EVALUATION INTERIM REPORT ONE

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| CONTRACT NO | 217872 |
| DATE       | 30.6.11 |
| ABSTRACT   | D5.2 presents a summary of the work undertaken in WP5 during the first year of iTEC together with the Evaluation Handbook (a one-stop shop of guidance and data collection procedures for National Pedagogical Co-ordinators) and an updated Knowledge Map. |
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| WORKPACKAGE | WP 5 |
| CONFIDENTIALITY LEVEL | PU |
| FILING CODE | ITEC-D5.2_MMU_V3.Doc |
| RELATED ITEMS | |

1 PU = Public

PP = Restricted to other programme participants (including the EC services);
RE = Restricted to a group specified by the Consortium (including the EC services);
CO = Confidential, only for members of the Consortium (including the EC services);
INN - Internal only, only the members of the consortium (excluding the EC services)
## DOCUMENT HISTORY

<table>
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<tr>
<th>Version</th>
<th>Date</th>
<th>Reason of change</th>
<th>Status</th>
<th>Distribution</th>
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<tbody>
<tr>
<td>V1</td>
<td>30.6.11</td>
<td>1st Draft</td>
<td>Draft</td>
<td>MMU</td>
</tr>
<tr>
<td>V2</td>
<td>31.7.11</td>
<td>Further clarification and more detail about the key documents produced this year inserted following internal review procedure. Internal reviewers: Jim Ayre, Roger Blamire, Frans van Assche.</td>
<td>Official</td>
<td>MMU</td>
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<tr>
<td>V3</td>
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<td>Typographical corrections</td>
<td>Official</td>
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<td>V4</td>
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Executive summary

The second deliverable of WP5, D5.2, is the first Evaluation Interim Report which records the preliminary activities of WP5 in preparation for the evaluation of the large-scale piloting of the iTEC scenarios.

The core tasks during this period have been:

1) Task 5.1: The iTEC Knowledge Map (submitted as an appendix to D5.1 on February 28th 2011, revised and resubmitted in this document). See Appendix 2.

2) Task 5.2 Development of the evaluation criteria, incorporated in The Evaluation Plan (submitted as an appendix to D5.1 on February 28th 2011, revised and resubmitted March 31st 2011).

3) Task 5.3 Development of the research instruments and protocols, incorporated in The Evaluation Handbook together with relevant information from The Evaluation Plan providing a single guidance document for the National Pedagogical Coordinators. See Appendix 3.

The Knowledge Map (Task 5.1 outcome) represents a selection of evidence of innovative pedagogical practices in classroom contexts from across Europe and beyond. It will provide a baseline against which to assess the impact of iTEC on teachers’ pedagogies and learners in participating countries. The first part contains a review of current innovative practices in classrooms, mainly in Europe, drawing on recent literature (published since 2008). The focus is on teachers’ actual use of technologies in the classroom and not on the potential of emerging technologies to change practices. Part 2 comprises summaries of the national contexts for the 12 countries participating in the large-scale pilots as full partners in the project and two countries participating as Associate Partners (with one, Sweden, forthcoming). This section provides a situational context for innovation – what may be normal practice in some countries may be regarded as leading edge in others.

The Evaluation Plan (EP) (Task 5.2 outcome) outlines the approach to be undertaken to evaluate each of the 5 cycles of validation in the iTEC project. It outlines the objectives and research questions underpinning the evaluation, the underlying methodology, the data collection methods and workflow, and the approach to data analysis including criteria for success. It should be noted that the Evaluation Criteria have been used to frame the research instruments and protocols for Cycle 1. They will be reviewed again with partners at each of the subsequent four cycles and any necessary adaptations will be made and reported via the Evaluation Cycle Reports.

The Evaluation Handbook (Task 5.3 outcome) presents the research instruments and protocols for National Pedagogical Co-ordinators (NPCs). The Evaluation Handbook is designed to offer a single source of guidance to meet the needs of National Pedagogical Co-ordinators. The first section includes relevant information from the Evaluation Plan: The objectives of WP5, the Research Questions, the Evaluation Criteria and an outline of the requirements and selection process for schools and case study teachers. The second section presents the Research Instruments with the protocols for administration and additional guidance/advice for the National Pedagogical Co-ordinators. In addition there is detailed guidance for teachers on producing iTEC Multimedia Stories (iMmS) to document their experiences. The iMmS will take two forms – either a chronological diary via a blog (or similar) or a thematic reflection or journal via presentation software (or similar).

There are two main sources of data collection to be gathered in each cycle:
1) Quantitative: an online survey of all teachers participating in the project at the end of the implementation of a scenario.

2) Qualitative: three case studies (in each partner country) of individual teachers from 2 or 3 schools.

NPC training was conducted through an on-line session on 14th June, 2011 (see Appendix 4 for meeting minutes).

During the first year of iTEC, WP5 and their partners have worked closely with WP4. The piloting and validation activities managed by WP4 complement the evaluation activities of WP5. There are clear benefits from working very closely together both to inform each other’s activities but also to ensure that data collection is not duplicated and that teachers participating in the pilots are not over-burdened. In addition, WP5 partners, particularly those representing the MoEs, have developed close working relationships with WP5 leaders, as have the National Pedagogical Co-ordinators (appointed by the MoE partners).

The Knowledge Map will be updated periodically, whilst the position as of September 2011 will be recorded in order to provide a baseline. The Evaluation Plan and Evaluation Handbook will be revised after each iTEC cycle.
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1 INTRODUCTION

1.1 REMINDER OF THE CONTEXT

WP5 is concerned with the evaluation of the large-scale piloting of selected scenarios in 1000+ classrooms. This first Evaluation Interim Report describes all activities undertaken prior to the first large-scale piloting of the Cycle One scenarios (which will begin in September 2011). Therefore, the focus of the report is on the evaluation preparatory activities.

1.2 PURPOSE AND SCOPE OF THE TASK

The purpose of this Report is to provide an overview of the main activities carried out by WP5 in preparation for the evaluation of large-scale piloting of Cycle One iTEC scenarios.

1.3 STRUCTURE OF THE DOCUMENT

The Report is structured under the following headings:

1) WP5 Internal Deliverables:
   a. ID5.1 (including Task 5.1): The iTEC Knowledge Map
   b. ID5.2 (including Task 5.2): Large-scale Pilot Evaluation Criteria
2) D5.1: The Evaluation Plan
3) Development of the Research Instruments and Evaluation Handbook (Task 5.3)
4) Supporting National Pedagogical Co-ordinators
   a. The Evaluation Handbook
   b. On-line NPC training session
5) Looking Forward
2 D5.2: EVALUATION INTERIM REPORT ONE

2.1 INTRODUCTION

This report captures the key activities that have been carried out by Work Package 5, between September 2010 and July 2011, in pursuit of its evaluation of the large scale pilot objectives.

