that TeamUp had potential for both pedagogical (65%, C4-5: n=393) and technological innovation (64%, C4-5: n=393). Using a digital tool to facilitate reflection was perceived to be innovative. Two thirds of teachers (67%, C4-5: n=393) who used TeamUp said that they intended to use the tool again and would recommend it to other teachers.

ReFlex was introduced in cycle 4. Its uptake in piloting was limited. A relatively small number of teachers (n=55) tried ReFlex and were positive about its use and potential. ReFlex was perceived to provide simple functionality not yet available through other tools.

iTEC prototype tools for supporting the design process

The Composer is a planning tool for teachers to create, adapt and share Learning Activities. It enables teachers to find Learning Activities based on a taxonomy of transversal skills, and to discover new pedagogical approaches. It provides teachers with suggested resources, including tools and services, to use in the delivery of a selected Learning Activity, potentially making new technologies available to them.

The **Scenario Development Environment (SDE)** is a recommender system that takes into account the user's profile (for example school level and subject) and can provide recommendations for resources such as applications, events, widgets and lectures. Users can create their own resources and, for the purpose of testing, a standalone prototype tool was provided which also enables teachers to create their own scenarios and/or Learning Activities.

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Following piloting in Austria in cycle 4, national coordinators were asked to introduce the Composer to Learning Activity development workshop participants in cycle 5. Evaluation of the tool provided valuable insight into the needs of, and challenges to, teachers in the design process. As a prototype, concerns were raised about usability including layout and login, complexity and translations.

The SDE was used to support the Learning Activity development process in one country. In addition, national coordinators were asked to each recruit 15-20 teachers to test the SDE and complete an online survey. Perceptions of the SDE were also gathered through the teacher focus groups. The SDE was perceived to be one of the most useful technology prototypes generated in the project in three countries. All teachers responding to the survey (n=20) felt that it was easy to use and that they would recommend the tool to other teachers. The visual appearance was viewed as positive as was the opportunity to discover new resources through recommendations. It was noted to be useful for less experienced teachers.

An iTEC prototype tool for curating digital learning resources

The Widget Store, designed as a productivity tool, provides a means of curating resources (widgets) and moving them easily between learning platforms, potentially offering seamless integration and facilitating interoperability. Teachers are able to create their own widgets to add to the store. Users can rate and review the widgets.

The Widget Store was piloted at scale in cycles 4 and 5. 28% (n=590) of teachers used the Widget Store and of these 32% (n=166) created their own widgets. Creating widgets was noted to demand a higher level of technical expertise although, in cycle 5, Portuguese students undertook this. Four out of five teachers (n=161) who used the Widget Store said that they would use it again in the future (81%) and would recommend it to other teachers (82%). However, teachers found it difficult to use (35%) and the range and quality of widgets was limited (20%). They also reported technical issues (16%). Teachers from some countries were positive, whilst in other contexts its potential value was less apparent, particularly compared to a growing number of similar tools and services.

An iTEC prototype tool for professional network development

The People and Events directory facilitates professional network development and collaboration for teachers. It connects teachers with similar interests, allowing them to share knowledge and experiences. It also enables them to identify people (from outside their current networks) and events that might support learning and teaching.

Most teachers (participating in the focus groups at the end of cycle 5) had registered with the site and some had created an event. Of those responding to the online survey (n=132), the main advantage of the directory compared to other social networking sites was perceived to be its focus on teachers' needs specifically (47 responses). Location-based searches for events were perceived as useful (59%, n=132). The facility to identify collaborators was similarly viewed as useful (64%, n=132). However, the 'events' features were used more extensively than the 'people' features. 81% (n=106) of respondents said that if the directory was developed into a mature product then they would use it again and 80% (n=89) of teachers said that they would recommend it to others. Such a mature directory would need to be more populated (27 respondents, 3 of 9 teacher focus groups) and the interface could be improved (13 respondents, 2 of 9 teacher focus groups).

Key finding 11:

Teachers collaborated more, both within and beyond their schools, a process facilitated through the online communities.

The ITEC approach led to increased collaboration between teachers (C3-5: 15 of 68 case studies; C4: 4 of 10 teacher focus groups; 3 of 16 national case studies). Training and support were positively received by teachers who particularly enjoyed face-to-face meetings, networking with other teachers, opportunities for hands-on experience of tools, online discussion forums, webinars and video-tutorials. The use of national online communities was evaluated in cycle 4. Although how the online communities were used varied, they were most commonly used to share ideas and examples of good practice. Collaborative problem solving also took place within the online community, but this was a less frequent activity (except in communities expressly intended for this purpose).

> The innovation takes place in the school itself and less in the individual classroom. Teachers talk more to each other about using technology. They work together in an interdisciplinary way using projects.
>
> (Belgium, case study report)

> Another innovation is the development of a community of practice of teachers. Dissemination by teachers has taken place via a national blog and websites. There has been an increase in collaboration and interaction between teachers.
>
> (France, national case study)

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3: What is the potential of the iTEC approach for system-wide adoption in schools?

