

**ITEC - WP 11**

**D11.5.2 (VERSION 2). – EXPLOITATION PLAN**

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V1	8/11/2012	1 <sup>st</sup> draft	Official	EUN
V2	28/02/2013	<b>Re-drafted at the Request of the European Commission Review Panel:</b> <i>It requires a more consolidated strategic vision of the contribution that iTEC expects to make, and a clear vision of individual and collective outcomes. All partners should participate in this work.</i>	Official	EUN

## Executive summary

This is a resubmission of the second of four versions of the iTEC Exploitation Plan, a public deliverable that aims to provide a strategy for sustaining iTEC results after the end of the project, including: mechanisms for developing and validating future classroom designs/scenarios; further development/deployment of iTEC tools and services related to these; and continuation of iTEC training and support services. The second version of the deliverable:

- Provides a strategic vision identifying the key exploitable outputs of the iTEC project as envisaged at the half way point of delivery, and an outline of how the iTEC consortium anticipates achieving the desired exploitation results.
- Describes the strategic approach and thinking behind the vision, and the methodology for creating the vision and bringing it to life.
- Provides a first analysis of how iTEC is aligned with or having an impact on the ICT strategies of education ministries in the project and how project partners more generally are beginning to see possibilities for exploiting iTEC results after the end of the project in August 2014.

In Year 2, work package 11, leading the exploitation activities, has continued to raise awareness of the project among all relevant stakeholders and has carried out a major redesign of the project web site.

Initial feedback from project partners on their individual exploitation plans indicates that:

1. At the mid point in the project, there already appears to be good alignment of iTEC activities with a number of national ICT strategies or signs that the project is impacting on policy formation.
2. Based on the experiences of schools in cycles 1 and 2, there are a number of positive reports that MoE want to implement iTEC learning stories/activities on a larger scale.
3. The more general dissemination actions of partners are now raising the profile of the project and there are encouraging signs that the majority of partners involved in the pilots are beginning to develop strategies for upscaling based on: incorporating iTEC results in initial teacher education and CPD; closer engagement with ICT advisers; and use of social media/networks to directly engage with teachers.
4. The majority of partners at this stage in the project have emerging ideas on how they will take dissemination and upscaling actions to the next level.
5. Partners have highlighted a number of factors that could inhibit the mainstreaming of iTEC results in different countries. This information has been fed into the mainstreaming discussions in the iTEC High Level Group.
6. At this stage in the project, a number of partners working to develop iTEC technology see themselves as providing a technology 'proof of concept' and all partners appear to have ideas concerning how the work in iTEC can be taken forward within their own organisation in order to support their specific research agenda or organisation's strategy.
7. Prior to classroom trials of the iTEC technology, it is too early in the project to anticipate whether it will be possible to move beyond a 'proof of concept' in most work packages. Issues related to the W3C widget specification and its scalability may particularly need to be addressed in the next phase of the project. Some partners developing iTEC technology are also aware that they do not have the capacity to run pan-European technical services for schools after the end of the project.

In the third year of the project as part of iTEC the exploitation strategy, partners now aim to:

- Produce a Future Classroom Scenario toolkit as means of streamlining the scenario development process in WP2 and increasing the possibilities that this can be sustained after the end of the project. Training courses incorporating this toolkit will also be developed in order to ensure that stakeholders outside the project can replicate the iTEC scenario development process at national, local and community levels.
- Produce a Learning Activity Design toolkit that can also be disseminated to the education community through training courses and workshops and trial how the iTEC Composer can be integrated within this.

- Explore how the widget store and other results from the iTEC technology development can be sustained beyond the end of the project.
- Showcase and demonstrate iTEC Learning Activities and supporting technology within Future Classroom Lab training courses, workshops and seminars for both practitioners and policy makers.
- Continue to develop working relationships with a group of active iTEC Associate Partners from both the public and private sectors, including major ICT vendors that have joined the Future Classroom Lab as industry partners.
- Take forward and further develop the recommendations related to the up-scaling and mainstreaming of iTEC results made by the High Level Group.

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## 1 INTRODUCTION

### 1.1 PURPOSE OF THIS DELIVERABLE

This is a resubmission of the second version of the iTEC Exploitation Plan, a public deliverable that aims to provide a strategy for sustaining iTEC results after the end of the project, including: mechanisms for developing and validating future classroom designs/scenarios; further development/deployment of iTEC tools and services related to these; and continuation of iTEC training and support services.

Version two of the Exploitation Plan was produced at the end of the second year of the project and will be updated annually with version four being produced in month 48.

As iTEC Learning Stories and Activities are validated over five cycles during the project, the later versions of the Exploitation Plan will increasingly report on the exploitation plans of individual project partners and actions being taken at national level to ensure that iTEC outputs are mainstreamed and taken to scale.

This second version of the deliverable:

- Provides a strategic vision identifying the key exploitable outputs of the iTEC project as envisaged at the half way point of delivery, and how the iTEC consortium anticipates achieving the desired exploitation.
- Describes the strategic approach and thinking behind the vision, and the methodology for creating the vision and bringing it to life.
- Provides a first analysis of how iTEC is aligned with, or having an impact on, the ICT strategies of education ministries in the project and how project partners more generally are beginning to see possibilities for exploiting iTEC results after the end of the project in August 2014.

### 1.2 PURPOSE AND SCOPE OF THE TASK

Deliverable 11.5.2 is an output of iTEC task 11.3 on Mainstreaming iTEC Scenarios and Results. At the time of writing this deliverable, complete evaluation results are available from two of the five iTEC validation cycles. This has enabled partners involved in the school piloting to begin some serious reflection on how iTEC future classroom designs might be up-scaled and mainstreamed and, in the case of MoE, to consider their potential impact on national ICT strategies and development plans.

In October 2012, the main technology developments in the project can still be considered advanced prototypes and, will not start to be subjected to large-scale testing in schools until Year 3. Real user testing and feedback will be needed in order to determine the potential of iTEC technology in an exploitation phase, however, project partners involved in the technology development have made progress in moving beyond the initial suggestions for exploitation of results made in version one of this deliverable.

### 1.3 RELATIONSHIP WITH OTHER TASKS/DELIVERABLES

As it develops over four versions, the final Exploitation Plan will particularly draw on:

- Evaluation data and findings from WP5 related to each completed project cycle (Task 5.4)
- Findings from running the training and support services for national technical coordinators in WP6 (Tasks 6.2 – 6.7) and for teachers in WP4 (tasks 4.5 and 4.5)
- The technology evaluation report in WP8 (deliverable D8.3 in Month 36) and the impact of iTEC on the standardisation process (deliverable D8.4 in Month 48)
- Deliverable 9.4 which will suggest actions for continued sustainability of the iTEC directory on a technical level after completion of the project (Month 46)
- Evaluation of the semantic modelling process in WP10 (Task 10.2.4, Month10-48)
- Evaluation Interim Reports 1-3 (deliverables D5.2 in M11, D5.3 in M23, D5.4 in M35) and Evaluation Plan (deliverable D5.5 in M46)
- A report from a peer learning workshop on what triggers and keeps reform processes in ICT in education alive (part of deliverable D11.3 in M24)

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- Findings from the Evaluation conference, originally planned for M42, but now proposed for M37 (contained within deliverable D11.4 in M48)
  - Recommendations related to mainstreaming iTEC results in the First and Final Reports from the iTEC High-Level Group (deliverables D11.3 in M24, D11.4 in M48)

#### **1.4 STRUCTURE OF THE DOCUMENT**

As the project develops, each version of the iTEC Exploitation Plan will contain increasing levels of detail. Following rejection of this deliverable in year 2, the format of the document has been changed to the following:

1. Introduction.
2. The iTEC Vision Statement: A strategic vision describing, in a way that is accessible to a wide range of stakeholders, what iTEC intends to achieve. Key components of the vision are also described, and an outline roadmap to achieving the vision is given.
3. Strategic Positioning of the iTEC Vision: The background to the iTEC approach, based on research, is given to provide a justification and rationale for the vision and its legitimacy.
4. The Methodology Behind iTEC: The approach to achieving sustainable impact in the education system is discussed.
5. Exploitation of Results by iTEC Partners: strategies and plans being made by individual project partners to exploit iTEC results beyond the end of the project.
6. iTEC Exploitation Planning in Year 3: an outline of the activities due to take place in the third years of the project, leading up to the drafting of the third version of the exploitation plan, and further progress towards achieving the iTEC Vision.

#### **1.5 IMPACTS OF THE DELIVERABLE**

##### **1.5.1 iTEC Project**

###### ***1.5.1.1 Impact on iTEC Milestones***

This deliverable was produced in October 2012, two months later than originally planned for D11.5.2 set in the project Description of Work. This delay was due to the difficulty in arranging online interviews with project partners in the main vacation period of July and August as part of the information gathering process related to the analysis of partners' exploitation plans provided in section 7 of the deliverable. It was also thought useful to align v2 of the Exploitation Plan with the recommendations emerging from the High Level Group peer-learning workshop that took place on 19-20 September 2012. These draft recommendations have been sent to HLG members at the end of October. The plan has been redrafted at the request of the European Commission review panel, for February 2013.

The original version 2 exploitation plan, D11.5.2 was rejected at the iTEC Annual Review in November 2012, and was subsequently re-drafted and resubmitted in on the 1<sup>st</sup> of March 2013.

Further, more detailed iterations of the Exploitation Plan will be provided in M37 as project results progressively become available and a final version of the deliverable (D11.5.4) will be produced at the end of the project in M48.

This deliverable complements the iTEC communication and dissemination activities and deliverables including the iTEC Communication Plan, an internal project deliverable that was provided to Commission reviewers for the second project review in November 2012. The communication plan will also accompany the exploitation plan when submitted again in M37.

###### ***1.5.1.2 Impact on iTEC 'Risk Analysis'***

The second version of this deliverable has no impact on the risks that are currently discernable in the project. Later versions of this document will report on how the project is dealing with any perceived: risks related to low, initial take-up of iTEC results; or a risk that the project may not have a long-term, sustainable impact on schools.

### **1.5.2 Ethical Issues**

The project does not foresee any ethical issues that need to be addressed by the Exploitation Plan.

### **1.5.3 IPR Issues**

The Consortium Agreement identifies ownership or IP rights in relation to any foreseen results from the project, together with mechanisms to deal with IPR claims that arise during the project in respect of unforeseen results. It is the intention, however, that the project will favour open source modalities for the exploitation of major project results and that the exercise of IP restrictions over access to any project results will be at a minimum.

Any issues related to IPR will be addressed in future versions of the Exploitation Plan as it becomes clearer what project results the Consortium or individual partners wish to exploit either collectively or individually.

In this second version of the Exploitation Plan, there is no indication that any IPR issues related to the exploitation of iTEC results need to be addressed at this stage in the project. This issue will be closely monitored and reported on in future versions of the deliverable.

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## 2. THE ITEC VISION STATEMENT

The Vision Statement has been drafted according to the following principles, based on “Managing Successful Programmes”, provided by the UK Office of Government Commerce.

- It is a description or “snapshot” of the desired future state, not a statement of intentions or objectives.
- It is written in a language that can be understood by a wide range of stakeholders, thus avoiding jargon.
- It describes a compelling picture of the future that is different, and better than the present.
- It describes a degree of transformational change that is inspirational to the key stakeholders.
- It does not state timescales and delivery dates as would be expected in a project plan or objectives.
- It is verifiable, so that it can be clear when the vision has been achieved.
- It is short and memorable so that stakeholders can use it to communicate the vision to others, and therefore, lacking in specific performance targets.

The vision will be reviewed by the iTEC General Assembly at the 6 monthly meetings (March and September) and updated as necessary. This vision forms the basis for the exploitation plan.

The following comment is contained in the second annual iTEC review report:

*“It is too soon to consider exploitable results, although several components are foreseen as marketable, such as the Classroom Scenario Toolkit, the Learning Activity Design Toolkit and specific tools such as the ITEC Composer, the ITEC widget store, for which key stakeholders interested in the ITEC results have been targeted.”*

It is important to reiterate that the following vision is intended to highlight a number of potentially achievable and desirable results at this stage of the project. However, significantly more consultation within the consortium, and with external partners is planned within the final years of the project, and more evidence from the ongoing work of iTEC is required before any firm decisions can be made on which project outputs are most appropriate for exploitation. Consequently, the vision below is expected to evolve through the remainder of the project as new evidence and ideas emerge, and new opportunities and challenges are presented by partners. Some aspects proposed in the vision may not be viable towards the end of the project whilst increased focus on specific aspect of the vision is likely.

Therefore, the vision below aims to highlight a wide scope of possibilities for exploitation, as a basis for consultation, before refining the vision down to a more realistic statement of what is agreed to be achievable and desirable.

### 2.1 THE VISION

The pace of change in the classroom has become significantly more aligned with the pace of change of technology and the use of technology in society. Technologies supporting creativity, collaboration and communication have become common in the workplace and everyday lives, and the ubiquitous nature of this technology, and the affordances it brings, is mirrored by its use in schools across Europe. Schools are no longer an oasis of low technology and traditional interaction. The adoption and exploitation of technology in support of learning and teaching is led by pedagogical considerations and policy needs, rather than questionable investment in the “next big thing” or “silver bullet” of education technology.

Purchasing, deployment and use of technology in support of education is now directed by a set of tried and tested guidelines, tools and techniques which ensure that decision making is informed by a reliable vision of the future classroom. These resources are packaged as the **Future Classroom Scenarios Toolkit**, and the **Learning Activity Design Toolkit**. They have been derived from the European Commission funded iTEC project.

The Future Classroom Scenario (FCS) Toolkit provides a clear, easy to adopt and flexible approach for creating a vision for the deployment and use of technology, based on educational requirements and needs in relation to policy and strategy. The toolkit brings together the key stakeholders, decision makers and those with influence over what can be achieved, and what is desirable in schools. The expertise and experience of the teaching community, combined with needs as perceived at policy level, and the capability of technology are combined, resulting in the production of Future Classroom Scenarios describing innovation in pedagogy and effective use of technology.

The FCS Toolkit is used through the education system to bring about incremental but sustainable change that has previously been missing in the education system, despite years of investment and research. At the level of individual schools, the toolkit is employed by school leaders as a framework for deciding on how to develop curriculum delivery and classroom design and practice. It is used, for example, when a school is considering investment in technology, or when a school is making changes to the curriculum or school layout. It provides an effective methodology for change management ensuring the key stakeholders are consulted and their support secured. The toolkit is equally valuable as a change management tool at regional and national level. It is used by local, regional or national government across many European countries to support policy change, particularly involving deployment of technology. In each case the toolkit is adapted to the local needs and context, but the fundamental principles of creating a shared and reliable vision of the future education situation is consistent.

The use of the toolkits has become systemic, used by suppliers, consultants, national, regional and local government, and by individual schools and practitioners. As the toolkit is free to use and well recognised, consultancy companies also offer training in its use. Major ICT suppliers have also adopted the FCS Toolkit as a way of maximising the effectiveness of the adoption of their technology. The results of using the toolkit translate into better use of their technology, increased customer satisfaction and increased sales. Adoption of the toolkit by ICT providers is viewed as a strong indicator of a customer focused, pedagogically aware organisation.

The Future Classroom Scenario Toolkit is accompanied and complimented by the Learning Activity Design Toolkit. The Learning Activity Design Toolkit is much more focused on enabling the adoption of advanced pedagogical approaches by teachers, supported by appropriate technologies and other resources. The Learning Activity Design Toolkit is used by individual teachers and collaborative communities. These include, for example, teachers in an academic department within a single school, or a wider community of teachers collaborating on curriculum development. This toolkit, in its simplest form, guides teachers in how to find and use an archive of Learning Stories and Learning Activities. These were initially developed as part of the iTEC project, and proved to be highly successful in inspiring teachers across Europe to adopt new and engaging approaches to curriculum delivery, using technology. The design of Learning Stories and Activities is underpinned by 21<sup>st</sup> Century skills and research into teacher competencies. A teacher competency framework has been adopted that makes practical use of previous work in this domain, particularly the UNESCO competency framework. This allows each Learning Activity to be mapped to the competency framework to ensure that the activities provide opportunities for teachers to develop new competencies. The mapping of competencies to the Learning Activities also allows teachers to select those Learning Activities according to competencies they wish to develop. In addition to this the toolkit allows teachers to adapt, create and share ideas for Learning Activities and Learning Stories. This has resulted in a growing collection of inspirational materials. The Learning Activity Design Toolkit has been adopted through networks of teachers e.g. those coordinated by commercial organisations, as well as National Networks and international communities such as eTwinning. The use of the toolkit is also promoted through teacher education institutions across Europe.