WP5’s 21 partners are: EUN (WP1 leader, WP4 leader, WP11 leader), FPCE (involved in WP4), DGIDC (MoE, Portugal), BMUKK (MoE, Austria), ITC (MoE, Lithuania), MONE (MoE, Turkey), AALTO (WP3 leader), ANSAS (previously INDIRE, MoE, Italy), TLF (MoE, Estonia), NCIE (MoE, Norway), UB (WP8 leader), K.U.LEUVEN (WP9 leader), UVIGO (MoE, WP10 leader), KM (WP7 leader), FULAB (WP2 leader), MMU (WP5 leader), MAKASH (MoE, Israel), ELFA (MoE, Slovakia), CNDP (MoE, France), EDUC (MoE, Hungary) and EDUB (MoE, Belgium).

Partners have been invited to undertake the following activities:

- Provide literature on innovative practices with technologies in the participating countries; [responses from 9 partners]
- Contribute to a shared definition of key concepts underpinning the evaluation, requested 21st January 2011; [responses from 5 partners]
- Review the first draft of the Knowledge Map circulated on 17th December 2010; [responses from 8 partners]
- Review the first draft of the Evaluation Plan, including the Evaluation criteria, circulated on 15th February 2011 (also circulated to remaining partners); [responses from 7 partners]

NOTE: All members attending the Steering Committee (representing all 11 WPs and 7 WP5 partners) held at Aarhus on 10th March 2011, reviewed and commented on the Evaluation Criteria; [responses from all the 12 SC members present at the meeting were recorded]

[Responses overall from 12 partners]

- Review the first draft of the Research Instruments circulated on 13th April 2011; [responses from 8 partners]
- NPCs were requested to attend a 2-hour online training event on June 14th 2011. They received a copy of the first draft of the Evaluation Handbook, containing the revised Research Instruments prior to this event. Although not asked to review this document formally, they did raise a number of points for clarification at the training event; [attended by 9 of the 12 full partners, 2 of the 3 associate partners, and representatives from both Promethean and SMART who are also involved in large-scale piloting]

- NPCs were requested to complete a pro-forma describing innovative practice in their countries by the end of June 2011, circulated on 8th June 2011; [11 responses from full partners; 1 to be provided in September]
- Review the first draft of this document, the third draft of the Knowledge Map and the second draft of the Evaluation Handbook, circulated on July 5th 2011; [responses from 4 partners: 2 MoE, and responses from three internal reviewers from the other 2 partners]
The core tasks during this period have been:

- Task 5.1: The iTEC Knowledge Map (submitted as an appendix to D5.1 on February 28th 2011);
- Task 5.2 Development of the evaluation criteria, incorporated in The Evaluation Plan (submitted as an appendix to D5.1 on February 28th 2011, revised and resubmitted March 31st 2011);
- Task 5.3 Development of the research instruments and protocols, incorporated in The Evaluation Handbook together with relevant information from The Evaluation Plan providing a single guidance document for the National Pedagogical Coordinators.

As this first Interim Report, D5.2, is submitted before the first large-scale piloting of the Cycle One scenarios has taken place, the focus of the report is on evaluation preparatory activities: developing the iTEC Knowledge Map (KM), the Evaluation Plan (EP), the Research Criteria (RC), the Research Instruments (RIs) and the Evaluation Handbook (EH), establishing working relationships with iTEC partners including supporting National Pedagogical Co-ordinators and undertaking activities to support WP2 and WP10.

Appended to this document are:

- Appendix 2: The Knowledge Map (ID5.1, submitted 28th February 2011 as an appendix to D5.1 and subsequently updated following a Change Request);
- Appendix 3: The Evaluation Handbook (which includes the Research Instruments);
- Appendix 4: Minutes of the on-line NPC training session (June 14th 2011).

2.2 WP5 INTERNAL DELIVERABLES

In producing the two Internal deliverables (IDs) described below in 2.2.1 (Knowledge Map) and 2.2.2 (Evaluation Criteria), WP5 partners both contributed to and offered critical comment on early drafts of the documents.

In addition to these two IDs, WP5 also produced a further significant internal document, the Evaluation Handbook, compiled for the purpose of supporting and guiding the National Pedagogical Co-ordinators in their roles as members of the wider evaluation team. Information about the Evaluation Handbook is presented in section 2.5.1. It is being submitted with this deliverable — see Appendix 3.

2.2.1 ID5.1 (including Task 5.1): The iTEC Knowledge Map

The purpose of the iTEC Knowledge Map is:

1. Situate the evaluation of the iTEC project in general and national contexts;
2. Reveal progress in iTEC schools beyond national baselines/benchmarks;
3. Help to interpret the evaluation findings in terms of underlying national conditions (political, educational, socio-economic and political);
4. Enable partners working with schools to make evidence-based decisions on pedagogical innovation.

The Knowledge Map is organised in two parts. The first part contains a review of current innovative practices in classrooms, mainly in Europe, drawing on recent literature (published since 2008). The focus is on teachers’ actual use of technologies in the classroom and not on the potential of emerging technologies to change practices. In order to build this Knowledge Map, a literature search was conducted of the British Education Index, Australian Education Index and ERIC databases using the search terms ‘pedagogy’ and ‘school’ and (‘ICT’ or ‘computer’ or ‘technology’) and restricting the search to the years 2008-2010. A similar search was conducted using Google Scholar which brought up over 16,000 links. These were scanned and selected until the titles of documents suggested that the literature was not very relevant. A hand search of research reports published by Becta, Futurelab, European Schoolnet and the OECD was also conducted. References cited in the literature gathered in this process and published during 2008-2010 were also scanned. All gathered literature was reviewed subsequently and only those studies that clearly offer insight into current innovative practice were included in the Knowledge Map. The practices identified are presented in Part 1 and fall into five thematic areas: Core subject teaching and learning; Blurring boundaries; Learner agency, personalisation and mobility; Innovation in classroom-based assessment; and Game-based learning. This work was led by MMU with support from EUN (a key partner in WP5) and a few further suggestions for relevant literature from other WP5 partners.

Part 2 comprises summaries of the national contexts for the 12 countries participating in the large-scale pilots as full partners in the project and two countries participating as Associate Partners (with one, Sweden, forthcoming). This section provides a situational context for innovation – what may be normal practice in some countries may be regarded as leading edge in others. Literature for each country was suggested by the MoE representatives (partners in WP5), together with further suggestions from other WP5 partners. In addition, relevant research from the search conducted for part 1 was included as were European Schoolnet Insight Reports and country reports from the STEPS studies. Finally a useful source was: Plomp, T., Anderson, R., Law, N. & Quale, A. (Eds) (2009) Cross-National Information and Communication Technology: Policies and practices in education (revised second edition). Charlotte, North Carolina: IAP, Inc. Each summary covers key groups, the curriculum context for ICT in schools, ICT in schools and digital learning resources. In addition, in each country’s section of the Knowledge Map is an entry that has been written by the country’s National Pedagogical Co-ordinator in response to WP5’s request that they define innovative practice from a national perspective. This includes outlining 3-4 criteria by which they might judge innovative practice and describing innovative practitioners. This section was led by a member of the MMU team and each country report was reviewed on two occasions by a MoE representative.