It is widely asserted that, in order to remain competitive in global markets, education and training needs to be transformed; one means to address this is through mainstreaming the use of technology in learning and teaching. Given that uptake of digital pedagogy is still low, it is essential to explore mechanisms that can support system-wide change. The iTEC project developed a process, toolkit and library of resources that could provide such a mechanism for system-wide adoption of digital pedagogy.

The evidence draws on the teacher survey (n=1399), national case studies (n=16), teacher focus groups (n=19) and implementation case studies (n=68).

Key Finding 12:

Awareness of the iTEC approach is growing in educational systems, and there are signs of widespread uptake.

During the project evidence of impact on compulsory schooling systems increased. Evidence of dissemination at local/regional/national levels to raise awareness of the benefits of the iTEC approach was stronger than evidence of change. This is to be expected given that awareness-raising is a necessary precursor to scaling up. By the end of cycle 3, there were early indications that the iTEC approach had already begun to transfer without direct intervention, primarily within schools but also to schools not already involved in iTEC. This activity increased in cycle 4 and cycle 5. With a project focus on exploitation in the final year, MoEs put mechanisms in place to support dissemination and in many cases clear plans to continue to support the iTEC approach in the future [9]. Examples include running professional development courses, integrating iTEC with new/ongoing projects and working with initial teacher education institutions.

In cycle 5, nine out of ten teachers (C5: n=244) said that they intended to use the iTEC approach again (91%) and would recommend it to other teachers (92%). While 81% of teachers (n=244) agreed that the iTEC approach could become part of their own routine practice, only half the teachers (52%) agreed that the iTEC approach could become part of the routine practice of other teachers in their school. They were particularly cautious about the potential to scale-up at national level, with only 43% agreeing that the iTEC approach could become part of routine practice for the majority of teachers in their country.

Four out of five teachers responding to the survey (85%, C4-5: n=575) indicated that they had shared their experience of various aspects of the iTEC approach with teachers outside the project (both within and beyond their schools). For example, one teacher in cycle 4 had presented their work at a conference for mathematics teachers and in cycle 5, teachers from two countries had spoken about iTEC at national conferences. There was some evidence of transfer of the iTEC approach within schools (C3-C5: 13 of 68 case studies) and of other teachers expressing an interest (C3-5: 19 of 68 case studies; C5: 54% of teachers surveyed, n=244). In contrast, some teachers perceived that other teachers might not be interested in the iTEC approach or would find the use of technology challenging (C3-5: 10 of 68 case studies; C4: 1 of 10 teacher focus groups). Similarly, teachers from cycle 5 (n=244) reported that about one third of teachers they had shared the iTEC approach with had mixed reactions and 14% were not interested.

> Yes, it has the potential to change my future practice because now I have learnt about other ways to get my objectives, other ways to work in groups with my students, other ways to do collaborative work, and I'm going to use it in my future lessons.
> (Spain, teacher)

> They were aware of it; K informs us regularly. She talks about it in e-mails, personal conversations and at meetings. Thus, teachers are aware of it, and are curious to know about the latest project K is involved in. This is how far we have got. I think later on other colleagues may join too.
> (Hungary, head teacher)

Key Finding 13:

The scenario-led design process can support mainstreaming of innovation, provided the process is refined.

Policy makers felt that the iTEC scenario-led design process would be an important output of the iTEC project in relation to policy making and the potential for supporting scale-up of digital pedagogy through professional development (7 of 16 national case studies).

The Learning Activity development process has potential for use in teacher training and professional development (4 national coordinators) and in supporting classroom teachers (3 national coordinators), school level change (3 national coordinators) and national level change (1 national coordinator). It could be used to design new/adapt existing Learning Activities (5 national coordinators) and/or be integrated with other parts of the iTEC approach (4 national coordinators).

As noted above (Key finding 5 and 6), some improvements to the process are required.

Key Finding 14:

The library of scenarios, Learning Stories and Learning Activities was viewed by policy makers and teachers as a valuable output of iTEC to support system-wide classroom innovation.

Teachers perceived that the library of Learning Stories and Learning Activities has potential to lead to both pedagogical and technological innovation in the classroom (C1-C3: 97%, n=826; C4-C5: pedagogical – 89%, technological – 88%, n=573). Policy makers noted that the library of resources provides an effective structure; is sufficiently innovative without being overwhelming; and is easy for teachers to use (8 of 16 national case studies). In addition, they suggested that Learning Activities are valuable because they provide concrete examples of novel approaches, emphasise innovation and flexibility, and encourage teachers to become learning designers (8 of 16 national case studies). 85% of teachers (C1-C4: n=1153) said that they would use the Learning Stories they had piloted again whilst 86% said that they would recommend Learning Stories to other teachers.

> The Austrian National Coordinators and teachers have found the new ideas, encapsulated within the Learning Activities, to be of greatest benefit in achieving their personal goals. The emphasis on innovation and flexibility (opportunities to experiment) has been most inspiring, with new elements such as bringing in external experts as an example.
>
> (Austria, national case study)

> The Learning Activities are valuable because they are very practical and show teachers how a lesson can be structured. The fact that they are concrete examples, rather than general descriptions is valuable.
>
> (Czech Republic, national case study)

> Today's simple lesson plans that we use consist of just books, notebooks and other class materials. This Learning Story has created lessons plans which are full of discovering, thinking, creating and achieving success as well as [being centred] in the real world around us.
>
> (Turkey, teacher)

Future Classroom Lab

iTEC
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Key Finding 15:

In countries in which iTEC aligns closely with national policies and strategies, the iTEC approach is likely to be adopted and to influence future practices.