The use of the Learning Activity Design Toolkit is supported by technology derived from the iTEC **Composer** Tool. The Composer acts as a reference model for online services that give teachers access to the bank of Learning Activities and Learning Stories. The services also allow teachers to adapt these resources to their

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own needs and create and share their own Learning Activities and Learning Stories with others. A valuable feature of these tools is the facility to help teachers find and make use of new technologies and resources. Teachers are able to select a Learning Activity, and are then provided with suggestions of what technologies would be most appropriate to use in the delivery. This is a powerful way of exposing teachers to new technologies, and a consequence of that, new approaches to learning and teaching e.g. teachers who may not have considered using online chat or collaboration systems will discover a number of technologies which enable this and which are free and easy to use. This will give them new and engaging approaches to formative assessment and classroom management.

The Composer also demonstrates “intelligent” advice on resources to the teachers through an underlying component, the **Scenario Development Environment**, which has the capability of making informed recommendations, based on the teacher’s local technical setting. Recommendations can therefore be personalised for each user. The Composer based technology also has the capability to provide recommendations on a range of resources, not simply limited to content. The research carried out in iTEC has demonstrated how teachers can be made aware of, and given access to, **People and Events** that can play a role in a given Learning Activity. For example, teachers can be given access to a live online chat with experts in a number of curriculum topics, and students can participate in online discussions with peers from across Europe.

The Composer based technology also provides resource recommendations from a growing repository of learning tools called widgets in the **Widget Store**. These Widgets are commonly simple tools, to support a range of classroom activities. They may be something as basic as a calculator or note pad, or something more sophisticated like the award winning, iTEC TeamUp tool, used to support collaboration and reflection. While the Composer provides widget recommendations, teachers can also search the store themselves and find popular widgets (frequently downloaded, or recommended by other users). Teachers are also able to create their own widgets without need of technical knowledge. They can create their own widget collections by “capturing” parts of the internet, such as films, animations and online activities, and collect them together in one place. The widget store has been integrated into a number of common educational platforms e.g. Moodle, DotLRN, Active Inspire, SMART Notebook, and several others. As a consequence of this, teachers can access the store in an environment they are familiar with, rather than having to find and register in a multitude of unfamiliar (often challenging) environments and platforms. The ability to access these resources and tools so easily, allows teachers to quickly discover and adopt new technologies in support of innovative and advanced pedagogy.

Beyond the end of the iTEC project, these technologies have remained to stimulate further research into the value and application of this support for teachers. The technical outputs have also been packaged as a “Technical Toolkit”, comprising a number of technical artefacts ranging from specific tools such as the iTEC Composer, the Widget Store, TeamUp, the User Management and Access System, reference implementations such as the Scenario Development Environment (SDE) and the People & Events directory, and specifications such as the iTEC semantic model and the iTEC data model and vocabularies. MoE and technical players do not adopt the full set of tools but pick and choose from the technical toolkit. For example some choose to develop their own P&E directory based upon the iTEC data model and vocabularies. Others use only the iTEC semantic model to develop their own linked data repository which, by following the iTEC specifications and the multilingual vocabularies, allows a good level of interoperability, allowing exchange with other MoE.

The Future Classroom Scenario Toolkit and Learning Activity Design Toolkit can be used separately, or together. Using the toolkits together produces Future Classroom Scenarios which act as an initial stimulus or vision for innovative pedagogical approaches. The Learning Activity Design Toolkit can then be used, following this, to turn that vision into a practical reality. The iTEC process has also established a set of specific tools that are used independently. These include the **Innovation Matrix** and **Selection Criteria**. The Selection Criteria are used consistently through both toolkits as a quality measure, to ensure that

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Scenarios and Learning Activities respond to needs defined across a number of dimensions, from innovation to trends in technology, society and education policy. The Innovation Matrix has been adopted by a range of other projects within the TEL domain to establish, in a consistent way, the relationship between technical innovation and pedagogical requirements and to rate the degree of innovation expected through classroom pilots.

Guidance and support for the continued, consistent and effective exploitation of the iTEC outputs is achieved through the Future Classroom Scenarios Continued Professional Development Lab Course (FCS CPDLab Course). The course is delivered in Brussels in the Future Classroom Lab facility. It is also published under open licences allowing others (suppliers, consultants, universities and MoE) to deliver and adapt the course. The course covers the use of the FCS Toolkit, Learning Activity Design Toolkit, use of Learning Activities in practice, and the use of technologies delivered through the iTEC project. The delivery of the course in Brussels, and with elements online, targets teachers and trainers who are able to deliver components of the course in their own countries.

## **2.2 OUTLINE ROADMAP FOR ACHIEVING THE VISION**

### **2.2.1 Toolkit and Training Completion and Testing**

Within the first two years of the iTEC project, the partnership has been very successful in developing and adapting the processes for scenario development and Learning Story and Activity design. The consortium now has a well thought through set of tools and techniques for achieving this, and already a solid bank of Future Classroom Scenarios and Learning Stories and Activities. These have been produced over three cycles involving the contribution of TEL experts, major technology suppliers, policy makers, education professionals and learners. These pedagogical outputs have been validated at large scale in over 1000 classrooms across 17 European countries, coordinated by both suppliers and MoE. The evaluation of these pilots has provided evidence of positive impact in the classroom. The pedagogical outputs and processes used to generate them have proven to bring innovation to the classroom, and effective use of technology to support increased opportunities for learners to acquire 21<sup>st</sup> Century Skills.

To exploit this work, it is seen as necessary to ensure that the iTEC processes are formalised in a way that can enable wider scale use and therefore impact across the European education landscape. The result of this is the production of the Future Classroom Scenario (FCS) Toolkit and Learning Activity Design Toolkit. The FCS Toolkit has been completed (January 2013) and is due for testing in the Spring/Summer 2013 by piloting countries. The use and value of the FCS toolkit will be evaluated by the activities of WP5. Consequently, there will be less emphasis on classroom evaluation. The results of this evaluation will be available in the autumn 2013. At that time the consortium will be able to make informed decisions on how the toolkit is further developed (e.g. an online tool) and how its wider scale adoption can be achieved.

The same testing and evaluation of the Learning Activity Design Toolkit is also scheduled for the Summer/Autumn 2013. The process of using this toolkit will also be evaluated through the work of WP5. The evaluation of the final cycle of iTEC pilots from December 2013 to March 2014 will be necessary to ensure that the Learning Activities generated through the use of the toolkit provide comparable results to those generated in earlier cycles. The evaluation results and reporting will be essential for the exploitation of these toolkits.

Alongside the development and testing of the toolkits, EUN is developing and testing the FCS CPDLab course, using expertise from the iTEC consortium to ensure consistency with the objectives of iTEC and to support the exploitation plan. The course will be completed in March 2013 and is being tested with iTEC teachers leading up to this. It has also been offered to teachers for the summer 2013 and is so far over subscribed with teacher registrations (of the 3 CPDLab courses, this one is currently most popular).

### **2.2.2 Technology Completion and Testing**

The use of the iTEC technologies by teachers requires further, more focused, evaluation in year 3 of the project. The current focus (Winter/Spring 2013) is on the use of widgets in shells. The People and Events directory will also become the focus in the spring, and the Composer, supported by the SDE will be more thoroughly evaluated in relation to its role within the Learning Activity Design Toolkit in the summer/autumn 2013. Several hypotheses relating to the use of the technology need to be tested including: do the technical developments make it easier for teachers to access a wider range of resources; does access to these resources stimulate or support innovation in pedagogy.

Again, this evaluation evidence, including the case studies and testimonials of users will be necessary in order to proceed with exploitation.

### **2.2.3 Compiling Evidence for Exploitation**

The evaluation of the toolkit and technologies so far described is intended to provide evidence for the further exploitation of iTEC outputs in order to ensure wider scale impact of the project. The evidence gathered will need to be appropriately analysed, compiled and communicated in a way that ensures that it engages the key stakeholders identified. These stakeholders will be those organisations capable of making the larger scale interventions to take forward the systemic change described in the vision. The evidence necessary will emerge over year 3 of the project with the evaluation of technology and the FCS Toolkit, but also into year 4 with the evaluation of the Learning Activity Design Toolkit and further refinement and demonstration of technologies.

### **2.2.4 Generating Support and Securing Commitment**

The creation of this vision provides a starting point for a package of concrete activity aimed at identifying who the specific dissemination and exploitation partners are, and what the necessary activities are in order to secure appropriate interest and, later, commitment to the vision. Clarity on which elements have the potential for exploitation has emerged in the latter part of the second year of the project. However, further work to generate “convincing” evidence in an appropriate format will continue through year 3. In parallel to this, during year 3, the iTEC project will increase its engagement with external stakeholders and Associate Partners. Dissemination in the early years of the project has been directed towards general awareness raising. Within year 3 of the project there will be a shift towards more targeted engagement with organisations and entities that can play a tangible role in up-scaling of iTEC outputs. These include:

National and regional Government – The adoption and exploitation of Learning Scenarios, Learning Stories and Activities, and the toolkits at national and regional level holds, perhaps, the greatest potential for ensuring that the good work of iTEC continues beyond the end of the project. This will take various forms with different bodies adopting different elements from iTEC but not necessarily all. E.g. in some cases the FCS Toolkit may be nationally embedded alongside the maturity modelling approach it provides. This may be most successful where there are centrally directed interventions in the education system. In other countries, the use of the Learning Activity Design Toolkit and CPD programme may be adopted by teacher training institutions or part of national or regional strategy.

ICT Suppliers – The toolkits and training programme are also targeted at major suppliers of ICT. ICT suppliers have significant contact and impact within schools. For the iTEC outputs to be systemically pervasive, it would significantly help if suppliers played a role in spreading awareness of their value in planning for the deployment and use of technology in schools. The iTEC partnership, therefore, will seek commitment from suppliers to promote the toolkits and make use of them in working with stakeholders in major technology deployments. It is envisaged that there is potential for the FCS Toolkit to be adopted as a quality standard for major technology implementations, and as such would be a desirable feature of tenders. Engagement with selected suppliers will also be necessary to promote adoption of the technical outputs of iTEC. The technical partners involved in iTEC have demonstrated an ability to produce the technical outputs

required, but do not all have the capacity to sustain any of this development beyond the end of project funding. A convincing business model for any iTEC technologies that provide added value will need to be considered in order to take the work further.

**Teacher Communities** – As an initial step, raising awareness of iTEC and its outputs for teachers will support a “viral” like spread of the use of tools, technologies and processes. The iTEC teacher community has been redesigned for year three of iTEC to enable this, and ongoing work with partners to encourage visibility of iTEC in their communities will continue. Consideration will also be given to more focused promotion to specific teacher communities. This could include, as an example, promotion of the FCS CPDLab course to networks of school leaders.

**Teacher Training Organisations** – A clear target for engagement in the final years of iTEC will be those organisations directly involved in teacher training. However, it is likely that the number of organisations, and challenge in securing commitment at this level may be limiting, therefore engagement through national and regional government will be prioritised. The objective will be to obtain commitment on the integration of components (modules/activities) of iTEC teacher training to national strategy and/or teacher training programmes, including initial teacher training and CPD.

**TEL Researchers** – The exploitation of the iTEC outputs such as toolkits and technologies would benefit from further use and research in ongoing TEL research. ITEC has used significant resources and expertise to generate some valuable and reusable tools and resources. Work through the consortium members, and with the support of the European Commission should act to maximise the adoption of these processes. As examples, iTEC has developed a robust process for designing classroom pilots. EUN intends to use this process in future projects, including those funded by suppliers. Other partners and the commission should also act to signpost the approach. As it is likely to prove difficult for iTEC partners to sustain the technical outputs beyond the end of project funding, it will also be necessary to ensure that the investment in this work is exploited through the dissemination of research outputs that add to the body of knowledge in the specific technical areas, so that the research community can carry this work forward. One concrete example of this will be engagement with the Moodle community to establish and exploit the achievement made on widget integration.

**Standards and Accreditation Organisations** – The greatest impact of iTEC will be achieved when its outputs become well established and easily recognised features of the education landscape. Standards’ organisations will be consulted on this with the aim of establishing standards and/or accreditation relating to specific outputs. As an example of this, the FCS toolkit could become recognised as a standard methodology for change management and school development, in the same way as PRINCE2 has become a standard for project management. Users of the methodology could be offered the opportunity to become an accredited practitioner. (It should be noted here that this proposal for version 2 of the exploitation plan is particularly ambitious, and its desirability and achievability will need to be investigated and assessed against other priorities.)

The technical partners are also expected to ensure that their outputs are used to establish technical standards. Consultations with standards’ organisations such as IMS Global are already underway.

### **2.2.5 Target Audiences for Communicating the Vision**

The iTEC Communication Plan is focusing dissemination activities and providing targeted messages for four key groups:

1. ICT in education policy makers and influencers
  - European Schoolnet members (30 Ministries of Education)
  - Regional/municipal educational authorities in Europe

## 2. ICT in education practitioners

- Professional associations

- Head Teachers

- ICT Advisers

- Teachers

- Initial and in-service training organisations

## 3. ICT vendors and suppliers (including SMEs)

- ICT technology and tools' providers

- Publishers and content developers

- Trade associations (vendor bodies and educational publisher associations)

- Standards bodies

## 4. The TEL research community

In version 3 of the deliverable, the iTEC exploitation strategy will look at which of the project results has the greatest potential for exploitation by which stakeholder groups. This section will also examine how iTEC results are being exploited by other EC-funded projects and global initiatives and will reference work by individual partners to ensure take-up of specific project outputs by, for example, relevant standards' organisations or the wider technology-enhanced learning research community.

### **2.3 COMPONENTS OF THE ITEC VISION**

At the end of the second year of the project, partners in the iTEC Consortium started to form clearer ideas concerning how they can individually exploit their work in the project (section 5) and are already anticipating a number of results that the project can offer to the stakeholders previously identified.

#### **2.3.1 Future Classroom Scenario Toolkit**

During the early years of the iTEC project, a key activity has been the development of innovative future classroom scenarios, led by NFER (formerly Futurelab) under Work Package 2. This activity was, initially, a centrally led and delivered, top down approach, involving the project's academic, industry and policy making partners and relied heavily on research and trends' analysis. The process provided a useful forum for partners to reach agreement on the value and nature of iTEC scenarios, which were then further developed for use by teachers in pilots. The early part of the process also generated valuable outputs such as the innovation mapping tool, knowledge map and scenario selection criteria. In successive cycles the process was refined to be more bottom up and ensure increasing community engagement with teachers and learners in order to ensure that their perspectives were fully incorporated.

Arguably this process could be difficult to sustain in future years, if there is a reliance on centralised resources and management or if a new mechanism cannot be found within which the different stakeholders can continue to collaborate on future classroom scenarios. In the second half of the project, therefore, a more streamlined and devolved strategy is being developed, through the construction of a "Future Classroom Scenarios Toolkit" within WP2.

The toolkit is being created as a set of resources and practices which will allow partners and other stakeholders to carry out scenario design at a national, local or community level. The toolkit will provide an opportunity for the ongoing development of scenarios tailored to the needs of specific communities and organisations. EUN is also working to deliver training in the use of the toolkit within its Future Classroom Lab, so that it can be adopted at a wider scale by current partners and other MoE participating in European Schoolnet, as well as current and new associate partners, educational organisations and suppliers. In January 2013 the toolkit was made ready for testing with teachers, both within and beyond the project, and a programme of training in its use was initiated.

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The use of such a Future Classroom Scenario Toolkit supports the emerging recommendations of the iTEC High Level Group in that it provides the resources and guidelines for a collaborative approach to exploring how emerging trends in teaching and learning, technology and society can be considered together to support institutional self-review and transformation.

At the end of the project, EUN intends to utilise the toolkit in order to provide opportunities for Ministries of Education to continue to collaborate on international scenario development, perhaps within a dedicated working group that is jointly funded by MoE and industry partners. Models for this already exist; the EUN Interactive Whiteboard Working Group includes 15 MoE and six IWB vendors and has funded the production of best practice and procurement guidelines over the past three years. Under the umbrella of the Future Classroom Lab, therefore, the aim is to establish a Future Classroom Scenario Development Working Group that will sustain the scenario development process beyond the end of the project.