The research showed that innovative practices such as increased collaboration, group work, cross-curricular approaches, self-regulated learning, and changes in the roles of teachers and learners are supported by technologies and tools that include learning platforms, social software, collaborative environments, augmented reality, tablet PCs and netbooks, smartphones and handheld devices, interactive whiteboards, multi-touch surfaces, learner response systems, and games-based learning.

Thus, the literature supports the assertion that technology can support innovation in teaching and learning. Nevertheless there are important caveats. Change in education is complex and affected by a wide range of factors from provision of technology in the classroom to teacher beliefs and attitudes. Whilst the mainly small-scale studies reviewed in the Knowledge Map involving early adopters and highly innovative teachers suggest that change is possible, the majority of larger-scale studies (representing levels and patterns of adoption across typical schools) suggest that pedagogical change (if it occurs) is by no means substantial. In many cases this lack of change is
attributed to a focus on technical skills in professional development, the influences of educational policies, and the importance of developing a shared understanding of educational goals.

There were good responses from all partners when they were invited to suggest relevant research projects that had been taking place in their own countries over the last 2/3 years. Five of the 12 partners provided extensive lists of links and references (more than 10), and a further 3 provided 2-3 links and references. Some technical references were also provided by a colleague at EUN. Not all of the suggested literature was considered to be relevant but it provided a useful starting point. Colleagues representing Ministries were specifically asked to check if the pen portrait of their country, contained within the document, presented a relatively accurate picture and if there was any further literature they felt might contribute (document circulated December 21st 2010). Five partners (one of whom had not responded initially and one of whom had only provided 2-3 links initially) suggested revisions and additional references. Finally, a tenth partner (who had not responded initially) suggested revisions and additional references for the country’s pen portrait when the revised Knowledge Map was shared with partners for review on July 5th 2011. Therefore, only two of the 12 partners did not contribute to this process but they have had an opportunity to review and amend the country reviews on two occasions.

In accordance with the DoW (p31 of 69), the Knowledge Map was appended to WP5’s first deliverable, D5.1: The Evaluation Plan, in M6. However, there was much discussion within WP5 about the need to continue to develop the KM beyond M6 and, with the agreement of the Project Steering Committee, a Change Request was submitted to the Commission (on February 3rd 2011). Permission to continue the development of the Knowledge Map was subsequently granted and this has meant that the document has continued to capture important research as it has emerged throughout the year.

For evaluation purposes, the KM provides an important base-line context (national and global) for the way that learning technologies are being deployed at the beginning of the iTEC Project.

The implications of these findings for iTEC are threefold.

First, the studies indicate that pedagogical innovation involving technology is possible although it is unlikely to be substantial, particularly initially, and requires teachers to engage in professional development, invest time, and possibly take a degree of risk. The potential gains are nevertheless substantial.

Second, the success factors and barriers to the adoption of technology to support innovation are not new; they have been identified in much of the research conducted over the last 20 years. Policy makers, leaders and practitioners in iTEC must address cultural change through professional development and through reconsideration of educational policies (including those on assessment and curriculum as well as technology).

Third, the barriers to adoption have meant that the uptake of many of the technologies and tools which have emerged in recent years has been low. By addressing these, iTEC can engage teachers across many schools and with appropriate support through training, communities of practice, scenarios and new technological tools, can support innovation and identify potential technology-supported pedagogical approaches that are scalable and suitable for widespread adoption.

The resultant final version of the Knowledge Map which is appended to this report (Appendix 2) will ensure that all iTEC partners, as well as WP5, have access to the most current picture of teachers’ uses of learning technologies across Europe and beyond.
Appendices 5 and 6 represent an initial mapping of the pedagogic practices/outcomes/technologies which emerged from the Knowledge Mapping task against the scenario descriptions produced in WP2 for Cycle 1 and Cycle 2. The scenario descriptions were examined carefully for explicit references to pedagogic practices/outcomes/technologies. It should be noted that in many cases additional items could be inferred from the descriptions. However, it seemed pertinent to focus on those identified as key to the scenario. Additional practices/technologies which did not emerge from the Knowledge Mapping are italicised.

In Cycle 1, all but one of the scenarios involves learners in media production (although to varying degrees), all but three refer to the use of a learning platform (unsurprisingly) and all but three refer to group work. Notable omissions are games-based learning, virtual worlds and simulations. There are also limited references to creativity (two), digital literacy skills (one) and critical thinking (one). Pedagogic practices in addition to those arising from the Knowledge Mapping are: project-based, research, different learning spaces, cross-curricular and cross-age. Technologies in addition to those arising from the Knowledge Mapping are: instant messaging, videoconferencing, multi-touch devices and apps.

In Cycle 2, there is an increased emphasis on peer coaching/sharing (all but two scenarios), stakeholder engagement (all but one scenario), collaboration (seven of the ten scenarios) and authentic experience/data capture (five of the ten scenarios). Group work is still prevalent (all but two scenarios). There are no references to different learning spaces. There is also an increased emphasis on creativity, digital literacy skills and critical thinking skills, as well as the introduction of a focus on STEM subject areas in three of the ten scenarios. In terms of technologies there is an increased emphasis on social software, games-based learning and simulations. Media production and the use of learning platforms are (unsurprisingly) still prevalent. Two scenarios introduce iTEC tools/technologies and two scenarios introduce video/pod-casting.

This analysis will support the evaluation as well as provide a useful starting point for the development of scenarios by WP2 in Cycle 3.

### 2.2.2 ID5.2 (including Task 5.2): Large-scale Pilot Evaluation Criteria

The Evaluation Criteria (EC) for the implementation of the large-scale pilots (ID5.2) were generated as WP5’s Task 5.2 and are included in the Evaluation Plan (D5.1) submitted on February 28th 2011.

WP5 worked closely with FULAB (WP2 leader), AALTO (WP3 leader) and EUN (as WP4 leader) whilst developing the Evaluation Criteria. All WP5 partners were invited to contribute to and provide feedback on early drafts of the EC (one MoE partner commented on EC when circulated separately on February 3rd 2011, and four of the 12 MoEs commented on the draft Evaluation Plan circulated on February 15th together with three other WP5 partners). The iTEC Steering Committee discussed a later, more refined draft and they made recommendations for some small changes to be made. WP5 agreed the suggested adaptations and the final version of the Evaluation Criteria were included in the revised Evaluation Plan (D5.1, resubmitted March 31st 2011).

The Evaluation Criteria have been derived from the Research Questions. The Research Questions that WP5 will address are as follows:
1) What are stakeholder\(^2\) perceptions of the impact of Learning Stories on
   Teaching practices including assessment; constructivist pedagogies: e.g. student-centred, knowledge building, self-directed, problem-based, active, peer-support; roles of teachers and learners; new learning spaces; effective uses of digital tools; and specifically:
   - Individualisation
   - Social/collaborative elements of learning
   - Creativity
   - Expressiveness
   - Engagement with a wider range of stakeholders\(^3\)
   - Teacher attitudes (motivation and engagement)
   - Learner attitudes (motivation and engagement), and learner attainment (skills, knowledge and understanding)

2) To what extent does the implementation of the Learning Story lead to any form of transformation and which Learning Stories have the maximum potential to have a transformative effect?