The national case studies were undertaken mid-way through the third year of the project, partly focusing on the impact of iTEC on ICT strategy and policy development. Dissemination was already taking place in many of the participating countries with seven indicating that they had held seminars, workshops or forums, and five stating that they had held conferences. In Norway, iTEC had already been influential and had been referenced in official government consultation papers and in Austria, Belgium (Flanders), Estonia, Finland and France the iTEC project was noted to align with current policy direction and therefore likely to be influential in the future. By the end of the project, two further countries (Hungary, Italy) indicated that iTEC had strongly influenced recent national strategy development.

> …this is the right time for policy recommendations to be included in the National Strategy of Education in Estonia. There is a chapter within this on 'digital culture in education'. The underlying ideas of iTEC appear to be very similar to those in the National Strategy.
>
> (Estonia, national case study)

> iTEC correlates quite well with other national developments, including the development of a new core curriculum, and the aim to digitalise the national matriculation exam in a few years. So, iTEC comes at a good time.
>
> (Finland, national case study)

Next Steps

The summary of the evaluation evidence presented above clearly shows that the iTEC approach had considerable impact on learners and teachers, and highlights the potential that exists for system-wide change if the project results are exploited fully. The evaluation results have influenced the final design of the Future Classroom Toolkit, integrating the scenario and Learning Activity development processes, and teachers' guide to learning activity design. Taking into account the need for clearer presentation and simplification of the process should ensure wider adoption.

The project has responded to recommendations made during the evaluation [4] as follows:

The Future Classroom Toolkit, bringing together the learning design processes, and addressing the issues identified during the evaluation, has been developed. The processes have been simplified; the presentation is more accessible and interactive; the complex terminology adopted has been clearly clarified; and many exemplars have been provided to make the process easier to adopt. The initial version of the Future Classroom Maturity Model has been reviewed by an expert, substantially revised and developed into an interactive tool.	European Schoolnet plans to work with Initial Teacher Education institutions to support adoption of the iTEC/Future Classroom processes and tools in teacher education.
European Schoolnet is offering to customise the toolkit for industry partners.	
The iTEC community will continue under the umbrella of the European Schoolnet Future Classroom Lab, supported by new Future Classroom Lead Ambassadors nominated by MoEs and Future Classroom Lab industry partners. Lessons learned from the People and Events directory will inform future development of this community.	
The iTEC Future Classroom Scenario process will continue to be used in the Creative Classrooms Lab project and future European Schoolnet projects involving MoEs.	
The Future Classroom Scenarios MOOC will be offered as a regular part of the European Schoolnet Academy programme. Shorter, face-to-face courses related to the Future Classroom Toolkit will continue to be offered regularly to teachers within the Future Classroom Lab in Brussels.	

iTEC prototype technologies

The University of Vigo will continue to develop the SDE. It would be beneficial to evaluate the SDE with more teachers, particularly in the countries which viewed it favourably.	
	The Widget Store will continue to be maintained. It will be made available for download as open source software. Some MoEs have already expressed an interest. It is unlikely to be taken up widely in the near future, and the reasons for this have been documented together with implications for the development of similar learning services [8].
The standalone Composer tool is not due to be developed further beyond the project. However, the lessons learned from its development and testing are informing development of other, simpler tools for supporting learning design.	
	Whilst it is not the intention to maintain the People and Events directory in its current form, lessons learned from the technical approach and user interactions will inform the development of the Future Classroom teacher community, managed by European Schoolnet.

Notes

[1] Austria, Belgium (Flanders), Czech Republic, Estonia, Finland, France, Germany, Hungary, Ireland, Israel, Italy, Lithuania, Netherlands, Norway, Poland, Portugal, Slovakia, Spain, Turkey, United Kingdom

[2] Rogers, E.M. (1995). *Diffusion of Innovations*. 4th Edition. New York: Free Press.

[3] Dillenbourg, P., & Jermann, P. (2010). 'Technology for classroom orchestration'. In M. Khinel (Ed.), *The New Science of Learning: Computers, Cognition and Collaboration in Education* (pp. 525–552). Berlin, Germany: Springer.

[4] Lewin, C., & McNicol, S. (2014). *Creating the Future Classroom: Evidence from the iTEC project. Full Report*. http://itec.eun.org/web/guest/deliverables

[5] http://fcl.eun.org/

[6] http://cpdlab.eun.org/course-materials

[7] http://www.europeanschoolnetacademy.eu/

[8] Griffiths, D., et al. (2014). *D8.4 Final Report on Technical Innovation in iTEC*. http://itec.eun.org/web/guest/deliverables

[9] Ellis, W. (2014). D11.5.4 iTEC Exploitation Plan. http://itec.eun.org/web/guest/deliverables

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