### **2.3.2 Learning Activity Design Toolkit and Composer.**

The iTEC Evaluation of classroom pilots has provided good evidence that iTEC Learning Stories and Activities can promote innovative pedagogical practices in the classroom. Adoption of iTEC Learning Activities has demonstrated increased levels of learner motivation, and greater opportunities for the acquisition of 21<sup>st</sup> Century Skills and competences by learners, and teaching competencies by practitioners. As with the iTEC scenario development process, the learning activity design element of iTEC, led by Aalto University within Work Package 3, has, up until now, been delivered through a top down approach. Therefore, for the same reason as the change in approach to Future Classroom Scenarios, the future work in this area will be to produce a Learning Activity Design Toolkit that can be disseminated to the education community through training. In this case the toolkit will incorporate one of the technical components of the project, the iTEC Composer. The aim is that this toolkit will be ready in April 2013.

On its own, the Composer presents itself as a proof of concept that demonstrates how teachers can discover, adapt and share Learning Activities and Learning Stories, and it supports teachers in discovering and making use of new learning resources. As part of the Learning Activity Design Toolkit, the Composer has the potential for wider adoption by schools. In the final years of iTEC the intention is to trial the Composer as part of the Learning Activity Design Toolkit in participating countries. Its long term potential will be established during this phase of the project. The Composer also provides teachers with access to the growing bank of innovative Learning Stories and Activities, complete with links to resources and information on teacher competencies to support professional development.

Once again, EUN will work with its partners to provide training in the use of the toolkit and Composer. This toolkit is focused on providing a community resource for teachers that allows them to develop and share their own innovative learning practices. The toolkit and Composer are being designed to facilitate the further development of iTEC's existing Learning Activities and Stories, through a community activity. The intention is to promote its use through existing, established communities of teachers and educationalists.

### **2.3.3 Widget Store**

An important milestone has been reached in the iTEC work to develop a new approach to providing teachers and learners with access to learning tools and resources through widgets. The project now provides a "Widget Store" which can be accessed through a number of platforms including the DotLRN platform provided by the iTEC partner Knowledge Markets, or through embedding in the popular Moodle platform by any institution running this environment. This provides the widget store with the scope to be adopted by a large number of schools across Europe.

The widget store has been developed with a "community approach" in mind. Fundamentally it does not simply act as a repository of content which teachers take from, but as a tool for easily creating and sharing tools and resources as widgets. Its potential value can be best understood if compared to other community sharing services such as YouTube, where the users are contributors as much as consumers.

The output of this work is an open source Widget Store. This could be deployed at a number of levels, from a European service, to an individual school. The choice of level will depend greatly on the type of widgets which will be stored (whether they are generic services, or if they are highly localised), and the legal framework relating to privacy in the context of use. The business case for maintenance of a service based on the Widget Store will vary according to the level of deployment.

National Technical Coordinators started to use the Widget Store and community widget creation tools in autumn 2012 and it is starting to be used by schools in the pilots, so that the potential for acceptance and adoption at scale can be properly established. Early in 2013, the project will also invite teachers to participate

in a widget competition in order to increase the number of widgets being developed.

The Widget Store fills a critical niche within the, now familiar, concept of a content/resource ecosystem. It is currently provided by Bolton University which, as an academic institution, does not have the capacity for sustaining it as a long term service beyond the project. However, there are a number of possible “business” models that can be explored for its future sustainable exploitation, should it prove its value within the timescale of the project.

### **2.3.4 The Technical Toolkit**

The Technical Toolkit described in the vision consists of the various technical components created in iTEC as open source examples that can be adopted by education organisations in ways specific to their needs. This includes the Widget Store, as discussed, and also:

- The Scenario Development Environment (SDE) as a system that manages iTEC cloud information to provide answers about the feasibility of stories and learning activities in particular technological contexts. In the opposite way, the SDE also identifies technology needs and limitations in schools to support the implementation of the learning stories and activities. The services of this system are provided through an API to the other components of the iTEC cloud.
- People & Events directory software that will be available as open source as-is. The technical challenge is to make multilingual widgets with authentication/authorization. It is expected that MoE will eventually integrate functionality as in the P&E directory into their respective educational systems. The iTEC P&E directory serves as a reference implementation.
- The central Authentication and Authorization server is at the heart of UMAC; its goal is to authenticate users, either locally or in collaboration with other Identity Providers, and to act as a Policy Decision Point that makes authorization decisions for any request to access iTEC services or data.
- The Authorization filter is a role-based and permission-based fine grain authorization filter that can be used to protect backend services to be integrated in the iTEC realm. Typically, those services are accessed via REST web services, and the filter sits in front of those services and in collaboration with the central server, grants or denies access. It acts as a Policy Enforcement Point.
- Client-side artefacts have also been developed for easy integration of user-facing components that access iTEC services; those artefacts (an oAuth client library and a feature for the widgets’ open-source container Wookie) make underlying authentication and authorization mechanisms transparent from the widget developer’s perspective.
- The Application Profile for describing the Technical Capabilities of schools, Learning Activities and resources including, content, people, and events. Such an application profile involves the data types, the data models, and the vocabularies and how to use these. In our experience with educational resource repositories, the application profile is the most useful outcome.
- The semantic model used to define technical settings, resources, Learning Stories and Activities. This model supports reasoning through a semantic engine to provide SDE functionalities. Thanks to the semantic approach, new knowledge related to future technologies and stories (not available today) can be smoothly incorporated into the system.
- In addition, WP10 is considering the possibility of publishing part of the information generated in the framework of the iTEC project as Open Linked Data nodes, that is, as information described using knowledge representation tools linked to other nodes offered to the Semantic Web community. Then, other smart agents, in line with other educational initiatives, may utilize this information. For example, the Open University offers semantic nodes with information about its curricula in this way.

### 2.3.5 The EUN Future Classroom Lab and the “Future Classroom” Brand

In October 2012, the iTEC project became part of a ‘family’ of related projects underpinning the long-term strategy of European Schoolnet as defined by its 30 supporting Ministries of Education. These projects all have a central focus on mainstreaming and sustaining innovative practice in schools involving ICT and are being coordinated under the umbrella of the European Schoolnet Future Classroom Lab initiative (FCL).



Workshop on Teaching STEM in the Future Classroom 15-16 September 2012

Opened in January 2012, the Future Classroom Lab consists of a room designed as an interactive classroom to illustrate how a traditional classroom setting can use technology to enhance interactivity and student participation, plus a large reconfigurable open space equipped with the latest technology from 16 industry partners; Acer, Apple, Cisco, eInstruction, Fourier, ISIS, Lego Education, Microsoft, Mimio, Panasonic, Planet PC, Promethean, RM, Samsung, SMART, Texas Instruments. While this new initiative is closely linked to the iTEC exploitation strategy, it is independently financed in order to ensure that iTEC results and related training can be sustained after the end of the project funding. In May 2012, the FCL was also accepted as a member of the European Network of Living Labs (ENoLL).

Based on the results of how designs for the future classrooms have been validated in >1,000 schools across Europe, EUN will use the FCL to demonstrate and showcase how new teaching and learning approaches can be successfully deployed. Policy makers will particularly be able to explore what training/support strategies and level of investment is required in order that scenarios can be mainstreamed and taken to scale at national and regional levels.

As described in the project Description of Work, the original aim was to position iTEC as ‘Living Lab’ or an ‘Ideas Lab’ where policy makers, practitioners and ICT suppliers can come together in order to rethink how teaching and learning can take place in 21st century classrooms and other learning spaces. The ‘value proposition’, for the education community, is that iTEC can provide a platform that stimulates discussions and validates practice related to a range of innovative teaching and learning activities that can be mainstreamed and taken to scale.

It is already clear that there are benefits to positioning iTEC as a key element within a larger “Future Classroom” initiative that is co-funded by EUN and supporting industry partners as part of the work plan and long-term strategy of EUN and its supporting Ministries of Education. For example, the FCL has made it easier to engage with major ICT vendors than in previous projects. Some of these companies are now

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starting to work with iTEC in order to develop their own Future Classroom Scenarios that can be proposed to MoE and schools in the pilots, either within the framework of the iTEC project itself, or as smaller, add-on, action research projects that may involve future classroom designs which are more 'leading-edge' or which incorporate technologies that are some years away from mainstream use in classrooms.

At the mid-way stage in the project, however, and partly as a consequence of the FCL success, the project now needs to consider carefully to what extent the Consortium preserves and further develops the iTEC branding when it comes to the exploitation of project results. Clearly this branding may have limited value several years after the project has ended, as is the case with many EC-funded projects. Further discussion on this issue is needed with iTEC partners in year 3 of the project, with the proposal being to reduce the emphasis on the iTEC brand and transition towards the "Future Classroom" brand which will have greater meaning to stakeholders.

### **2.3.6 iTEC Teacher Training and the CPDLab initiative**

Successful exploitation of iTEC results will require a strategy that is both: top down - providing guidelines and recommendations to policy makers and ICT vendors via the activities of the iTEC High Level Group; and bottom up – disseminating and mainstreaming examples of Future Classroom Scenarios that engage practitioners and encourage them to experiment with new approaches to teaching and learning.

While the iTEC dissemination strategy aims to reach as wide an audience of practitioners as possible, widespread take-up of iTEC results will require the project to find new ways to provide ongoing training and support beyond the end of the project. With this in mind, the European Schoolnet CPDLab project<sup>1</sup> is making an important contribution to the iTEC exploitation strategy. This two-year project, supported by the Commission's Lifelong Learning Programme, commenced in October 2011. Its aim is to improve the quality of ICT-related Continuing Professional Development available to teachers, school leaders and other school staff and help schools become effective learning environments by offering a portfolio of training courses directly related to the needs of teachers in the future classroom.

In particular, the project is specifically designing, testing and disseminating three, five-day CPD courses that support:

- Innovative pedagogical use of Interactive Whiteboard technologies in secondary schools.
- Improved safety policies in secondary schools, addressing issues such as cyber bullying, use of social networks, responsible use of mobile and Internet technologies etc.
- Implementation of teaching and learning activities for the future classroom based on scenarios that have been developed and evaluated in iTEC.

As part of the dissemination and exploitation activities of this project, a shorter course for policy makers will also be designed based on these topics and extending to the policy implications and opportunities arising from them.

Each five-day course developed in the project will be delivered in the new Future Classroom Lab. Courses for practitioners will be published in the Comenius In-Service Training Database and actively promoted through Comenius National Agencies and MoE dissemination channels so that teachers, teacher trainers and non-teaching staff from across Europe can apply for a Comenius grant in order to cover the costs of travel, subsistence and course fees.

The CPDLab project, therefore, has been consciously designed to leverage, consolidate and help sustain the work that will be carried out in work package 4 in iTEC related to the professional development of teachers (Task 4.5). Training provided to teachers in how to set up an iTEC shell and use the main iTEC tools/services (Task 6.5) will also inform the development of the CPDLab courses, as will the three versions of the iTEC environments' manual (D6.4) and the FCS and Learning Activity Design Toolkits.

Support and CPD being provided to national coordinators and teachers in iTEC is primarily carried out using online tools. This is partly a consequence of the project travel budget being significantly reduced during the contract negotiation process. The CPDLab project will make it possible to develop a suite of iTEC modules and training materials that can be delivered face-to-face within a reconfigurable physical space that contains

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<sup>1</sup> Continuing Professional Development Lab (CPDLab), <http://cpdlab.eun.org>

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all the technology that is needed in order to deliver any iTEC scenario. These face-to-face courses can also be localised and adapted for use at national and regional level by educational ministries and other partners. Online delivery of some of these CPD modules is also envisaged.

In October 2012, the three 5-day courses developed within the CPDLab project were included in the Comenius-Grundtvig training database and teachers across Europe can now apply for a Comenius in-service training grant through their National Agency. The first course will run on the 8-12 July 2013. See <http://ec.europa.eu/education/trainingdatabase> and <http://tiny.cc/cpdlab-fcs>.

Working with the CPDLab project, iTEC will also explore possibilities for giving an iTEC/FCL accreditation to this course or whether more formal recognition of teachers' completion of the course is possible by associating the course with a university involved in teacher CPD.

Teachers coming on the course will have the opportunity to:

- Trial the iTEC scenarios, Learning Stories and Activities, being developed and tested in classrooms across Europe.
- Experiment with the range of iTEC widgets that and learn how to create their own.
- Plan how they can implement iTEC Learning Activities in their own school.
- Explore how to get involved in iTEC through the network of iTEC teaching ambassadors and through webinars.
- Develop a Future Classroom Scenario using the FCS Toolkit, which can then be used in their own school.
- Use the Composer tool to discover and develop Learning Stories and Activities.

Within the FCL, therefore, practitioners can learn how to implement future classroom designs and be provided with in-depth, face-to-face courses on a range of topics related to the effective use of ICT in schools.

Steps are also being taken at national level to ensure that iTEC impacts on teacher education and CPD. UL, for example, aims to adapt and include a selection of iTEC learning scenarios in a Masters programme on ICT and Education and another Masters programme on Teaching Informatics.

It is interesting that some Ministries are starting to develop facilities similar to the Future Classroom Lab. Norway, for example, has set up a demonstration centre in Tromsø where teachers and pupils can experiment with new ways of teaching and learning. Austria has recently expressed an interest in developing a national version of the FCL as have four Italian regional authorities and a teacher education institution in Israel. EDUCATIO in Hungary aims to upgrade its existing mobile Computer Lab along the lines of the FCL model. UL may also work on a FCL concept with DGE in Portugal.

### **2.3.7 Teacher Communities**

The importance of engaging and sustaining an active teacher community has grown within the iTEC Project. Initially the role of the communities has been to allow sharing of experience, peer support and to gather input into the iTEC processes such as scenario development. However, it is clear that a large and active community of teachers will provide a powerful route to exploitation. In year 2 the iTEC website underwent significant development in order to attract and maintain the interest of teachers involved in the project. A highly simplified registration process also allows visiting teachers to become members of the community. The iTEC website now has two main objectives:

- To offer future classroom learning and teaching resources, technologies and training opportunities
- To build and sustain an online community of teachers by enabling exchanges and sharing of experiences

The objective here is not only to provide iTEC teachers with pedagogical and technical resources but also to encourage non-iTEC teachers to make use of iTEC resources. This will be achieved mainly through the iTEC website, but also during teachers' events described in the iTEC teacher training programme.

To encourage and support adoption of the Learning Stories and Activities, the iTEC website provides the following information:

- Guidance on the use of technology to support iTEC Learning Stories and Activities, including iTEC technologies and resources to support their use

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- Guidance on the relevance of iTEC Learning Stories and Activities in relation to teacher competences and 21st Century skills, etc.
  - Case studies and films demonstrating how Learning Stories and Activities have been effectively used in practice
  - News of current activities in the pilots and opportunities for collaboration among iTEC teachers
  - Links to the partners' portals where information on individual partners' piloting activities can be found, including national forums
  - iTEC evaluation processes and results – providing evidence for the adoption
  - Background details of the iTEC project, and links to related projects such as CPDLab
  - Details of teacher workshops, online training sessions and webinars.
  - Opportunities to share experiences and ideas, and to allow them to collaborate on finding solutions to challenges in the piloting process.
  - A space to give teachers' work visibility and showcase their best practices

From March 2013 the iTEC community forum will be moderated and animated by the WP4 staff and 14 moderators selected among iTEC teachers. The teachers will be recruited for their strong commitment to iTEC and their knowledge of Web-based tools for education. Their role will include replying to questions, providing advice and bringing their networks into the discussions. They will also be asked to retrieve relevant content and success stories from the national online communities. Teachers will be advised in their own language and thus break the language barrier, but also make them feel more comfortable about taking part in online discussions. In order to strengthen the community, a series of actions will be undertaken to reinforce the iTEC identity among teachers. The objective is to create solid bonds between the teachers and to make them feel part of a large, European, community.

As part of the WP4 training programme, a series of 4 face to face international workshops will be held in the FCL in Brussels in 2013. Each time, 20 teachers from 10 countries (2 per country) will take part in this event giving a total of 80 teachers in 2013. Several follow up activities will be required from teachers coming to the course, such as creation of a widget, and a video, which is intended to engage them deeper into the project and allow them to show others how they have used the Learning Activities and technologies in their classroom. These face to face events are intended to offer a good opportunity to build networks and bonds among participants. The end result is intended to be a group of iTEC Ambassador Teachers, leading the growth of a sustainable network. As these teachers will be selected from across the partnership they will form the bond between local/national networks and the central iTEC network.