3) How effective are iTEC national and local support and mechanisms for local implementation (including the development of technical and pedagogical knowledge and skills)?

4) How do teachers perceive the Learning Stories in relation to quality (how easy it is for teachers to implement a Learning Story including the selection and combination of a range of people, tools, resources and services; connection to current practice; what works and what doesn’t work)?

5) What are the enablers and barriers to the process of implementation?

The Evaluation Criteria below are not presented in priority order. They are numbered only for ease of access. The Evaluation Criteria are:

1) The set of training resources produced for teachers is perceived by the teachers to be supportive of their continuing professional development in relation to the technical and pedagogical skills required to integrate digital tools into their teaching practices.

2) There is evidence that the training resources are:
   a. made available to support all teachers;
   b. perceived by teachers to be useful and appropriate to their needs;
   c. easy to locate and access;
   d. easy to adapt to suit local contexts.

3) Software developed specifically for iTEC (e.g. composer, shells, registry, SDE) is perceived by S-B Stakeholders to be fit for purpose and easy to use.

4) Teachers’ technical skills and understanding of the pedagogical use of digital tools increases.

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\(^2\) These are the “school-based stakeholders”, i.e.: Students, Teachers, ICT Co-ordinators (where appropriate), Head Teachers. We refer to this group of stakeholders as “S-B stakeholders”

\(^3\) These are the “scenario-specific stakeholders” with whom a teacher may engage whilst teaching with a particular scenario and with whom the teacher would not usually engage. These may include, for example, parents, members of the community, local/national/international subject experts and/or professionals, students from other countries etc. We refer to this group of stakeholders as “S-S stakeholders”
5) Communities of practice, supported by online communication and collaboration tools, are established and are:
   a. actively used by teachers;
   b. perceived by teachers to be easy to use and fit for purpose.

6) The Learning Stories used by teachers in the pilots are perceived to be innovative by all stakeholders, whilst remaining connected to current practice, in the context in which they are adopted (nationally, regionally, locally).

7) Learning Stories used by teachers in the pilots are successful and of good quality when they are supported by evidence that they:
   a. engage and enthuse teachers and students;
   b. are perceived to contribute effectively to teachers’ and students’ objectives and practices;
   c. have a positive impact on learner attitudes and attainment (teacher perceptions, other measures such as national test outcomes or end of term grades);
   d. have a positive impact on teacher attitudes to their use of technology to support teaching and learning;
   e. require relevant and appropriate use of digital tools (i.e.: the Learning Story could not be undertaken just as appropriately/efficiently without the use of the digital tools);
   f. present achievable technical challenge (i.e.: they are challenging, but not too difficult to adapt/implement);
   g. are perceived by S-B stakeholders and NPCs (who will liaise with NTCs) to be technically sustainable and scalable;
   h. would be recommended by participating teachers for regional/national dissemination.

8) There is evidence that the adoption of a Learning Story will lead to a long-term change for a teacher (and possibly for the school overall) in relation to one or more of the following teaching practices:
   a. new approaches to assessment procedures which are considered to be more authentic (valid, reliable and useful to teachers and students) than previous assessment practices;
   b. adoption of approaches to teaching that change the ways students learn (e.g. student-centred, knowledge building, self-directed, problem-based, active, peer-support);
   c. shifts in the roles of, and relationships between, teachers and students;
   d. creation of new learning spaces within and/or beyond the boundaries of the classroom;
   e. appropriate, innovative and effective uses of digital tools;
   f. teachers’ approaches to:
      • individualisation;
      • social/collaborative elements of learning;
      • creativity;
      • expressiveness;
      • engagement with a wider range of stakeholders.

9) Learning Stories with the maximum potential to trigger the transformation of teaching and learning are identified.

10) Underlying change processes necessary to bring about transformation are identified.

It should be noted that the Evaluation Criteria as now presented have been used to frame the research instruments and protocols for Cycle 1. They will be reviewed again with partners at each of the subsequent four cycles and any necessary adaptations will be made and reported via the Evaluation Cycle Reports.
2.3 D5.1: THE EVALUATION PLAN

The Evaluation Plan (EP) outlines the approach to be undertaken when evaluating each of the 5 cycles of validation in the iTEC project. It is concerned with what happens in the classroom as a result of participating in iTEC through WP4 and how that affects teachers’ pedagogical practices and learning outcomes. It outlines the objectives and research questions underpinning the evaluation, the underlying methodology, the data collection methods and workflow.

It also includes a conceptual model adapted from SITES Module 2 (Kozma, 2003) and the “20 key descriptors of educational change” developed and used by WP2 during Cycle One to underpin the development of the scenarios. (The descriptors produced by WP2 were developed following a review of trends and drivers affecting and being affected by education. Their purpose is to illustrate challenges and possible changes to formal and informal education). The descriptors were used in WP5 to inform the data collection instruments in order to ensure that the descriptors would be covered. Finally, it describes the approach to data analysis including the Evaluation Criteria.

A set of “Agreed Definitions and Descriptions” are included in Appendix 1 of the Knowledge Map. In order to develop a shared understanding of the focus of the evaluation and to avoid as much translation and interpretative confusion as possible, all WP5 partners were asked to contribute their thoughts and ideas to define some of the complex terminology used within the Evaluation Criteria. Five partners (including three MoEs) provided suggested definitions.

D5.1 also included the Knowledge Map (as described above, Version 2 dated 31st March 2011).

As stated above, four of the 12 MoEs commented on the draft Evaluation Plan circulated on February 15th 2011 together with three other WP5 partners.

2.4 DEVELOPMENT OF THE RESEARCH INSTRUMENTS AND EVALUATION HANDBOOK (TASK 5.3)

The Research Instruments (RIs) were developed by WP5 as Task 5.3. The Research Instruments are included in the Evaluation Handbook (see: Appendix Three). The Evaluation Handbook forms a substantive part of this deliverable (together with the revised Knowledge Map).

The Evaluation Handbook is designed to offer a single source of guidance to meet the needs of National Pedagogical Co-ordinators. The first section includes relevant information from the Evaluation Plan: The objectives of WP5, the Research Questions, the Evaluation Criteria and an outline of the requirements and selection process for schools and case study teachers. The second section presents the Research Instruments with the protocols for administration and additional guidance/advice for the National Pedagogical Co-ordinators. In addition there is detailed guidance for teachers on producing iTEC Multimedia Stories (iMmS) to document their experiences. The iMmS will take two forms – either a chronological diary via a blog (or similar) or a thematic reflection or journal via presentation software (or similar).

There are two main sources of data to be gathered in each cycle:

1) Quantitative: an online survey of all teachers participating in the project at the end of the implementation of a scenario.

This will be completed by all iTEC teachers as soon as possible after they have concluded their implementation of the iTEC scenario.
2) Qualitative: three case studies (in each partner country) of 3 individual teachers from 2 or 3 schools.

The qualitative data collection will be carried out by National Pedagogical Co-ordinators (NPCs) who are supported by WP5 as part of the wider evaluation team. The case study data collection will include: a lesson observation, an interview with the teacher, and interview with the ICT co-ordinator, an interview with the head teacher, and an interview with a group of students. In addition, the case study teachers will document their experience through an iTEC Multimedia Story (iMsS).