European Schoolnet and its partners are also involved in other activities concerned with the growth of teacher communities. These include eTwinning and the new LivingSchoolsLab (LSL) project (FP7 Programme), which commenced in October 2012. LSL is expected to put in place a permanent network of schools in Europe for ICT validations and support the development of whole school approaches to ICT deployment and the mainstreaming of innovative practice.

### 3. STRATEGIC POSITIONING OF THE ITEC VISION

A strategic vision for an integrated project such as iTEC is best situated in a framework or method that addresses the trajectory from new ideas to a full uptake of developed products, services, methods, etc. Among such frameworks and methods taken into consideration are the adoption life cycle for Learning Technologies by CETIS, the design science approach of Hevner et al. [Hevner 2004], the design science research methodology for IS research Peffers et al [Peffers 2008], and the benefits realisation management (BRM) approach [Bradley]. A simple model is depicted in figure 1.



Figure 1: The innovation cycle

iTEC's strategic vision is that, today, the greatest impact can be achieved by **improving the mainstreaming process of current and emerging technologies into evolving educational contexts**. From this perspective, one of the most substantial contributions the project seeks to make to the educational community is an approach to this process that can be used also for future emerging technologies and that can be used across Europe. It goes without saying that in order to succeed, new artifacts, methods, frameworks, etc are required.

The principles guiding this iTEC vision are:

- addressing the mainstreaming challenge and aiming at a systemic change
- connecting better to current practice of learners, teachers, head teachers, and policy makers
- no school left behind

While these principles emerged from careful analysis in 2009 of promises and achievements of the last two decades, they have received support from more recent studies such as the NESTA report (November 2012).

#### 3.1 ADDRESSING THE MAINSTREAMING CHALLENGE AND AIMING FOR SYSTEMIC CHANGE

As the use of ICT in education left the initial stages of hype and excitement, many stakeholders in the education community realized that there is much research but disappointing levels of innovative practice.

The problem is compounded by the fact that, for understandable reasons, the educational systems adapts slowly while on the other hand ICT is evolving at an increasing speed. In such a context, the effectiveness of mainstreaming processes is often the most determining factor in changing the practice and capitalizing on what ICT can offer. It should be noted that in our view, mainstreaming processes should not only fosters the uptake of current and emerging technologies but also fosters the detection of risks and barriers, in order to avoid mainstreaming activities that are likely to fail.

There is this old saying: "Give a man a fish and you feed him for a day; teach a man to fish and you feed him for a lifetime" Similarly, iTEC seeks to improve the mainstreaming *approach* rather than to provide a few successful mainstreaming show cases of hyped technology. The goal is to embed the adaptation to technological change into practice, rather than to acquire new capabilities today which might be already obsolete five years from now. Making the mainstreaming process more effective not only addresses the

bottleneck in the innovation cycle today but has also a long-lasting effect when new technologies are introduced. It is all the more important to do this, given that the natural tendency is that the mainstreaming gap is widening.

At the same time, there are increasing opportunities in society for learning to happen in and out of school as part of an everyday discourse that increasingly exploits ICT. Bruner, for example, describes, very early on, pedagogy as an “extension of conversation” [Bruner 1990] and today ICT provides the capacity for a social conversation that extends far beyond (and also helps link) the physical spaces where learning takes place (school, home, library, museums, community, etc.). A social concern, for example, that pupils have to “power down” or switch off their personal ICT devices when they come to school was first reported in 2007 [Guardian 2007]. A survey [NESTA 2009] with 2,447 young people aged between 11 and 16 years old, showed that for example, 83% of secondary students in England and Wales wanted to see their teachers embrace new technologies in the classroom.

### **3.2 CONNECTING WITH CURRENT PRACTICE OF LEARNERS, TEACHERS, HEAD TEACHERS, AND POLICY MAKERS**

Successive European Commission IST work programmes have been shaped by a large number of factors including the influential foresight study produced by the Institute for Prospective Technological Studies in the beginning of this century (IPTS) for the IST Advisory Group (ISTAG) [ISTAG 2001]. At that time the vision was that schools would no longer exist. Learners aged 10-75 join an ‘ambient for social learning’ and come to plenary sessions, “in a room looking much like a hotel foyer with comfortable furniture pleasantly arranged”. When they arrive, the ‘ambient’, rather than a human teacher welcomes each learner, assesses their requirements and makes suggestions for how to organise their stay. Later on, as learners talk to each other, “these private conversations, the mental states of the group, are synchronised with the ambient; individual and collective work plans are agreed and in most cases checked with the mentor through the ambient.”

Today, this earlier scenario remains a remote and probably undesired future for most teachers and parents. However, if one revisits this scenario and allows the teacher to assume some of the roles envisaged for the ‘ambient’, then it begins to have a lot more resonance in today’s society where we now see emerging an “internet of things” and the prospect of Web 3.0.

In 2008, a further IPTS study [IPTS 2008] offers a scenario for a 21st Century Learning-intensive Society (LIS) “which could emerge from the potential of the present”. Here, school is finally declared as being “over” and the end of compulsory schooling is now explicitly anticipated. “By 2015 half of high school students have opted out of the compulsory system. By 2020 the old classroom school is a historical vestige.”

It is not obvious, however, how such a transformational change could come about in the space of this decade, particularly as the study recognizes that the educational system adapts slowly to the learning society. Scenarios for the future classroom built on an IPTS “rigorous imagining” process certainly have a role but there is a risk that this approach too often results in designs for the future classroom that are simply too unconnected with current practice, fail to engage teachers and cannot be mainstreamed because they are divorced from educational policy making in the real world.

The recent NESTA report [NESTA 2012] confirms this and concludes “We found proof by putting learning first. We have shown how different technologies can improve learning by augmenting and connecting proven learning activities...there is also a great deal that can be done with existing technology. It is clear that there is no single technology that is ‘best’ for learning.”

### **3.3 NO SCHOOL LEFT BEHIND**

iTEC aims at “augmenting and connecting proven learning activities” starting from whatever level of good practice schools have reached. This is illustrated in figure 2, a typical normal distribution, where the green

curve depicts the intended change from the red curve. iTEC aims not only to bring the next novel technologies to the pioneers (see yellow area), it aims to develop an improved mainstreaming process that can be used by everyone as the impact of this will be much bigger.

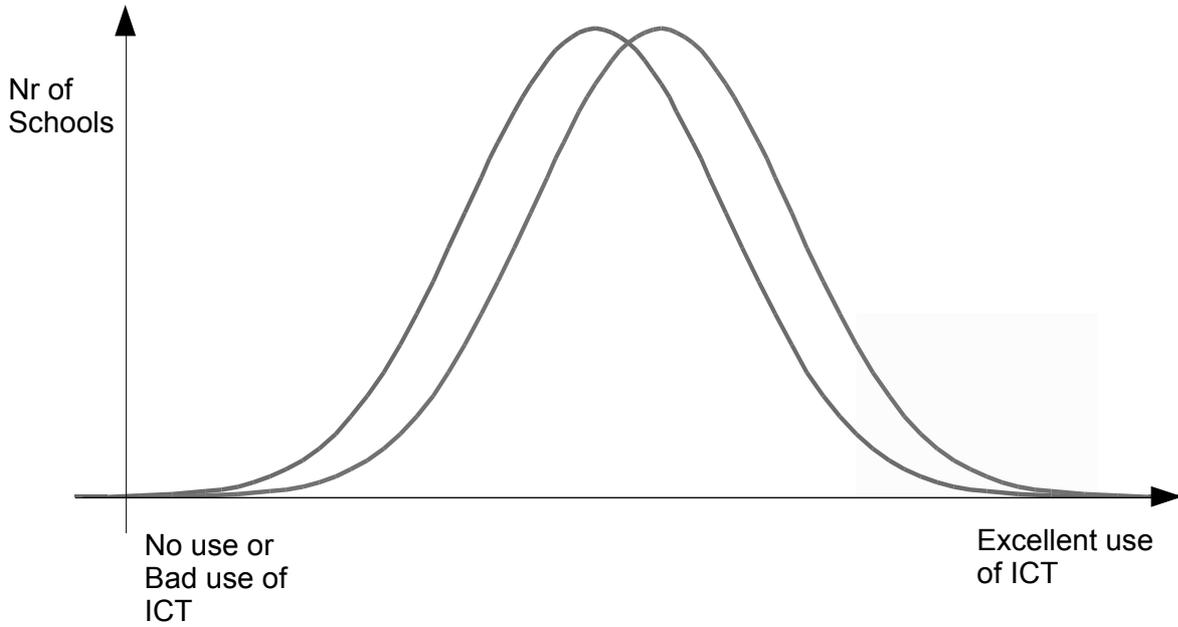


Figure 2: Use of ICT in schools

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## 4. THE METHODOLOGY BEHIND ITEC

### 4.1 INNOVATION, IMPACT AND BENEFITS

Roger (1995) defines innovation as "an idea, practice, or object that is perceived by an individual or other unit of adoption" (p11). However, the questions about innovation within projects such as iTEC address different concerns that should be clearly separated:

- Innovation as experienced by stakeholders
- Innovation being understood as the *new* contributions a project makes to the field of education

This section deals with innovation as experienced by stakeholders while section 4.2 discusses innovation in more detail.

**Innovation as experienced by stakeholders is not a goal in itself.** This is illustrated by the following example. A teacher getting naked for the classroom would be experienced as very novel. Nevertheless, it would be considered by most stakeholders as undesirable. As such, innovation/novelty is clearly not a goal in itself but has only value as a means to yield benefits. It must be a change that creates positive value and is better (more effective, more efficient) than its predecessor (Miles 1964, Kirkland and Sutch 2009). The same holds for creating impact. Scaling up the 'naked teacher' across Europe would certainly have a big impact. However, it would again be considered undesirable by most stakeholders. Moreover, the search for innovation for innovation's sake might distract stakeholders from implementing beneficial changes. It is not because for example someone in Asia or America was the first to implement successfully a new TEL approach, it should be discarded for being not-novel in Europe. Similarly, it is not because novel practice emerged in a school in Greece and is there now common practice, that it should be discarded in Denmark.

Therefore, iTEC seeks to increase shareholder value by a carefully planned and methodical approach to change, driven by a clearly defined vision of systemic change. The methodological approach is inspired by the more recently developed Benefits Realisation Management (BRM) approach [Bradley 2010]. Benefits are defined as "an outcome of change which is perceived as positive by a stakeholder". Disbenefits are outcomes seen as negative. A particular outcome may be a benefit to one stakeholder and a disbenefit to another.

Central to such approach is to create a line of reasoning of the contributions a project such as iTEC makes to benefits and disbenefits for stakeholders. Whereas it is outside the scope of this document to provide such a full line of reasoning, the benefits that the project is aiming at for each contribution are given in next section.

Following a BRM approach, Return on Investment (ROI) comes from:

- elimination, or reduction in the number, of wasted investments. For example by early detection of barriers or lack of benefits of emerging technologies
- earlier realisation of benefits. For example by facilitating the integration of new apps in the existing technological environment
- increased realisation of benefits. For example by sharing successful scenarios and learning activities
- sustained realisation of benefits. For example by providing a mainstreaming toolkit that can deal with emerging technologies in the future

#### 4.1.1 iTECs Design Science research Methodology

While the overall approach is inspired by BRM, a more targeted approach is needed for implementing the ICT aspects. While different approaches to design science research for IT exist, iTEC has adopted the approach described by Peffers et al. depicted in figure 3.

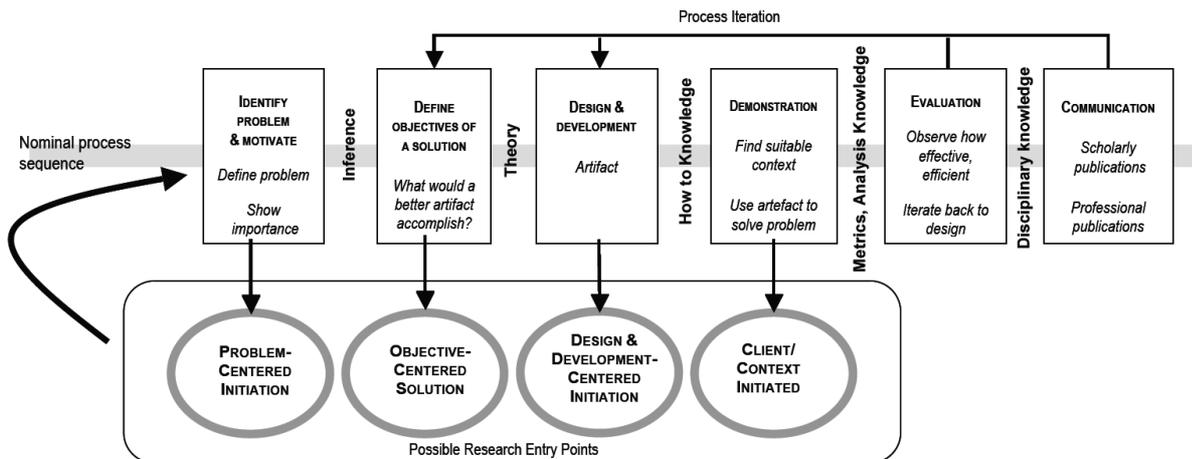


Figure 3: Design Science Research Methodology (DSRM) Process Model

In this model four research entry points are described. The first entry point deals with the identification of the problem and motivation for the research. Following the benefits model, iTEC seeks to remove barriers for mainstreaming or seek to exploit the engaging potential of TEL.

Barriers to the mainstreaming of technologies have been studied since the beginning of TEL. For example the first large scale European project about TEL in schools (The Web for Schools project) reported the limited time of teachers, teacher training, the curriculum, etc. Other research added lack of teacher confidence (teachers being scared and intimidated by their student's increasing knowledge about Internet and communication devices), lack of pedagogical teacher training; lack of suitable educational software, limited access to ICT; rigid structure of traditional education systems, etc.

However, the issue most mentioned is the lack of time by teachers which also seems to influence other cited problems. Therefore, as teachers reported that they spend most of their time (apart from contact hours in the classroom) at lesson preparation and assessment, iTEC seeks to alleviate this problem by trying to reduce time in this area. More in particular, iTEC provides: readymade scenarios, automated help in finding feasible ones, automated support for localisation, finding more easily other types of resources, download and play applications, plug and play authentication and authorisation, support in establishing new collaborations. All these iTEC artifacts have one characteristic in common: seeking to alleviate the problem of lack of time when implementing emerging technologies. The definition of these time saving artifacts addresses the second research entry point of figure 3.

Besides addressing the lack of time, iTEC is seeking to exploit the engaging potential of TEL. Again from the early Web for Schools project up to recent projects such as the Stellar project, research has pointed to the engaging potential of TEL<sup>2</sup>.

While, the ambient intelligent vision from 2001, previously discussed, was unrealistic, it was indicative of a shift to different forms of more learner-centred, ICT-facilitated approaches including personal learning, individual learning, self-regulated learning, and ambient schooling. However, this approach comes with its own challenges. As Gerard Fischer, a distinguished HCI scientist, observes "...the scarce resource for many people in the world of today is not information but human attention". This is perhaps even more so in education where teachers have to compete with the many distractions that the multimedia and technology world of today offers.

At the same time this multimedia and technology world offers opportunities for engaging learners and teachers. Within a learner-centred approach the handles to harness engagement come from interactions.

<sup>2</sup> For example in the Stellar 'Big Meeting' of February 2012 there was only one factor mentioned by all business stakeholders: the engagement potential of TEL.

See appendix III for a model that illustrates where engagement can be created and facilitated. It is based on the observation that the learning experience can only be altered through interaction. Typically a learner interacts with a coach (usually the teacher), a subject expert (usually the teacher), co-learners, education material, and the world at large. ICT provides the means to go beyond the classroom setting. For example be able to chat with an astronaut about space travel, participate in a distant experiment in CERN, get coaching support from a grandmother living a 100 km away, have access to simulation and serious games, consult same age learners abroad about how to pronounce a foreign language.

As such, engagement can arise from the person, material, or environment one interacts with and/or the interaction conduit itself. iTEC explores to what extent interactions other than the traditional can possibly enhance engagement and this addresses the second research entry point of figure 3.

Given that the first research entry point is clearly embedded in the overall iTEC vision, artifacts (the second research entry point) have been defined, iTEC develops these new artifacts, demonstrates and evaluates them. This corresponds to the third and fourth research entry point of figure 3.

In summary, iTEC uses all four research entry points of the DSRM process model, seeking to alleviate the most important barrier in the mainstreaming of technologies and exploiting ICT's engagement potential as an enabler in this mainstreaming, iTEC's strategic vision.

## 4.2 TRANSFORMATION THROUGH INNOVATION

iTEC is about the classroom of the future and from the start of the project there has been much discussion about change processes and innovation. As a consequence, the project outputs integrate what has been learnt about them both in the project and from TEL research generally. This section describes briefly how TEL work on innovation forms part of the iTEC vision.

iTEC's specific contribution to innovation in Technology Enhanced Learning (TEL) is in the importance given to validation of the conditions in which such innovations can be taken to scale. That is why the participation of ministries of education is essential. This approach is justified by the fact that although ICT is used more and more in schools, little real change in modes of teaching and learning is taking place. Yet there is a consensus that such a change is needed if students are to develop the competences needed to participate fully in 21st century life and work.

A distinction is made in iTEC between technological and pedagogical innovation (Bécharde 2001)<sup>3</sup>. Technological innovation refers to widespread use of an invention or a technology, for example the presence of ICT in schools regardless of its use or possible innovative practices with it. One example is the use of interactive whiteboards which can either reinforce traditional teacher-centred practices or innovative ways that support learner initiative. Pedagogical innovation is at the heart of iTEC and refers to fundamentally transforming practices in order to improve learning. From this perspective ICT is a means to enable the teacher to achieve pedagogical outcomes and optimise innovative pedagogies (but does not per se bring them about (Lebrun 2002)<sup>4</sup>).

Pedagogical innovation, whether a totally new approach or a combination of existing approaches, requires a major change in educational values and organisation (both pedagogical and administrative – structures, functions, roles, communication). It is also closely linked to teachers' professional identity, and indeed can be a threat to it (Langevin 2001)<sup>5</sup> because a pedagogical innovation is a new 'script' (Noteboom 2000)<sup>6</sup> in the

<sup>3</sup> Bécharde, J.-P. (2001). L'enseignement supérieur et les innovations pédagogiques : une recension des écrits. *Revue des sciences de l'éducation*, XXVII(2), 257-281.

<sup>4</sup> Lebrun, M. (2002). Théories et méthodes pédagogiques pour enseigner et apprendre : Quelle place pour les TIC dans l'éducation ? [Theories and methods for teaching and learning : Which place for ICT in education ?]. Bruxelles-Paris: De Boeck

<sup>5</sup> Pezet-Langevin, V. (2001). Qu'est-ce que le burnout ? Comment les entreprises peuvent-elles y remédier ? In C. Lévy-Leboyer, A. Vom Hofe, M. Huteau, & J.-P. Rolland (Éds.), *R.H. : Les apports de la psychologie du travail* (pp. 435-451). Paris : Éditions d'Organisation.

<sup>6</sup> Noteboom, B. (2000). *Learning and Innovation in Organizations and Economies*, Oxford University Press, Oxford.

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same way that fast food has changed the traditional restaurant script from choose > be served > eat > pay > leave to choose > pay > carry food to table > eat > clear up). In iTEC a problem-based learning script might be: define problem > research (collaboratively) > share / validate results > formulate new problem, and an active learner script: identify learning objective > define/negotiate pathway > identify and organise learning resources (people, events, content) > follow learning path > apply knowledge / assess progress. Such scripts are 'new' if compared to a 'traditional' teacher-driven instructional script such as Listen/read > repeat/copy (individually) > test recall > apply new knowledge / skill. And of course the technologies available to support these scripts are very different.

#### **4.2.1 Sustainable versus disruptive innovation**

Sustainable innovation builds on existing thinking, products, processes, organisations, or social systems. Whatever the extent of change they introduce - dramatic or very limited - they don't affect the core of what already exists. It's all about doing better, going faster, being clearer, costing less, thinking deeper, etc.

In contrast, disruptive innovation (Christensen 2008<sup>7</sup>) changes in a fundamental way the DNA of a process, organisation or consumption mode (or the script; see Noteboom above). It usually consists of an innovation that is simple, convenient, accessible and affordable. It usually results in a major change (which, like sustainable innovation, can be incremental) but usually does not require technological breakthroughs; in disruptive innovation, the technology can be quite trivial, it's the business model (in education, i.e. organisation and design of the act of educating) that radically changes. Compared to traditional face to face higher education, MOOCs can be considered as a disruptive innovation, because they reach new population groups (in distant countries), have no pre-requisites, and offer education to massive audiences with a very limited number of teachers, not delivering formal qualification, etc. Disruptive innovation usually develops in the margins of a system until it changes it irreversibly (eradicating the previous way of doing things), and parallels with mutation in biological processes can be instructive.

Both sustainable and disruptive innovation, as well as technological and pedagogical innovation, feature in iTEC and can be seen in the innovation matrix developed in WP2, with its five stages summarised as: Exchange - Enrich - Enhance - Extend - Empower. Mapping characteristics of the scenarios to this matrix shows that there is a shift from early to later cycles from stage 2 to stage 3 and 4, with a few elements in some scenarios that correspond to stage 5. There is a good evidence (WP5) of a desire among iTEC schools to take on scenarios that challenge existing practices and extend competences and pedagogies. The problem is that, as OECD note (OECD 2010<sup>8</sup>), the limits of reform in the system may have been reached and the only way forward is radical change. Some iTEC schools (e.g. in Austria) consider that they are at this point but that does not imply they are willing to take the next step. One noted benefit of iTEC is that it permits experimentation and risk-taking and it is this opportunity that the disruptive scenarios developed in the later stages of the project exploit.

#### **4.2.2 Real pedagogical innovation and how it can be identified**

Mainstreaming innovative pedagogical practices based on TEL implies knowing that they are indeed innovative. As technological and pedagogical innovations are two independent concepts, the mere introduction of a technology (e.g. an interactive whiteboard, tablet, a 3D printer, Augmented Reality) is no guarantee of pedagogical innovation. Pedagogical innovation exists only when the methods and relationships in teaching and learning are modified by the use of technology. For example, if acquisition, investigation, discussion, practice and making are the five key activities in learning, then the issue is to identify the changes in each of them that arise from the use of technology (Laurillard 2013<sup>9</sup>). Such changes can be qualitative (e.g. depth) or quantitative (e.g. frequency, duration). The same analysis can be made of relationships between teacher and student (teacher or student locus, peer learning etc.). In all cases it is important to document qualitative and measure quantitative aspects, with and without the technology, and the wider effects (e.g. motivation, confidence in working with others). Gathering such evidence is also

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<sup>7</sup> Christensen M.C., Horn, M.B., & Johnson, C.W (2008) *Disrupting Class: How Disruptive Innovation will change the way the World learns*. McGraw Hill Publishers New York.

<sup>8</sup> OECD (2010), *The Nature of Learning: using research to inspire practice*.

<sup>9</sup> Presentation, Institute of Education, London, February 2013.

needed to scale up a pedagogical innovation that is not a simple recipe or step by step guide applicable in any context. What really makes an innovation is its spirit, essence and ultimate objective. For this to happen in classrooms outside iTEC, the innovation has to be adapted to any new environment (recombining, adjusting etc.) – while retaining its essence (Tobin 2005<sup>10</sup>) – in order for other teachers and learners truly to own it

The approach in iTEC is therefore to identify these technological and pedagogical innovations in scenarios and learning activities and make them widely available, useful and adopted. The Innovation Matrix is one iTEC product that makes this possible, and it forms part of the scenario toolkit, itself designed to support change in schools, and the approach to bringing about the classroom of the future on a large scale is build on this evidence-based foundation. The challenge in iTEC is to communicate to the majority of education stakeholders that the changes described and illustrated to be achievable and beneficial in iTEC can be adopted in their own schools and systems.

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<sup>10</sup> Tobin K (2005). Exchanging the baton: Exploring the co in co-teaching. In WM.Roth &.K Tobin (eds) *Teaching together, learning together*, .141-161, Peter Lang, New York

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## 5. EXPLOITATION OF RESULTS BY ITEC PARTNERS

It is important that iTEC results can be exploited by the TEL research community. The second year of the project has seen an increase in the number of papers published by iTEC Consortium partners<sup>11</sup> and dissemination of the iTEC research findings is likely to accelerate as partners in the technology work packages start to report on the usability of the iTEC tools and services and the feedback gained as a result of large-scale user testing.

Currently, there is considerable interest in the findings from the early school pilots. Responding to this, Cycle 1 evaluation findings were presented by MMU at the European Conference on Educational Research and an article has been prepared for the European Research Journal. In order to reach teacher educators, an abstract is being prepared for a Virtual Showcase at the Society for Information Technology in Education 2013 conference and journal articles will be submitted to the Journal of Technology and Teacher Education.

As indicated in version 1 of the Exploitation Plan, in order for iTEC to really have the impact foreseen in the Description of Work, the focus in WP11 must increasingly be on helping project partners to develop their own exploitation strategies and to support them as they work to mainstream project results. The vital requirement in the general exploitation strategy is that individual partners (and the schools involved in the pilots) must increasingly become the key drivers of exploitation actions in order for iTEC to have a significant impact on the educational reform process in each participating country. Recommendations from the iTEC HLG also see an important role being played by iTEC 'ambassador' teachers in the mainstreaming process.

Version 2 of the iTEC Exploitation Plan has particularly focused on examining the reaction of iTEC partners to emerging project results and looking at how project partners intend to exploit these at national level (particularly MoE given their key role in up-scaling and mainstreaming innovative practice) or within their own organisation.

As part of this exercise, all iTEC partners were asked to complete a short questionnaire (with different questions for MoE and iTEC technology partners) on their exploitation strategy and initial actions in August and September 2012. This exercise was then followed up with an interview with each partner. The sections below summarise the responses from partners in terms of initial ideas on how the major project results can be exploited by each member of the iTEC Consortium. It should be noted however, that the comments provided by partners during the consultation carried out in the summer of 2012, less than 2 years into the project, give an early indication of what will ultimately be included within the final exploitation plan. In this stage in the project the focus was very much on operational activity such as developing tools and resources, establishing process and running pilots and evaluation. Plus, in line with the DoW, the major technical outputs had not been fully deployed or evaluated. It is within the final years of the project that we expect to see a sharper focus on sustainability and a wider, more consensual awareness among partners.

### 5.1 FUTURE CLASSROOM SCENARIO DEVELOPMENT AND LEARNING ACTIVITY DESIGN

Under the direction of NFER (formerly Futurelab), project partners have developed novel learning and teaching scenarios which maximise the engagement of learners in the future classroom through the effective use of ICT. Scenarios are based on an analysis of various trends affecting the way in which education is expected to change. These include trends in education policy and strategy, trends in development and use of technology and social trends. Throughout the process, learners, teachers, policy makers, technology providers and pedagogical experts in the project have collaborated in designing the iTEC scenarios.

In a phase led by AALTO, the initial learning scenarios are then used as a stimulus for further analysis and design with teachers in order to produce suitable learning activities. This design process starts with workshops to identify the challenges teachers would face when delivering the scenarios, and to guide the development of learning activities. The teachers then test these activities in the classroom at small scale to refine them before some of these are taken forward by the project for large-scale testing in national pilots.

Interviews carried out prior to the production of this deliverable indicate that project partners value the scenario development process and are keen to find ways to maintain this process after the end of the project and also to develop training materials that would allow stakeholders outside the project to replicate the process. At the same time there is the recognition that, in order to sustain the process after the end of the project, it

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<sup>11</sup> <http://itec.eun.org/web/guest/papers-and-articles>

will need to be streamlined; for example, in order that it can become an affordable and self-sustainable service for participating MoE.

As part of the project exploitation activities, NFER is now moving ahead and working with EUN to:

- Develop a scenario development toolkit to allow iTEC partners and other stakeholders to carry out scenario design at national local or community level.
- See how the toolkit can be integrated in training courses for teachers and policy makers in the EUN Future Classroom Lab, including within a 5-day course on Future Classroom Scenarios being developed within the CPDLab project.
- Explore how a self-sustainable Scenario Development Working Group could be put in place under the umbrella of the EUN Future Classroom Lab, so that European MoEs and industry partners can come together at regular intervals in order to develop new educational/policy/classroom scenarios around relevant issues, trends and/or best practices.

A similar collaboration is taking place later in 2013 between EUN and Aalto to design and exploit a Learning Activity Design Toolkit.

## 5.2 PARTNERS RUNNING SCHOOL PILOTS

Education Ministries in iTEC or organisations nominated to act of their behalf (BMUKK, CNDP, CTIE, DGE, EDUB, EDUC, ELFA, INDIRE, ITC, MAKASH, MONE, NCIE, TLF) were asked to respond to a questionnaire that included questions related to mainstreaming results from the large-scale pilots in the project. A slightly amended version of the questions were also put to both Promethean and SMART that have involved schools in WP4 piloting and to UNI-C that is leading WP6.

### **1. How does the iTEC project fit with the development of your national ICT strategy or the priorities of your Ministry? And what do you hope to gain from participating in iTEC?**

*The responses to this question were encouraging and indicated that, at the mid point in the project, there already appears to be good alignment of iTEC activities with a number of national ICT strategies or signs that the project is impacting on policy formation. Some examples include:*

- Austria where iTEC “fits into the recent IT strategy of the BMUKK eFit21 <http://www.bmukk.gv.at/schulen/efit21/index.xml> as well as in the IMST campaign <http://www.bmukk.gv.at/schulen/schubf/se/imst.xml>.”
- Belgium (Flanders), where EduBIT anticipates that iTEC scenarios can feed into three new large projects now being established by the Flemish ministry related to the use of tablets, games and smartphones, as well as into initiatives related to both visual and media literacy.
- Denmark, where UNI-C will work to introduce and integrate (lessons from) the most innovative scenarios/stories/activities, together with iTEC/ICT-technologies, into the pilots of the future ‘demonstration schools’, which form an action line in the Danish national strategy ‘ICT in compulsory schools 2012-2015’.
- Hungary, where iTEC results are being integrated within new teacher training and in-service training programmes being developed by EDUCATIO.
- Israel, where the ambitious program called Adapting the Education System to the 21st Century commenced in 2010. MAKASH “hopes that iTEC will enable us to develop a variety of services supporting the Ministry’s strategy, both by training and supporting teachers that participate in the National Program as well as increasing the schools out reached for the Organizational Development program.”
- Italy, where iTEC is part of the national Digital School strategy that includes the national IWB expansion project and several other actions (Classroom 2.0 Digital Publishing and School 2.0).
- Slovakia, where iTEC is highlighting “the need to put much more effort into the development of the digital technology infrastructure, teachers training and curriculum design.”
- Switzerland, where iTEC is seen as being “ideally suited to support the “Both use-ICT-to-learn and learn-to-use-ICT” strategy which has been adopted by the Swiss cantonal ministries of education in 2007.

- Norway, where “iTEC is “well aligned with national priorities”. NCIE hope “to move productive use of ICT in Norwegian classrooms ahead by providing a set of validated high-quality practices for Norwegian educators.”
- Turkey, where iTEC is seen to be feeding directly into the national Information Society Strategy, FATİH project and MoNE teacher education strategy.

Even where some countries were unsure how iTEC might finally influence the national ICT strategy for schools, they expressed a view similar to that of Ministry in Portugal where DGE “hopes to gain enough expertise and knowledge that make it possible to go on with the implementation of iTEC learning stories and learning activities after the completion of the project itself.”

In terms of their company strategies, both Promethean and SMART suggested that there are benefits from working in the project and good opportunities to exploit iTEC results.

- Promethean emphasised how the evaluation of the iTEC pilots and working with multi-disciplinary researchers and designers is already feeding into the development of the company’s product roadmap, helping them to understand the competences that teachers of the future will require and develop appropriate training and professional development opportunities. A strong focus for Promethean is new approaches to assessment and “iTEC enables us to explore our novel ideas on assessment with valuable teacher feedback at every step of the process so that any issues that arise can be solved.”
- SMART anticipates “being able to scale the pedagogy in the project and use it as a new methodology that “we can extend in our network of schools through advocacy programs like SMART Showcase Schools (140 in EMEA) and SMART Exemplary Educator Program (105 in EMEA) and SMART Education Consultants.”

## **2. Are there iTEC Learning Stories and associated Learning Activities that you want to implement on a larger scale? If so, which ones? And why?**

*Based on the experiences of schools in cycles 1 and 2, there were a number of positive reports that MoE want to implement iTEC learning stories/activities on a larger scale. Some notable examples include:*

**ELFA:** “We have tested the ‘Outdoor study project’ in the first cycle and it was a big success, especially activities such as Collecting data outside of schools, Teamwork and Team newflashes.”