In addition to the above, data will be collected from the processes leading up to the scenario implementation (development of the scenarios, the development and pre-piloting of the prototypes), workshop events, national support mechanisms and, contributions and activities in the teachers’ online community. Finally, towards the end of each cycle the National Pedagogical Co-ordinator will be interviewed by WP5 colleagues.

WP5 partners were invited to comment on the first draft of the Research Instruments circulated on April 13th 2001. Four MoE partners and one Associate Partner alongside three additional partners provided feedback. The feedback was both constructive and valuable, including comments about the length of the questionnaire, the phrasing of some of the questions, duplications and omissions.

Development of the Research Instruments also involved practising teachers (UK-based and not involved in iTEC) who willingly and freely gave their time to test the validity and timings of the RIs. Their contributions included: timing the on-line questionnaire, checking and timing the interview questions. One of the secondary teachers, who is involved in learning technology action research with MMU, agreed to tell her own multimedia story (and to time its construction) as an exemplar for iTEC case study teachers who will be required to complete their own iTEC Multimedia Stories (iMmS). The online survey will be piloted further with at least five teachers from three of the participating countries.

The second draft of the Research Instruments were included in the Evaluation Plan and circulated to National Pedagogical Co-ordinators on June 3rd 2011. Concerns and issues raised in the online NPC training event held on June 14th 2011 were also addressed before the Evaluation Plan was circulated to all WP5 partners on July 5th 2011.

EUN colleagues have worked closely with WP5 to set up a dedicated area in the Teachers’ Community site for the uploading of case study teachers’ iMmS. EUN have also developed video tutorials to support teachers to create a blog, and embed images, documents and video clips. All iTEC teachers and partners will have access to the iMmS which will be keyword-searchable.

2.5 SUPPORTING NATIONAL PEDAGOGICAL CO-ORDINATORS

WP5 has compiled an Evaluation Handbook and provided online training in order to support and guide NPCs in their role as members of the wider evaluation team.

2.5.1 The Evaluation Handbook

Everything that NPCs need to know about their role as members of the wider evaluation team is contained within this guidance document, including the relevant information from the Evaluation Plan such as the Research Questions and Evaluation Criteria. (See section 2.4 above).
2.5.2 Online NPC training session

NPC training took place as an on-line session on 14th June, 2011. The session was recorded so that those who were unable to “attend” could link to the recording of the session at their convenience. The recording will remain available for NPCs to use as a reference point should they wish to re-visit the session.

WP1 helped to set up the FlashMeeting for the session. Some of the participants found it difficult to hear the inputs and it was necessary to type in the key points that were being made via the chat feature of Flash. WP5 have suggested that, whilst FlashMeeting is adequate for general team meetings, iTEC should consider a more reliable web-conferencing tool for training sessions.

Minutes of this session are appended to this report as Appendix 4.

The key issues arising were:

1) Clarifications were made from three queries from the NPCs in relation to potential flexibility around the timetabling of evaluation activities and the adaption of interview questions subject to local circumstances. The Evaluation Handbook was amended to indicate that flexibility is acceptable.

2) Associate Partners requested clarification about their specific role as compared to that of full partners. It was made clear that Associate Partners are expected to facilitate quantitative data collection but that WP5 would investigate the options for participating in qualitative data. This resulted in the issue being raised in subsequent PIM and SC meetings. WP5 has proposed that qualitative data will be analysed and case study visits will be made subject to resources being available. In addition, WP5 has confirmed that additional qualitative data collected by SMART and Promethean will be included in the analysis.

3) In relation to teachers producing multimedia stories of their experiences, NPCs provided a number of suggestions of alternative platforms which could be used such as Prezi. These suggestions were incorporated in the Evaluation Handbook.

4) Some additional tools were requested by one NPC, namely checklists for activities and a pdf of the teacher questionnaire to share with teachers prior to undertaking the survey. The checklists have been incorporated in the Evaluation Handbook as an appendix and the pdf will be made available.

5) Two queries were raised about translation issues and whether or not the data should be collected in English. NPCs were advised that research instruments (including interview schedules) should be translated into local languages but that if teachers were happy to conduct interviews in English then that could save on potential translation costs. The NPCs have freedom to choose whichever approach is most appropriate for teachers in their country.

Participants were all very positive about the meeting, despite the poor sound quality for some and the need to cover a lot of material in a short space of time. In particular they appreciated the level of detail provided in the Evaluation Handbook. A formal evaluation of this event was not conducted.

Following the event, an email was sent to all NPCs with the link to the recording of the meeting. Those who were unable to attend were also sent an email encouraging them to view the recording.
2.6 LOOKING FORWARD

As new research and articles emerge throughout the life of the project, WP5 will continue to add to the Knowledge Map although care will be taken to ensure that country specific portraits as of September 2011 remain preserved to act as a baseline from which we can make judgements about impact and change.

WP5 will make adaptations to any aspect of the evaluation processes and procedures if, as a result of thorough Review and Evaluation, such adaptations are deemed to be beneficial to the project.

Due to the timelines of cycles it will not be possible to wait until the end of a cycle in order to review the criteria and evaluation procedures. Therefore, the review of each cycle will take place while the classroom implementations of Learning Stories are taking place. The review process will involve all partners including those in the pedagogical strand of iTEC, those in the technical strand of iTEC and the NPCs. The process will involve a formal review of the Evaluation Criteria, against the scenarios produced by WP2 and any technical developments. In addition, NPCs will be asked to comment on the evaluation processes and protocols, and issues arising from any data received will be taken into account.

The proposed review periods are as follows:


WP5 will undertake the following activities in year 2 of iTEC:

- Prepare and pilot the online survey (September 2011);
- NPCs arrange translation of online survey and other instruments (September/October 2011);
- NPCs ensure that data collection takes place in Cycle 1 (September – December 2011);
- Visit three countries participating in the large-scale pilots (October – December 2011);
- Review Evaluation Criteria and Evaluation Handbook (October – December 2011);
- Revise, if necessary, the Evaluation Criteria and Evaluation Plan (by December 20th 2011);
- Analyse Cycle 1 data (December 2011 – February 2012);
- Internal Deliverable 5.3 Evaluation of Cycle 1 (February 2012);
- If necessary, revise the online survey (March 2012);
- NPCs ensure that data collection takes place in Cycle 2 (April – June 2012);
- Visit three countries participating in the large-scale pilots (April – June 2012);
- Review Evaluation Criteria and Evaluation Handbook (April – June 2012);
- Revise, if necessary, the Evaluation Criteria and Evaluation Plan (by June 30th 2012);
- Analyse Cycle 2 data (June 2011 – July 2011);
- Deliverable 5.3 Evaluation of Cycle 1 and Cycle 2 (July 31st 2012).
## APPENDIX 1: LIST OF ABBREVIATIONS

<table>
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<tr>
<th>ACRONYM</th>
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<tr>
<td>KM</td>
<td>Knowledge Map</td>
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<tr>
<td>EP</td>
<td>Evaluation Plan</td>
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<td>RC</td>
<td>Research Criteria</td>
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<td>RiS</td>
<td>Research Instruments</td>
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<td>EC</td>
<td>Evaluation Criteria</td>
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<td>NPC</td>
<td>National Pedagogical Co-ordinator</td>
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<td>EH</td>
<td>Evaluation Handbook</td>
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<td>iMmS</td>
<td>iTEC Multimedia Story</td>
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<td>SDE</td>
<td>Scenario Development Environment</td>
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APPENDIX 2 : THE KNOWLEDGE MAP (ID5.1)
The Knowledge Map: Innovative Classroom Practice with Digital Technologies

Cathy Lewin
Jonathan Savage
Maureen Haldane
Nicola Whitton
Roger Blamire
October 2011

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Credits

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publisher
Manchester Metropolitan University, UK

acknowledgements
The authors would like to acknowledge the contributions of WP5 partners to this document. In particular partners representing Ministries of Education involved in iTEC have acted as key informants, proving further commentary on ICT in education in their countries.