**EDUCATIO:** “All of the iTEC Learning Stories are useful examples that we intend to present to Hungarian teachers. There are a number of iTEC Learning Activities commonly used by innovative teachers but there are also several LA’s which could revolutionize learning and teaching; for example, collaborative assessment, peer feedback.”

**INDIRE:** “There are scenarios/learning stories/activities we consider more appealing for a wider scale extension: Homework and schoolwork flip (scenario); recognising informal learning (learning story); Working with outside experts (learning activity); Forming teams/mental notes about students (learning activity).”

**CNDP:** “From the three learning stories proposed in cycle 2, “Creating Science Resources” is the most implementable on a larger scale.”

**MAKASH:** “We found the ‘Students creating science resources’ Learning Story notably helpful for teachers. They easily integrate into teaching syllabuses for a variety of learning contexts.”

**EDUB:** “The ‘flipped school’. The didactical concept behind this scenario and the technical implication is innovative. Mostly schoolwork is based upon what pupils have learned in the classroom. By changing the system we can focus on exercises and tasks in the classroom; the teacher becomes coach. The instruction moment can be moved to a virtual environment; the real learning comes in the classroom.”

**ITC:** “There are two learning stories that we would like to implement on a larger scale. These learning stories are “A Breath of Fresh Air” from Cycle 1 and “Students Creating Science Resources” from Cycle 2. Lithuanian teachers agreed that these scenarios are innovative and motivate the students.”

In some countries, a larger evidence base may be required before decisions can be taken about upscaling iTEC scenarios. NCIE in Norway suggested that, "It is too early in the project and we would like to see a richer set of learning stories/activities and use iTEC technology."

**3. What specific actions have you have already taken in order to help upscale iTEC results? (For example, provide details of in-service training or other forms of support provided to schools that are not directly involved in the project)?**

*The more general dissemination actions of partners are now raising the profile of the project and there are encouraging signs that the majority of partners involved in the pilots are beginning to develop strategies for upscaling based on: incorporating iTEC results in initial teacher education and CPD; closer engagement with ICT advisers; and use of social media/networks to directly engage with teachers. Some notable examples include:*

**INDIRE** "has already used "Homework and schoolwork flip" (scenario) and "Recognizing informal learning" (learning story) in a post-graduate teacher training course with a limited number of teachers to test the effectiveness of those formats for teachers not included and familiar with the iTEC project and the feedback was positive."

**CTIE** has carried out "dissemination activities on a national level using the cantonal teacher training universities' joint expert group which is mandated to deal with issues of ICT and e-Learning in teacher education."

**ELFA** has prepared one of the first cycle 2 videos and is working with the ministry and promoting iTEC within the largest teacher education initiative yet undertaken in Slovakia.

**EDUB** "has provided 'discovery boxes' where schools can read about the scenarios used in the first cycle. On the EduBIT days (each year) there are always a session about iTEC, and are results discussed."

**CNDP** has issued a call for participation in iTEC to all 31 ICT advisers of the Ministry (one per regional education authority) and the most actively engaged pedagogical advisers in ICT in primary education have been contacted by the MoE.

**BMUKK** has worked with BG Klosterneuburg, a leading school in iTEC to provide best practice to other schools, has promoted iTEC to all ENIS schools (European Network of Innovative Schools) and is producing teacher training materials.

**ITC** has translated the iTEC scenarios into Lithuanian and promoted them via the national portal and has started to organised iTEC teacher training events in several regions.

**SMART** has started to involve its Education Consultants and SMART Exemplary Educators in iTEC meetings and workshops and is also using social media to promote iTEC results to its teacher community.

**PROMETHEAN** is using its Promethean Planet community (1.3 million members) to: recruit more iTEC pilot teachers; gather comments on scenario selections; comment on prototypes; promote iTEC webinars and training sessions; reach out to our Planet Microsites to help contribute to the iTEC research through a teacher survey and power league activity. Three online communities for teachers have also created: Activ iTECProm, iTECProm Geogebra, iTECProm Scratch.

**4. What specific actions do you think you will take in the final two years of the project to help upscale and mainstream iTEC results (e.g. will you run some larger pilots around iTEC Learning Stories or take other policy actions)?**

*The majority of partners at this stage in the project have fairly clear ideas on how they will take dissemination and upscaling actions to the next level that include: national training workshops and events; use of social media to reach out to teachers not involved in the project; and plans for extending the iTEC pilots that are already in place. A number of MoE see themselves as gradually growing and expanding the network of schools throughout the remaining cycles in order to create a self-sustainable community of practice around iTEC results. Some notable examples of how partners intend to upscale and mainstream iTEC results are as follows:*

**DGE** comments that, “The strategy which has been devised for the pilots is to take on board teachers who have participated in previous piloting cycles. In this way we aim to create a network of teachers which consists of those who are more experienced and those who are new to the project. By cycle 5 we hope to have created a self-sustainable community of practice which, once the formal project is over, can build on knowledge, skills and competences amassed in these four years. Competence Centres may have a central role here, in the sense that they can more easily communicate with local schools and help in the “localisation” of LSs and LAs. A policy has not been devised yet, but headteachers and local communities will definitely have to be brought into the process.”

**MONE** has progressively involved a greater number of schools in the project starting with seven schools in Turkey that were involved in the EUN/Acer netbook pilot and then, in cycles 2 and 3, by inviting 26 schools involved in eTwinning.

**MAKASH** anticipates starting a large-scale pilot involving 40 classrooms at the beginning of the school year 2012-2013. It has also “designed an ITEC-based course of studies for in-service training of teachers in coordination with the Ministry and steps are now being taken to have this approved and accredited.” The aim is to deliver this with the Ministry’s in-service training centres (PISGA).

**INDIRE** plans to use single elements of the scenarios/learning stories/activities as online training materials for larger scale ICT professional development initiatives on a national level. “In particular we will run national training programs on digital skills, IWB competencies and classroom 2.0 innovative settings. We expect to have easy-to-use, pedagogically focused ITEC technological tools and to be able to provide them to teachers that are not initially included in the project. We are planning to include the scenarios in other research/experimentation projects (i.e. funded under the PON action addressed to the southern Italy regions).”

**EDUCATIO** anticipates embedding ITEC results in a number of professional development courses for teachers in Hungary as part of the *Social Renewal Operational Programme 3.1.5 Support of teacher professional development*, as well as in new courses connected to digital competences and ICT supported learning. The ITEC Learning Activities will also be used as examples of ‘standard’ pedagogical activities that will be incorporated in a redesign of the Hungarian Sulinet national educational portal. EDUCATIO already has a mobile laboratory which it uses for roadshows, dissemination events and training sessions. There are plans to showcase ITEC scenarios and Learning Activities within an upgraded version of this Lab in a permanent location, using a model similar to the EUN Future Classroom Lab.

**CNDP** aims to strengthen the links between ITEC and the French scenario databases, such as PrimTICE for primary education and Edubases for secondary education. A common standard for creating and publishing learning scenarios (ITEC-PrimTICE-Edubases) is under study. The intention is also to use the Experitheque, a database of innovative projects in schools.

**BMUKK** is particularly interested in how ITEC technical development will impact on LMS shells and, depending on the results from the validation of ITEC technology, “will push the use of ITEC learning activities in all grades.”

**PROMETHEAN** intends to use Promethean Planet as its primary channel for communicating with teachers and has already put in place dedicated pages where teachers involved in the project can share ideas and resources. Through the use of short links, it is possible to push people to the content from Facebook and Twitter. To support these pages and drive traffic, Promethean will include: a banner on the Planet home page that changes monthly; regular updates on the Planet Facebook page; regular tweeting.

**SMART** has included schools from Germany and Spain in cycles 1 and 2 and plans to extend the piloting to include schools in Poland. SMART widgets and implementation ideas and widgets specifically created for cycle 3 will also be made available to all ITEC schools via the Teachers’ Community.

**UNI-C**, as leader of WP6, is supporting teachers in the WP4 pilots. Based on examples from the ITEC pilots that best illustrate innovative and engaging use of ICT, UNI-C aims “to set up a national showcase (on the EMU national portal), and invite teachers to suggest examples of matching Danish scenarios/learning stories that deserve to be showcased. The best examples will then be translated into English and added to the teacher community or another platform provided by the EUN to

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promote the exchange of innovative, educational uses of technology across European countries. If all (a number of) MoEs do something similar iTEC may create an invaluable, sustainable platform for the exchange of innovative uses of technology in education.”

**5. What do you currently see as the main roadblocks that could prevent you from mainstreaming iTEC results?**

At the half-way stage in the project, partners have highlighted a number of factors that could inhibit the mainstreaming of iTEC results in different countries. This information has been fed into the mainstreaming discussions in the iTEC High Level Group and has been taken into consideration when developing HLG recommendations.

Factors that may inhibit mainstreaming can be highly dependent on the national context. However, a number of key issues seem to be emerging and these will be explored further by the HLG in the final two years of the project and lead to recommendations in the project's final Exploitation Plan. These include: inadequate infrastructure and particularly poor classroom broadband connectivity in some countries; the need to find new, cost-effective mechanisms for CPD; lack of teacher motivation to use ICT in order to adapt their current teaching practice and lack of incentives for them to do so; an inflexible national curriculum in some countries which leaves little room to explore new pedagogical approaches; having adequate time and resources to validate and then disseminate iTEC technology.

**BMUKK** hopes that the new possibilities offered by the iTEC technology will help MoE mainstream iTEC results but suggests that the project may also need to develop more leading-edge or innovative learning activities in order to be able to better capture the attention of those teachers who are already interested in new pedagogical approaches.

**EDUB** suggests that positioning iTEC may be difficult at a time when there is an ongoing debate concerning the focus of the national ICT strategy and when ICT may not be regarded as a key issue in the debate on educational reform.

**DGE** sees four main potential roadblocks to mainstreaming results. “1) Continuous Professional Development: a system has to be devised whereby all those teachers interested in using LSs and LAs have the chance to actually attend training sessions and even whole courses. This is costly and there may be necessary to find ways of finding “lighter” alternatives to formal, time-consuming training. 2) Continuing support. It is known that training in and of itself is not enough for teachers to implement innovative ways of teaching and learning. 3) Lack of equipment and infrastructures in all schools willing to participate. In a time of financial constraints, it will be of paramount importance to make the most of whatever equipment and infrastructures there are in schools, as we don't envisage spending large amounts in this area in the next few years. 4) Lack of motivation on the part of many teachers. As in other countries, many teachers are unsatisfied and it may be difficult to find ways of motivating and helping them to be more creative and innovative in their classrooms with their students.”

**CNDP**, like a number of partners, highlights that mainstreaming at a policy level may not be possible until there are more results available from the iTEC validation cycles “as national coordinators cannot present concrete evidence of ‘what works and why’ in iTEC scenarios. Once the results will be available, and provided that they identify the efficient pedagogies and technologies within the scenarios, we think there will be a concrete basis for teacher professional development and maybe stronger arguments for engaging teachers in the project.”

**CTIE** only sees wide scale adoption as being possible in Switzerland once project results and particularly the learning scenarios and activities' descriptions are available in German, French and Italian. (CNDP and TLF also mentioned the importance of translating iTEC results).

**EDUCATIO**, sees “a lack of modern infrastructure in schools” as one of the main challenges in Hungary and points to the fact that the average internet connection in schools is below 4Mbit/s for the whole institution. While Hungarian teachers are open to new methods and many of them are participating in different educational projects, there are difficulties in embedding project-based learning within teaching and learning, as most elements of everyday school practice are regulated by the National Core Curriculum. In terms of pedagogical approaches, “project-based methods are not compulsory and that is why the projects in many cases are organised in the afternoons.”

**ELFA** similarly highlights a lack of equipment but also suggests that lack of support for teachers and low teacher salaries in Slovakia does not make practitioners receptive to changing their teaching methods

and “this leaves little room for school principals to motivate them. We believe that EU funds and MoE development projects can be the drivers for bringing more money to schools and enable the development of successful schools.”

**INDIRE** highlights the need for iTEC technical results to feed effectively and in a timely fashion into the later project cycles, so that challenging, pedagogical scenarios are complemented by innovative tools. However, INDIRE also suggests that the project should not place “too much emphasis on introducing new technologies when the object should be EDUCATIONAL INNOVATION and not technological innovation. If too much pressure is put on having ‘new products’, the risk is that we run behind solutions that the school system will not be able to sustain and the participation to innovation will be limited to the usual percentage of innovation schools instead of the average school institution. The aim should be to improve education and not technology.”

**MAKASH**, like a number of MoE, points to the fact that political factors outside their control could easily impact on the national ICT strategy or development plan and lead to the loss of key personnel. Like INDIRE, MAKASH is aware that there needs to be sufficient time so that iTEC technology can be properly tested in the pilots, demonstrated to policy makers in the Ministry and embedded in teacher training programmes.

**MONE** highlights the limited funding currently available for teacher education in Turkey both within and beyond the iTEC project and also suggests that new ways must be found to provide incentives for teachers to change their current practice, particularly as teachers may find it challenging to implement iTEC learning activities within an “inflexible curriculum”. Mainstreaming will also require the project to ensure that effective user testing is carried out prior to the introduction of iTEC technology, as teething problems with technology can easily discourage or even alienate teachers in the pilots.

**NCIE** points to the particular problems of policy makers in decentralised education systems where “NCIE is not in a position to instruct schools or teachers to use iTEC results” but needs “to find appropriate partners and constructive approaches to implement these changes”, including within Norwegian teacher education institutions and other government agencies such as the Norwegian Centre for Science Education and the Norwegian Centre for Mathematics Education.

**SMART** echoes the views of several MoE by highlighting roadblocks such as: lack of connectivity in the classroom; school policies in some countries that inhibit BYOD pedagogical approaches and use of mobile devices in school; inflexible educational systems where teachers may not see the value of project-based learning or trying to develop specific competencies; lack of quality pedagogical training involving ICT; and both assessment frameworks and exam pressures in many countries.

**TLF** suggested that, while “descriptions of learning scenarios are mature enough”, iTEC technology may be more of a “proof of concept” and while it may be suitable for use with small groups of users in pilots, it could be difficult to make this ready for large-scale use.

### 5.3 PARTNERS DEVELOPING ITEC TECHNOLOGY

Project partners involved in developing iTEC technology or providing support to teachers that will use the technology (AALTO, CTIE, EUN, FUNDP, BOLT, KM, KUL, PROM, SMART, TLF, UNI-C, VIGO) were asked to respond to a questionnaire that was used particularly to elicit some initial feedback related to how partners viewed the technology being developed in the project and potential roadblocks to exploitation.

These responses from project partners come at a time before there has been any large-scale testing of iTEC technology in the WP4 pilots in order that conclusions can be drawn concerning the added value of the iTEC technology approach and the usability of tools and services that could potentially be provided to teachers: an iTEC widget store, People and Event directory, Composer and Scenario Development Environment. Based on the results from the user testing, version 3 of the Exploitation Plan will include a more in-depth analysis of the potential for exploiting iTEC technology that includes : an analysis of the resources that would be needed for further developing and maintaining iTEC tools and services; plus possible ‘business models’ that could support wider rollout of iTEC technology.

During the current exercise, some of the most useful feedback from technology partners came in response to the following two questions.

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**1. What specific results from your technical work package have the potential to be exploited after the end of the project and how will your own organisation exploit these? Or do you consider your work in iTEC to be more a demonstration or 'proof of concept'?**

*At this stage in the project a number of partners see themselves as providing a technology 'proof of concept' and all partners appear to have a clear idea concerning how the work in iTEC can be taken forward within their own organisation in order to support their specific research agenda or organisation's strategy, most notably perhaps by SMART which has already provided widget integration in its Notebook 11 software.*

**AALTO** is developing technical prototypes to various stages of completeness that are all published under an OSI-approved license. "We may exploit them further, but anyone else is free to do so as well. Learning Activities developed during the project will be finally published as a teacher guide book (most likely also an online publication), which may extend the reach of these ideas in European classrooms."

**BOLT** highlighted that iTEC is increasing the functionalities of the Apache Wookie, the underlying server for the delivery of widgets, that is already an open source project hosted by the Apache Foundation. On top of the Wookie, it is developing a layer that allows widgets to be displayed along with social paradata and this has the potential to be used as a store of educational widgets for use by teachers. The store also has features allowing teachers and potentially students to create and upload widgets.

**CTIE** anticipates that it will be possible to use entries in the people and events database after the end of the project and, after the project, if the database is offered as a service, CTIE "will most certainly continue to feed the database with events and people that are relevant in our national context."

**FUNDP** suggests that "the ITEC UMAC (User Management and Access Control) component is mainly built as an enabling component for the rest of the iTEC system. FUNDP's role in iTEC has always been defined as a support function to develop helper components. The main results are thus mainly about integration efforts made in applying standard approaches to authentication and authorization in complex multi-layer web environment. Exploitation will mainly be through publication of scientific papers in a related conference."

**KM** sees itself as "working on 'proof of concept' implementations that are able to demonstrate a highly flexible and user-friendly digital workspace for teachers. The key elements of such a vision are: a user-friendly, configurable Shell supporting ICT-inspired instruction on the large scale; a Composer tool for a light-weight sharing of good practices of instructional design. KM looks forward to the pre-pilots and pilots providing evidence for assessing the market potential of both products." While the Shell in its current form depends heavily on the success of the W3C widget paradigm, "an exploitation of both, DotLrn Shell and Composer, can be envisioned without depending on the Widget success story."

**KUL** sees WP9 as "supporting experimental scenarios to find out whether actors, other than learner and teacher, can play a role in the learning process. Example actors are: experts, parents, co-learners, retired teachers as tutors, etc. As such it is a proof of concept." KUL suggests that the People & Event directory can be used also after the project if MoE or other partners see its value. Although KUL is not planning to maintain the people and event directory for schools itself, KUL will continue to use the People and Event directory technology for its ongoing research in this area. As the software is open source, it will also be possible for others to use it for other purposes.

**PROM** reports that the idea of "widget style" content is something it already supports in its products and it sees widget style solutions helping to provide similar experience across multiple devices as well as to provide users with libraries of useful tools and interactive resources. "The research around this idea that ITEC offers is therefore very useful to inform our future developments and ideas." However, it also points to the need to accommodate the "App Store" models used by Apple, Google, Microsoft and others and that these challenge the W3C widget approach iTEC currently uses. Promethean suggests that, "the well-adopted alternatives must remain the focus in the longer term for Promethean if we are to take the ideas to scale. In a general sense, work in ITEC is 'proof of concept' in the use of W3C widget as a technology but ITEC provides "a solid platform for our ongoing work to fully exploit the broader HTML5 Canvas and JavaScript combinations that the project also allows us to explore."

**SMART** has designed three specific widgets, Idea Cards, Six Thinking Hats and random words that assist “parallel thinking” and promote decision-making. The widgets can be run on IWBs, on student devices and within LMS/PLEs. SMART has also already integrated a W3C compliant widget in its SMART Notebook software and is providing a way to integrate W3C widgets on any Notebook page (iTEC widget viewer). Currently the viewer is only available to iTEC teachers but after the next project cycle it can be made available to all SMART users. SMART is also exploring ways to integrate the widget store directly (direct instantiation of widgets without downloading or copying embed code).

**UNI•C** has produced “the online iTEC environments’ manual that can be used by all schools and coordinators using the technologies, iTEC- and other ICT-tools, described in connection with learning stories and learning activities. In its capacity as a founding partner of the EPICT Group ([www.epic.eu](http://www.epic.eu)) UNI•C will also investigate whether some of the iTEC materials (e.g. on IWBs) can feed into the EPICT Group’s further development of instructional resources. Also the competence work of iTEC will feed into the EPICT Group’s further development of the EPICT Competence Framework.”

**VIGO** confirms that WP10 in iTEC is essentially a research work package that is exploring “the potential of semantic technologies to support the identification of those resources that best fit in a learning activity. From this perspective, WP10 and its main result, the SDE, could be seen as a ‘proof of concept’.” The original idea was that the SDE would enable technical coordinators to find learning activities that are feasible in their schools from a technical perspective and would also help teachers to create lesson plans by selecting the best resources to support them. Real user testing will be necessary in order to determine the practical, added value of SDE services and mechanisms and VIGO has outlined a number of further possibilities for how its research into automatic enrichment and population mechanisms could enhance the exploitation potential of the SDE.

**2. Please indicate what you see as possible roadblocks to the exploitation and sustainability of these results after the end of the project. And/or what support might be needed in order to mainstream these results.**

*Prior to classroom trials of the ITEC technology, It is too early in the project to anticipate whether it will be possible to move beyond a ‘proof of concept’ in most work packages. Issues related to the W3C widget specification and its scalability may particularly need to be addressed in the next phase of the project. Some project partners are also aware that, as universities, they do not have the capacity to run pan-European technical services for schools after the end of the project. Some notable responses to this question are as follows:*

**AALTO** comments that technical prototypes developed in WP3 are typically small applications, which may have a niche user base in some cases, but that “a credible provider of these services is needed, as a university cannot be a service provider.”

**BOLT** suggests that “The primary barrier to setting up a widget store beyond the end of the project is hosting and maintenance” but that, as a result of the enthusiasm of teachers using widgets during iTEC training events, “there is a growing conviction that the teachers at least would welcome this.” With the focus now shifting to teachers and possibly pupils now being able to create and manage widgets themselves, “the project is relying less on being able to harvest widgets from the widget community, or develop lots of them ourselves, but more on the automatic widget creation tools within the store and shells.”

**CTIE** suggests that, continued technical support will be essential in order to keep the people and events database in perfect working order and offer it as a service to schools.

**FUNDP** sees that its results “will most likely feed into the scientific community and hopefully find adoption in other contexts. We see no real roadblock in adopting our solution because it has been design to adapt itself to various contexts. For instance, we support local authentication for users who can’t or don’t want to re-use credentials across platforms, but we also support authentication from major identity providers on the Web for users who are open to this solution.”

**KM** observes that the iTEC Exploitation Plan need to take the (potential) success or the (potential) failure of the W3C widget approach into account. “A successful uptake of the W3C widget approach might trigger the rise of competitors Knowledge Markets needs to react on. A failure will require us to search

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for an alternative technical solution. This might come at price that Knowledge Markets is not able to afford. On the other hand, the app paradigm is out there and highly successful and the W3C widget approach is just a technical variation of that paradigm.”

**KUL** suggests that a major roadblock to exploitation as far as it is concerned could be the ‘limited advancement made in technology in comparison to the state of the art’, although this may be particular to KU Leuven’s situation. In terms of widgets, KUL suggests that, “The ROLE project, in which KU Leuven is involved, is more advanced in terms of widgets, in particular it uses Inter-widget Communication instead of OAI-PMH harvesting of services supporting widgets. Nevertheless the use of W3C widgets and the use of Wookie are an interesting addition.”

**PROM** comments that, “The focus on W3C widget specification is perhaps not a foundation for scaling, although with good design principles and use of APIs to allow further customisation of applications, useful tools services and assets should be able to be sustained after the project in other more popular or exploitable formats. The other tools that will appear later in the project should also allow referencing of a greater diversity of tools and services than the current batch of W3C widgets offer and many of these should have less issues with going to scale. The structure of the project is good and does allow us to explore the idea of “widgets” and then refine them in the latter stages, perhaps providing alternatives with more inherent sustainability.

**SMART** suggests that, “Regarding technology, the project fits with our widget strategy as Notebook 11 is already a shell for learning. The iTEC vision of interoperability of widgets across shells fits with our commercial view.” However, it points out that, although all widgets are based on HTML, “there are different levels of integration between the widgets and their shells. W3C widgets are optimized for learning management systems (e.g. Moodle is a shell for W3C widgets), SMART’s SDK would allow a higher degree of interactivity (e.g. change position or properties of objects on SMART Board, handwriting recognition) but these functions are not supported by the W3C standard. Furthermore, some of the widgets use Flash or Java which are not supported by all shells.

**UNI-C** recognises the need for ongoing support to schools will be needed after the end of the project. It suggests that, together with TLF, UNI-C “will investigate the possibilities for TLF operating a subscription-based support service for after-project pilots/activities. The need and basis of this support will depend upon the number of countries and schools wishing to scale after the finish of the iTEC project.”

**VIGO** highlights that the project is at the stage where “complete integration of project services under the iTEC Cloud” plus testing of iTEC technical results in pilots during cycles 4 and 5 will first be necessary before it will be possible to analyse how those services could be exploited after the end of the project either individually by partners or by partners collaborating in order to exploit services, possibly under an “iTEC Cloud” brand.

Finally, it is worth noting that European Schoolnet has some experience of taking technology demonstrations or a ‘proof of concept’ through to delivery of a pan-European service for schools. For example, its Learning Resource Exchange (LRE) service for schools (<http://lreforschools.eun.org>) was developed within a number of EC-funded projects, starting with the CELEBRATE demonstration project (2002-2004), then in the CALIBRATE and MELT projects, before the LRE was made publicly available towards the end of the MELT project in December 2008. Currently, it is sustained and funded by MoE working together in a EUN LRE Subcommittee that is open to other content stakeholders.

This may be a model that the iTEC project can draw as it completes the integration of project tools and services and evaluates the feedback from teachers on iTEC technology during the final cycles of the school pilots.

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## 6. ITEC EXPLOITATION PLANNING IN YEAR 3

At the midway point, the iTEC project is on track to produce exploitable results, not least of which is the possibility to create a permanent, multi-stakeholder platform under the umbrella of the new Future Classroom Lab initiative where policy makers, ICT vendors, educational publishers, practitioners and TEL experts can work together in order to rethink how teaching and learning can evolve in the future classroom.

### 6.1 EXPLOITATION ACTIVITIES AND MILESTONES

#### 6.1.1 Scenario Development and Learning Activity Design

The production and role of the Future Classroom Scenario Toolkit and Learning Activity Design Toolkit has been discussed earlier in this document. The following milestones are within the current delivery plan:

- Completion of the FCS Toolkit – January 2013
- Testing of the FCS Toolkit: used by partners and Associate Partners to create scenarios in each country – June 2013
- Completion of the Learning Activity Design Toolkit – April 2013
- Testing of the Learning Activity Design Toolkit – December 2013

Within v3 of the exploitation plan, the next steps in terms of wider scale promotion and uptake will be discussed. The plan will be based upon the results of the year 3 trails and consultation with partners and Associate Partners.

#### 6.1.2 Pilots and Evaluation

Pilots will continue with cycle 4, and there will be continued evaluation of classroom pilots, particularly with regard to technology deployment.

In the third year of the project the evaluation work under WP5 will be refocused to provide more evidence for exploitation and up-scaling. Previous cycles have focused on classroom impact, and over the three cycles good evidence for the positive impact of iTEC Learning Activities has been gathered. In year three more attention will be paid to communicating this evidence to partners, Associate Partners and wider stakeholders to ensure that the value and potential of iTEC is made high profile.

To gather evidence in support of up-scaling, two focus groups will be held with NPCs and, where possible, any other stakeholders and teachers who have been involved in the process. The first should take place from May– September 2013 and the second from November 2013 – January 2014. The first focus group intends to capture and evaluate each partner country's use of the Scenario Development Toolkit and how each is sharing/embedding the process. The second focus group intends to capture and evaluate each partnership country's use of the Learning Activity Development Toolkit and how each is sharing/embedding the process.

National case studies will also be derived through interviews with NPCs, MoE representatives and other key stakeholders (3 interviews per country) to be conducted from April-June 2013, subsequently reviewed and revised through a consultative process from March-April 2014. The case studies are intended: to capture perceptions of change/innovation enabled through iTEC; to capture and evaluate how iTEC has supported ICT policy and development at national, regional and local levels; and to identify enablers and barriers in relation to scaling-up iTEC outcomes at national, regional and local levels.

- Focus group activity: Evidence for up-scaling Scenario Development – May-September 2013
- Case Studies: National/regional impact of iTEC in support of ICT policy development - June 2013
- Focus group activity: Evidence for up-scaling Learning Activity Design – November 2013 – January 2014
- An additional internal deliverable will be delivered in M32 (April 2013) to provide a consolidated report on the evidence gained from the first iTEC cycles, highlighting the impact of iTEC on innovation in the classroom, and the barriers to up-scaling. D5.4, Evaluation Interim Report Three,

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will be completed in M36 and submitted to the EC with additional evidence for the potential to upscale based on the evaluation activities described above.

The findings from this work will feed into the third version of the Exploitation Plan in M37

### 6.1.3 Training Development and Teacher Community Expansion

The relationship between iTEC teacher training, and the EUN FCL and CPDLab project has been previously discussed in this document. It is already envisaged that a number of potential iTEC results could possibly be mainstreamed at a pan-European level via the European Schoolnet Future Classroom Lab that was launched in January 2012 (see section 2.3.5). This new initiative is not dependent on iTEC funding but is part of a wider European Schoolnet business development strategy. From day one, the FCL has been established as a self-sustainable facility in which both European Schoolnet and ICT vendors are working together to cover operational costs.

A revenue stream is anticipated from FCL services that will include running regular CPD courses and training workshops for both practitioners and policy makers. Funding of action research pilots and validations may be possible from FCL industry partners that have used iTEC methodologies in order to develop their own scenarios and Learning Activities. There may also be the potential to 'export' the complete FCL model to other countries/regions or specific services.

The delivery of the course is also intended to support the growth of a sustainable community of practices. The course has been developed to encourage participants to form strong professional bonds with colleagues and foster a culture of collaboration, peer support and sharing. The teachers involved will join other teachers already in the iTEC teacher community, and will be joined by other teachers involved in other EUN and partner projects. These teachers will be given the status of "ambassadors" for iTEC and the Future Classroom, and encouraged to recruit colleagues into the community.

- The Future Classroom Scenarios Course has been developed through the second year of the project, with various modules of the course already delivered to iTEC teachers. The course will be delivered again in February 2013, April 2013 and June 2013. Following this, it is the intention of EUN to deliver the course at a regular frequency up to the end of the iTEC project and potentially beyond, including online versions of parts of the course.

### 6.1.4 Technology Sustainability Options

It is too early in the project to propose a specific economic model for sustaining iTEC results after the end of the project. The project first needs to decide *what* results have the potential to be exploited and by which stakeholders, before proposing *how* and at what cost these can be mainstreamed and sustained. Later versions of deliverable 11.5 will explore and propose an economic model for sustaining iTEC results, and this is particularly the case in relation to technology outputs. Feedback from a number of ICT vendors confirms that the iTEC vision and technological approach to advancing the state-of-the art (section B1.2.1 of the DoW) remains in line with mainstream thinking in terms of how K-12 learning platforms and environments are likely to evolve over the next five years.

Should further testing of the iTEC Shell and Widget store demonstrate that this approach provides teachers with easier access to a greater range of user friendly learning tools, it will be necessary to develop a sustainable business model for its on-going penetration. This may be supported commercially by, for example a major ICT supplier, or consortium of suppliers that see this approach as beneficial to their own business development. Alternatively, options for a more community based open source approach to exploiting the technology may be found, through working with the existing OS community such as that which supports the on-going development of such things as Moodle. Other technical outputs such as the Composer, SDE and P&E directory may make an impact in education through stimulating, and adding to on-going research in these areas. iTEC technical partners will explore these sustainability options in the third year of the project, and identify an approach for each technical output. The findings will be reported in each technical deliverable due this year and brought together in the year 3 exploitation plan in the context of the wider iTEC vision.

- D7.3, Third generation of iTEC Shells and Composer– August 2013
- D8.3, Technology evaluation report with demonstrator maintenance and support procedures– August 2013

- D9.3, Report on metrics for the directory deployment and use – August 2013
- D10.3, Support for implementing iTEC engaging scenarios V3 – August 2013

### **6.1.5 Partner and Associate Partner Engagement and Consultation**

The project recognises that scaling up designs for the future classroom requires more than large-scale demonstrations of scenarios that successfully engage teachers and learners. Ways must be found to bring project results to the attention of key policy makers and civil servants taking decisions on national strategies and funding related to the implementation of ICT in education. Project results must also be aligned with the political and economic realities that are impacting on the way in which ICT contributes to the educational reform process in each country. The scale of the challenge that the project faces here is considerable, particularly as a number of national agencies dealing with ICT in education have either disappeared entirely since the project commenced (e.g. Becta in the UK) or are subject in several countries to audit, review or merger with other national agencies. The general economic downturn in many countries is also likely to impact on future investment in ICT in education.

The approach adopted for raising awareness, disseminating results and creating impact in iTEC is building upon the experience already gained by European Schoolnet in a number of large-scale projects and leverages existing channels for dissemination of project results, including the EUN Steering Committee (that includes senior representatives of 30 MoE) and EUN conferences and special events.