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Coordinated by European Schoolnet

The work presented in this document is partially supported by the European Commission’s FP7 programme – project iTEC: Innovative Technologies for an Engaging Classroom (Grant agreement Nº 257566). The content of this document is the sole responsibility of the consortium members and it does not represent the opinion of the European Commission and the Commission is not responsible for any use that might be made of information contained herein.
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<td>Draft</td>
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<td>iTEC/EU</td>
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<td>Submitted as part of D5.2</td>
<td>iTEC/EU</td>
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EXECUTIVE SUMMARY

The purpose of this paper, the Knowledge Map, is to:

- Situate the evaluation of the iTEC project in general and national contexts;
- Reveal progress in iTEC schools beyond national baselines/benchmarks;
- Help to interpret the evaluation findings in terms of underlying national conditions (political, educational, socio-economic and political);
- Enable partners working with schools to make evidence-based decisions on pedagogical innovation.

The paper is a review of current innovative practices in classrooms, mainly in Europe, drawing on recent literature (published since 2008). The focus is on teachers’ actual use of technologies in the classroom, and not on the potential of emerging technologies to change practices. The practices are presented in Part 1 and fall into five thematic areas: Core subject teaching and learning; Blurring boundaries; Learner agency, individualisation and mobility; Innovation in classroom-based assessment; and Game-based learning.

Part 2 comprises summaries of the national contexts for 13 countries participating in the large-scale pilots, to provide a situational context for innovation. This is because what may be normal practice in some countries may be regarded as leading edge in others. Each summary covers key groups, the curriculum context for ICT in schools, ICT in schools and digital learning resources.

The research showed that innovative practices such as increased collaboration, group work, cross-curricular approaches, self-regulated learning, and changes in the roles of teachers and learners are supported by technologies and tools that include learning platforms, social software, collaborative environments, augmented reality, tablet PCs and netbooks, smartphones and handheld devices, interactive whiteboards, multi-touch surfaces, learner response systems, and games-based learning.

Thus, the literature supports the assertion that technology can support innovation in teaching and learning. Nevertheless there are important caveats. Change in education is complex and affected by a wide range of factors from provision of technology in the classroom to teacher beliefs and attitudes. Whilst the mainly small-scale studies reviewed in this paper involving early adopters and highly innovative teachers suggest that change is possible, the majority of larger-scale studies (representing levels and patterns of adoption across typical schools) suggest that pedagogical change (if it occurs) is by no means substantial. In many cases this lack of change is attributed to a focus on technical skills in professional development, the influences of educational policies, and the importance of developing a shared understanding of educational goals.

The evidence presented in the studies therefore provides an important cautionary note for those seeking to transform ‘potential’ into practice – including the iTEC
consortium – and emphasise the need to engage in rich debate at all levels about educational goals rather than innovation as such or technological potential alone. Efforts to mainstream innovation also need to take account of national contextual factors, notably assessment frameworks, professional development strategies and existing cultures of schooling if real innovation beyond the ‘early adopters’ is to be achieved.

The studies analysed in the Knowledge Map illustrate a range of practices. In many of them, it is stated that the adoption of new technologies has led to changes in pedagogical practices. However, these studies tend to involve early adopters, enthusiastic and innovative teachers, and are therefore applicable to such types of teachers. They do not therefore represent levels and patterns of use across regions and nations by other teachers in other schools. In addition, some of the teachers involved in the studies had already adopted innovative pedagogies such as student-centred practices. The technology was therefore appropriated by them to support a constructivist approach to teaching and learning, rather than driving pedagogical change in that direction.

With this in mind, the studies show innovation afforded by technology in the areas of:

- Learner agency (learner engagement, independence and autonomy, individualised learning, personalised learning);
- Increased variety of pedagogical approaches and classroom activities (peer learning, learner engagement with wider stakeholders such as the local community, businesses and experts, group work, problem solving and other exploratory approaches, collaboration; authentic learning experiences, classroom interaction, communication and discussion, multimodal presentation: visualisation of complex concepts, video, animation, diagrams, photographs, as well as text;
- Assessment (self- and peer-assessment, and evaluation); teacher roles (coaching);
- Improved learning outcomes (key competence development – creativity, digital literacy skills (new forms of text production and literacy practices), lifelong learning skills, critical thinking).

The evidence suggests that specific technologies can support innovations.

**Handheld devices, learner response systems and mobile phones.** There are many studies of these different devices; uptake is still limited for a variety of reasons (primarily funding, interoperability issues, e-safety concerns). Their use, while in some cases reinforcing existing practices, can support innovation and improvements in:

- Whole class participation, communication and engagement;
- (If networked), sharing individual work and views with the class and in collaborative learning;
- Assessment – self-assessment, formative assessment, immediate feedback;
(In the case of learner response systems), learning gains, learner engagement, learner confidence (particularly when responses can be anonymous), feedback to teachers about overall understanding, pace and particular difficulties and misconceptions, assessment (but this can be time-consuming and inaccurate);

Augmented reality experiences, authentic and engaging tasks.

**Virtual classrooms and learning platforms.** The studies indicate that uptake of learning platforms has been slower than anticipated and that they often replicate traditional pedagogies or used simply to organise resources, but that, in cases of effective use, e.g. blending online with face to face learning rather than wholly online provision, can:

- Impact positively on learner outcomes;
- Facilitate access to subject specialists;
- Enable anytime, anywhere access to learning;
- Provide asynchronous and synchronous communication;
- Support self-paced, independent learning;
- Support collaborative learning;
- Re-engage disaffected learners;
- Support parental engagement;

**Tablet PCs, laptops and netbooks.** One-to-one provision is growing in many countries (for example, UK, Spain, Portugal) and has been used to support student-centred approaches in a very small number of studies; more commonly they are often used to support traditional pedagogies. Their use can lead to increased technical skills, but limited innovation beyond the mere introduction of the device.

**Social networking applications.** Uses of tools that support public access are still at an early adopter stage across Europe although some elements such as blogs and wikis have been incorporated into learning platforms. When used, they can:

- Support communication, collaboration and discussion;
- Enable co-construction of knowledge;
- Support student-centred approaches;
- Encourage participatory approaches;
- Enable the creation of authentic tasks;
- Facilitate anytime, anywhere learning;
- Develop digital literacy and critical thinking skills.

**Games-based learning, virtual worlds and simulations.** Again, the research suggests that their adoption is still at an early stage across Europe with some countries at more advanced stages (Scotland, Catalonia, Denmark). There is a need to identify sustainable and scalable uses of game-based learning across Europe. Currently, the evidence suggests that they can require significant time investment from teachers and learners to achieve mastery, that they may not necessarily support subject knowledge development (teachers need a good understanding of the
curriculum and to think creatively to maximise learning opportunities), and that cultural barriers and attitudes to games-based learning. Nevertheless their use in teaching and learning can:

- Develop digital literacy, social and meta-cognitive skills and support language learning, although there is limited evidence to date on impact on student learning outcomes, some studies reporting learning gains;
- Support student-centred approaches, increase motivation and engagement;
- Support student autonomy and engagement and increase social interaction and collaboration;
- (In the case of mobile devices) support location-based gaming;
- (In the case of virtual worlds) support inquiry-based learning, but distract learners from learning objectives;
- (In the case of student-authored games) be particularly engaging and support the development of media-literacy skills, as well as promote deeper engagement with learning;

Innovation using such technologies, according to the evidence reviewed, calls for:

- Supportive school leaders;
- Flexibility within curriculum implementation;
- A clear rationale for integration of technology;
- Careful planning and structuring of tasks;
- Appropriate and timely professional development focusing on ICT pedagogies;
- Effective and adequate technical support but also ICT pedagogical support.

Barriers identified in the research, to the capacity of such technologies to support innovation include:

- Technical problems, interoperability issues, a perceived lack of quality software for supporting some subject areas, and the very speed of technological developments;
- Classroom management concerns and the need for more complex planning of lessons;
- Lack of task structure can lead to lack of focus;
- Perceived impact on teachers’ workload (e.g. communication demands outside working hours in online learning);
- Learners’ digital cultures and practices, though highly complex, are often not as sophisticated as we sometimes assume;
- Traditional pedagogies which can shape and restrict the ways in which technologies are appropriated;
- Lack of meta-cognitive skills in learners;
- Lack of awareness of contemporary pedagogical approaches in teachers;
- E-safety concerns together with safety concerns in relation to handheld and portable devices;
• Concerns about curriculum demands and high-stakes testing (where the test outcomes lead to important consequences for the learner);
• Funding.

The implications of these findings for iTEC are threefold.

First, the studies indicate that pedagogical innovation involving technology is possible although it is unlikely to be substantial, particularly initially, and requires teachers to engage in professional development, invest time, and possibly take a degree of risk. The potential gains are nevertheless substantial.

Second, the success factors and barriers to the adoption of technology to support innovation are not new; they have been identified in much of the research conducted over the last 20 years. Policy makers, leaders and practitioners in iTEC must address cultural change through professional development and through reconsideration of educational policies (including those on assessment and curriculum as well as technology).

Third, the barriers to adoption have meant that the uptake of many of the technologies and tools which have emerged in recent years has been low.

By addressing these, iTEC can engage teachers across many schools and with appropriate support through training, communities of practice, scenarios, and new technological tools, can support innovation and identify potential technology-supported pedagogical approaches that are scalable and suitable for widespread adoption.
INTRODUCTION

2.7 RATIONALE

The aim of this paper is to present an overview of innovative pedagogical practices using ICT, both within and beyond Europe, gathering evidence from a wide range of sources including traditional and grey literature, in order to inform decisions taken within the iTEC project on pedagogical practices.

In order to build this knowledge map, a literature search was conducted of the British Education Index, Australian Education Index and ERIC databases using the search terms ‘pedagogy’ and ‘school’ and (‘ICT’ or ‘computer’ or ‘technology’) and restricting the search to the years 2008-2010. A similar search was conducted using Google Scholar which brought up over 16,000 links. These were scanned and selected until the titles of documents suggested that the literature was not very relevant. A hand search of research reports published by Becta, Futurelab, European Schoolnet and the OECD was also conducted. References in literature gathered in this process and published during 2008-2010 were also scanned. All gathered literature was reviewed subsequently and only those studies that clearly offer insight into current innovative practice were included in the knowledge map.

The focus of the iTEC project is on classroom practice and literature has therefore been selected for inclusion in the map on this basis. Literature concerned with teacher attitudes and professional development has been excluded (and will be reviewed in Work Package 4). Some literature which focuses on the learner rather than the teacher has also been excluded unless it is deemed to be unique or novel. Literature concerned with linking home and school, and parental engagement has also been excluded unless clearly linked to classroom practice although it is acknowledged that these aspects are part of a teacher’s pedagogy. Literature relating to the potential (rather than practice) of technology to support teaching and learning more generally has also been discarded with the exception of a small number of recent reports concerned with current trends in the classroom which have been used to sketch out how different pedagogies could be supported in the near future.

This document presents the state of the art in terms of what is actually happening in primary and secondary school classrooms in terms of innovation. The first part of the report is structured around an overview of key thematic areas.

The second part of the report, an analysis of ICT in education on a country by country basis, draws on the European Schoolnet Insight reports as well as literature and personal comments put forward by the relevant Ministries of Education to provide a brief summary of current practices for each of the countries participating in the large scale pilots.
2.8 KEY INNOVATION TRENDS

Before describing the current innovative practice, it is important to flag up the key trends in innovation in classroom practice that are expected to continue over the next five years. The key trends likely to influence school education in the next five years and identified in the 2010 and 2011 Horizon reports (Johnson et al, 2010; Johnson et al, 2011) are listed as:

- The abundance of resources and relationships made easily accessible via the Internet is increasingly challenging us to revisit our roles as educators. (2011)
- As IT support becomes more and more decentralized, the technologies we use are increasingly based not on school servers, but in the cloud. (2011)
- Technology is increasingly a means for empowering students, a method for communication and socialising, and a ubiquitous, transparent part of their lives. (2010)
- Technology continues to profoundly affect the way we work, collaborate, communicate, and succeed. (2010 & 2011)
- The perceived value of innovation and creativity is increasing. (2010 & 2011)
- There is increasing interest in just-in-time, alternate, or non-formal avenues of education, such as online learning, mentoring, and independent study. People expect to be able to work, learn, and study whenever and wherever they want to. (2010 and 2011)
- The way we think of learning environments is changing. (2010)

Furthermore, emerging technologies likely to influence pedagogies are identified as: cloud computing, collaborative environments, game-based learning, mobiles and smartphones, augmented reality and flexible displays/multi-touch surfaces (Johnson et al, 2010) with open content / open education (for example, making teaching resources freely available), learning analytics and personal learning environments predicted to impact on teaching and learning in 5 or so years (Johnson et al, 2011).

The critical challenges that schools will face over the next 5 years include: the growing importance of digital media literacy, economic pressures, increasing demand for individualised and personalised learning, outdated models of schooling, and taking account of informal learning (Johnson et al, 2011).