This, second iteration of the iTEC Exploitation Plan will be used as the basis for further consultation with partners, Associate Partners and stakeholders in year 3 of the iTEC project. The objective of the consultation will be to achieve agreement from partners to play an active role in achieving the iTEC vision.

The consultation will take the form of direct engagement with key partners and stakeholders, starting with those whose commitment to iTEC will raise the profile of the project and add legitimacy and “weight” to the achievement of the vision. The consultation will be supported by the evidence collated, and presented in D5.4 (see above). Progress made will be reported in the third version of the exploitation plan in M37.

- The iTEC General Assembly will focus on the iTEC vision and exploitation plan, discussing each of the vision “components” described in Section 2 of this document, and proposals of how each can be achieved. – March 2013
- The High Level Group Evaluation Conference, scheduled for M42 will be brought forward, and scaled up in year 3 of the project. The current proposal is to hold a high profile, multi-stakeholder event focused on exploitation of iTECs outputs. The intention is to invite high level participants from iTECs partners and Associate Partners, and wider stakeholders including TEL experts, suppliers, key representatives from the European Commission and representatives of national and regional authorities currently not directly engaged in iTEC. – September 2013.

### **6.1.6 Associate Partners**

Working with Associate Partners is an important part of the general project exploitation strategy. The iTEC DoW (Task 11.2) outlines how the project aimed to recruit Associate Partners as a way of extending the reach of the project and embedding project results. As part of this work, the project initially developed a Charter for Associate Partners as a public deliverable (D11.1) explaining how stakeholders can have an active involvement in the project, as well as an Associate Partner FAQ and application form.

In the second year of the project, regional education authorities have continued to show interest in iTEC. The Extremadura region in Spain, for example, has adapted a number of iTEC scenarios for local use. Extremadura was formally accepted as an iTEC Associate Partner in October 2012 and 38 schools from the region will now take part in iTEC activities in Years 3 and 4. There has been less progress on recruiting other Associate Partners in year 2 from commercial organisations and MoE, as the focus of engagement shifted more towards collaboration with other EC projects. This was based on recommendations from the first annual review. It has also been the case that the initial approach to engaging with Associate Partners has proved challenging in the context of the economic downturn. The potential Associate Partners approached, for example, found it difficult to involve and manage a minimum of 20 schools and support them in an iTEC related pilot.

During the second year of the project, however, the number of ICT vendors showing interest in iTEC, as a result of joining the EUN Future Classroom Lab, has been encouraging. At the same time, it became clear that many ICT vendors joining the FCL are also interested in exploring the use of emerging or recently

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introduced technologies that, at this point in time, can only be validated in smaller pilots. Some MoE are also expressing an interest in working with ICT vendors and TEL researchers under the umbrella of the FCL in order to explore more 'blue-sky' visions of the future classroom.

To meet this demand, the project revised the Charter for Associate Partners in August 2012 in order to provide opportunities for iTEC Associate Partners to co-develop future classroom scenarios and innovative Learning Activities that can be validated as a joint Future Classroom Lab/iTEC 'proof of concept' with a smaller cohort of schools.

The aim, within the third year of the project is to attract more Associate Partners to the iTEC project. Associate Partners will work within iTEC in two ways. Initially they will be required to support the dissemination process, communicating iTEC through their own networks, thus raising awareness. EUN is also engaging with a subset of Associate Partners to work alongside iTEC in the development and delivery of classroom pilots based on Future Classroom Scenarios. **In response to the recommendations of the European Commission Review Panel, at the second iTEC review, these pilots are intended to be of smaller scale, but demonstrating far more radical innovation, and based on emergent TEL research.** While the radical nature of these pilots will be limited in terms of up-scaling, they will act as an example of what can be achieved through iTEC with sufficient focus of resources.

#### 6.1.7 High Level Group Activity.

The formation of a High Level Group (HLG) of decision shapers (Task11.3) was a new instrument, established in June 2011 in order to help iTEC exploit and mainstream project results. As part of the iTEC Exploitation Plan, the intention is for the HLG to become a permanent body within the framework of European Schoolnet after the end of iTEC in order to help sustain the positive achievements of the project and act as an important source of knowledge and information on the educational reform process.

The High Level Group had its second meeting in May 2012. The meeting was informed by the evaluation results from the first two cycles of school pilots as well as three discussion papers commissioned from HLG members that provided an insight into the strategies for mainstreaming and sustaining national ICT initiatives (in Hungary, the Netherlands and Norway). A major conclusion from the meeting was that, in terms of the take-up of results, the project needs to make a distinction between up-scaling and mainstreaming:

- Up-scaling successful scenarios by Ministries is something that should be within the ambition level of the project and will be something that can be directly addressed as part of the project exploitation activities. Following positive feedback from piloting scenarios, it can be expected that MoE will wish to gather more evidence by the deployment of a larger scale experimentation at national level; for example, by perhaps conducting a more in-depth, longitudinal impact study.
- Mainstreaming successful scenarios, however, and taking these to very large scale will require an implementation and adoption plan to be developed within the national systems based on the work done during the up-scaling phase.

Following the meeting, the HLG issued an initial set of [recommendations](#) in July (for teachers, policy makers, ICT vendors and the European Commission) aimed at stimulating the policy debate on how schools in Europe can mainstream innovative use of ICT in the future classroom.

On 19-20 September 2012, a number of HLG members met with MoE, senior policy makers, industry representatives and teachers involved in iTEC pilots, in a peer learning workshop. The aim of this meeting was to reflect further on up-scaling and mainstreaming possibilities and also to formulate more specific recommendations that will help steer the iTEC exploitation activities for the duration of the project. These recommendations are outlined in detail in D11.3, *First Report from the High Level Group*.

The activity of the High Level Group will continue to inform the exploitation plan and support the achievement of the vision. The influence of its members will be sought in the preparation of the High Level Group Evaluation Conference now proposed to take place earlier than planned. It should be noted however, that resources allocated within the project for the work of the HLG are limited and that the members are providing their time and input to the project on a voluntary basis.

- High Level Group Evaluation Conference – September 2013

### **6.1.8 Revised Communication Plan.**

The communication plan, within the first two years of iTEC, has allowed partners to engage with a range of stakeholders across the European Education Technology community in order to identify which of these stakeholders has an “appetite” for what iTEC may deliver long term, and to judge the level of interest in potentially sustainable and exploitable outputs. Within the next year it will be important to refine the communications’ message to present those key stakeholders with a clearer and more concrete vision of what iTEC can deliver and how. The communications’ strategy, in development for year 3 of the project, will seek to ensure that the iTEC vision is communicated, with clarity to the identified target audiences in a way that will elicit the desired responses from each stakeholder group. The communication of the vision will be tailored to each stakeholder group, as will the channel of communication.

Industry and MoE partners will be encouraged to take up the iTEC toolkits and training as discussed previously in this report. The HLG Evaluation Conference will be one example of how this will be achieved, as will be the recruitment of further AP’s as dissemination partners. iTEC project partners will also continue to present iTEC findings to their own communities, and the development and exploitation of teacher communities is intended to lead to bottom up adoption of iTEC outputs. Among the TEL research community, the profile of iTEC will also be raised through an increased number of published papers and articles. These activities will be documented in the revised communication strategy.

- Revised communications strategy – June 2013

### **6.2 THE “LOCUS OF INNOVATION” IN ITEC AND A CONSOLIDATED STRATEGIC VISION**

In conclusion to the 2nd iTEC Exploitation Plan, it is important to clearly state that the objective of the iTEC project, to bring about sustained and scalable positive change to the classrooms of Europe, has not changed. The first two years of the project have helped identify potentially strong candidates from among the iTEC outputs for bringing about this change, and in so doing, realistically providing a model for achieving system wide impact. While the project has focused initially on gathering evidence to validate the iTEC processes as a mechanism to bring about classroom innovation, the locus of innovation within iTEC is in the processes themselves, and the potential for mainstreaming. The toolkits, training and technologies described all contribute to this holistic and comprehensive package of interventions that can realistically be applied across the varied European education landscape.

The iTEC vision has evolved in detail throughout the project and this is set to continue as the focus on exploitation increases with more intense consultation of partners and stakeholders. In the next phase of work, leading up to the penultimate exploitation plan at the end of year 3, iTEC will move closer to a more consolidated strategic vision. This vision will be reinforced by the input of all stakeholders on the necessary changes: educational; social; cultural; organisational; political; and technological, necessary to bring about the necessary impact.

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## APPENDIX I: COMPARISON OF THE NESTA REPORT WITH ITEC'S STRATEGIC VISION

In the table underneath, the iTEC vision is compared with the conclusions of the report "Decoding Learning: The Proof, Promise and Potential of Digital Education" [NESTA, November 2012]

Conclusion of the NESTA report	iTEC's vision
We found proof by putting learning first. We have shown how different technologies can improve learning by augmenting and connecting proven learning activities.	Connecting with current practice of learners, teachers, head teachers, and policy makers is one of the principles of iTEC's vision
This approach gives us a new framework for evaluating future innovations in education	iTEC seeks to improve the practice of mainstreaming by providing guidance for mainstreaming, including evaluation of future innovations
The numerous examples of good practice identified in this report show that there is also a great deal that can be done with existing technology. It is clear that there is no single technology that is 'best' for learning. We have identified technology being used effectively to support a variety of learning activities and learners across a wide range of subjects and learning environments. Rather, different technologies can be used to support different forms of learning, either individually or in conjunction with others.	iTEC is in particular addressing the mainstreaming of existing technology. In iTEC's vision the novelty of technology is less important than the beneficial change.
There is a growing body of invaluable evidence that demonstrates how technology can be used effectively to support learning. However, if that evidence is going to be useful in practice it needs to address the contexts within which the technology is used; and it needs to be presented in ways that are accessible to industry, teachers and learners.	iTEC addresses context in different ways: (a) the widget approach making novel applications context neutral from a technology point of view, (b) the SDE as a contextualising recommender, (c) a large scale validator with technical and pedagogical co-ordinators that deal with the specific regional/national context.
We found clear potential to make better use of technologies that are widely available and that many schools have already purchased. But this potential will only be realised through innovative teaching practice. Teachers may require additional training that enables them to use technologies in new ways.	iTEC emphasizes the innovative practice and provides a model of CPD to facilitate this.
There is enormous potential for further innovation in digital education. Success will come from commercial developers, researchers, teachers and learners working together to develop, test and spread imaginative new technologies.	iTEC considers different stakeholders, even those beyond the mentioned, and brings them together to collaborate on the development of a vision for the future classroom.
We also found many areas of promise; that is, areas where technology is currently undervalued and underused. We found relatively little technological	iTEC is exploring new scenarios for underused and undervalued technologies. It also addresses assessment, and through the

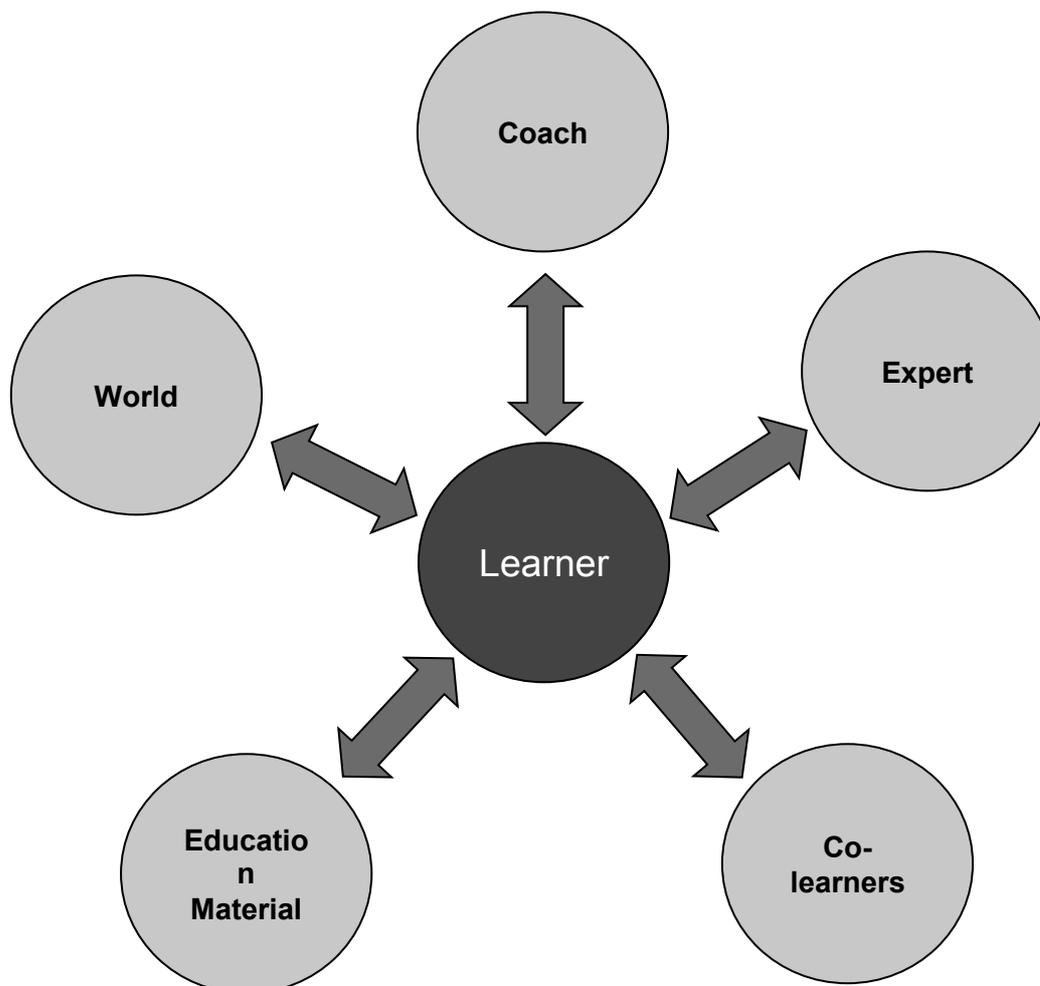
<p>innovation in some of the more effective learning themes we considered in Chapter 2. For example, the market is saturated with drill and practice games (particularly for maths) to support Learning through Practising despite being regarded as one of the less powerful learning themes.</p> <p>Meanwhile, there has been relatively little technological innovation aimed at supporting Learning through Assessment – which can be a powerful aid to teaching and learning.</p>	<p>widget store seeks to expose teachers to technologies that promote unfamiliar practice.</p>
<p>Over recent decades, many efforts to realise the potential of digital technology in education have made two key errors. Collectively, they have put the <b>technology above teaching</b> and <b>excitement above evidence</b>. This means they have spent more time, effort and money looking to find the digital silver bullet that will transform learning than they have into evolving teaching practice to make the most of technology.</p>	<p>iTEC puts teaching clearly above technologies. iTEC is driven by scenarios that connect to the teachers world. It should be noted that the NESTA report mentions <i>teaching vs technology</i>. Not pedagogy vs technology. This corresponds also to iTEC's vision. iTEC also chose to seek a systemic change rather than a hyped innovation of today that probably will be forgotten tomorrow.</p>
<p>If we are to make progress we need to clarify the nature of the goal we want to satisfy through future innovation. Much existing teaching practice may well not benefit greatly from new technologies. As we continue to develop our understanding of technology's proof, potential and promise, we have an unprecedented opportunity to improve learning experiences in the classroom and beyond.</p>	<p>iTEC's goals are very clear: effectuating a systemic change by improving the mainstreaming process of current and emerging technologies into educational contexts</p>

## APPENDIX II: INTERACTIONS

In our quest to enhance learning through technology, it is worthwhile to reflect on the handles for enhancing learning, especially in the context of contemporary theories about learning. While these theories may differ in many respects all have a component of interaction. Behaviourism, as a learning theory, relies on interaction such as for positive/negative reinforcement. Constructivism relies on interactions for among others collaborative activities and social negotiations among learners. The post modern theory relies on interactions when knowledge is socially constructed. Adult learning holds that adults draw upon their experiences, which in general includes interactions, to aid their learning. Instructivism is build around the teacher-learner interaction.

It goes without saying that the earlier mentioned learning theories rely also on non-interaction processes such as self-motivation, self-directing, inferences and associations. However, any external influence on these processes will again be through interactions.

Figure 4 presents a model of interactions in a learner-centred approach.



*Figure 4: Interactions – the levers for engagement*