Moyle (2010) suggests that digital technologies should be used to enable teachers and students to ‘experiment with ideas’ (p38) through inquiry-based, project-based and problem-based learning. Digital technologies, she argues, serve multiple purposes in such endeavours from organising ideas and searching for information, to presenting ideas to an audience. She also notes that networking between students and teachers both within and across institutions can enrich curricula and develop knowledge and skills further. She argues that in order to enable pedagogical change to happen, attention must be paid to an integrated architecture which includes:

- the physical structure – learning spaces should be flexible and accommodate technologies easily;
- the technological structure – technologies should be robust, flexible, scalable, secure and interoperable; the organisational structure – this should be adapted to enable innovations (including those in the classroom) to take place;
- the human infrastructure – schools need visionary leaders and enthusiastic staff who value technology and understand how to integrate it in a meaningful way;
- and informational infrastructure – supporting teachers, learners and administrators in all aspects of school life through technologies which support flexible learning such as cloud computing.

Manches et al (2010) summarise the findings of the Capital research project in England which was designed to inform future educational technology policies for schools prior to the change of Government in May 2010. They argue that:

- Technology can make assessment more efficient, timely and flexible. However, it can be constrained by national assessment practices and demands reliable infrastructure.
- Social tools can support collaboration including the creation and sharing of content by learners, and peer-review. However, use is currently limited, with teachers requiring greater support to integrate such technologies in the curriculum, and some learners are resistant to shifting personal practices into formal settings.
- Games have great potential to support learning through increased motivation and opportunities for construction, reflection and collaboration. However, their use is constrained by e-safety concerns, particularly as development costs and the limited education market mean that the focus of industry is the domestic market. In addition, as with social tools teachers need support to understand how to adapt and integrate games (commercial off the shelf games in particular).
- Mobile technologies, the increase in learning platforms and the growth of cloud computing mean that learning can be extended beyond the school wall and blur the boundaries between formal and informal learning. However, there are concerns over the use of mobile devices in school settings relating to technical issues of supporting multiple devices, and the risks involved and the required teacher skills.

Further they suggest (Crook et al, 2009, p.3) that potential new pedagogical practices facilitated by technology include:

- Live reflection: Stimulating self-awareness in personal study, with a particular emphasis on new technological possibilities for prompting, supporting and recording reflection 'in the moment'.
- Rich feedback: Promoting learning dialogue within formative and summative assessment, with a particular emphasis on new technological tools to support rich media exchanges.
• Learning community trails. Expanding and exploiting collective classroom memory, with a particular emphasis on the use of new technological means of capturing, storing and making available the results of previous activity.
• Gaming to learn: Exploring the motivational and learning potential of massively multi-player online games for purposes associated with the formal curriculum and subject disciplines.

There is also a set of consistent messages emerging about the ways in which, when appropriate conditions prevail, the potential to use digital technologies to change educational practice significantly can be realised.

In a study of innovative use of ICT in 15 schools from five countries (Fredriksson, Jedeskog & Plomp, 2008) pedagogic changes included increased collaboration, more group work, a shift in teacher roles (coach/counsellor) and less formal interaction between teachers and students. There was also a greater focus on cross-curricular projects and independent learning, as well as new uses of physical spaces to facilitate this (e.g. in the library).

Crook et al (2010) conducted a study of 9 secondary schools in England which were considered to be innovative in terms of practices with ICT to support teaching and learning through the collection of data about 85 lessons. In summary they argue that ICT enables new forms of classroom practice including greater mobility and flexibility as well as making a difference to the kinds of activities that can take place; and extends the range of learning practices including richer multimodal teaching resources, more readily supporting research activities and learner construction of digital artefacts and knowledge.

From a pedagogical perspective the countries (participating in iTEC) proactively encouraging teachers to incorporate contemporary pedagogical practices through policies are as follows (adapted from EACEA P9 Eurydice, 2011, p43; as of 2009/10):

<table>
<thead>
<tr>
<th></th>
<th>Project based learning</th>
<th>Personalised learning</th>
<th>Individualised or student-centred learning</th>
<th>Science investigations</th>
<th>Online learning</th>
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(S) at secondary level only. ‘Personalised learning’ is defined as: ‘Pupils learn in ways that are relevant to their own background, experiences, and interests. They can choose the topics they will learn about, the tools or strategies they will use, and the types of work products they will create’ (EACEA P9 Eurydice, 2011, p96).

‘Individualised learning’ is defined as: ‘Teachers make it possible for individual pupils to work at their own pace, or they adjust instruction based on individual pupils' skill levels and learning needs’ (EACEA P9 Eurydice, 2011, p96).

Notably Norway and Sweden allow their teachers to have autonomy over chosen pedagogical approaches so none of the above are mandated through policies. Belgium and Turkey provide support for teachers but there are no policy directives. And the Czech Republic has no specific guidance on innovation in the classroom in its policies.

These key trends and observations have structured our literature search and informed our presentation of evidence of current innovative practices in the remainder of the report.

2.9 FROM ‘POTENTIAL’ TO PRACTICE

Any review of research into innovative classroom practice needs to recognise the ways in which ideas or aspirations about the potential of digital technologies to radically transform education are often not realised or tend to mutate in the process of being incorporated into the real life settings of schools and classrooms (Selwyn, 2010). Our review of contemporary research in this area continues to provide evidence of this process even thirty years after the early introduction of computers into schools.

Typical use by teachers across European schools is described as (EACEA P9 Eurydice, 2011):

- In Mathematics, computers are used more for skills practice, while in Science, they are used more often for looking up information (ibid, p47)
- Students rarely use computers for conducting experiments or simulations of natural phenomena in Science lessons (ibid, p49)
- Computer use in language of instruction and foreign languages is more the exception than the rule (ibid, p51)
- On average, more than one third of students use computers for Mathematics and Science schoolwork at least once a month (ibid, p53)
- E-portfolios are not yet widely used for pupil assessment (ibid, p57)
• Only a few countries make recommendations at central level on the use of ICT for general pupil assessment (ibid, p58)

There are some high profile examples of the clash of aspirations and reality. For example, the School of the Future in Philadelphia, supported by Microsoft, was an attempt at rethinking school design, including pedagogical approaches and integrating technology to a greater extent (Cullinane & Hess, 2010). The school opened in September 2006. There were no books and all learning resources were provided through a learning platform. Every learner was provided with a laptop. Staff set out to develop a project-based curriculum from scratch and dropped traditional summative assessment practices. Discipline policies relied on learners taking responsibility for their actions. Unfortunately the vision was challenging to realise – the wireless network was unreliable, the learners unfamiliar with technology and from challenging backgrounds with behavioural and learning issues. Following the sudden departure at the end of the first year of the school leader, the flexible curriculum was replaced by the traditional district curriculum and teachers were encouraged to abandon innovations that were perceived to have been ineffective. Currently the school blends self-directed learning, technology and standard core curricular subjects. With Microsoft’s continued support, it is claimed that most teachers use blogs and wikis to support teaching and learning, students manage their assignments online, and some of the project-based activities have been successful (Mezzacappa, 2010).

Studies of the adoption and use of Interactive Whiteboards also foreground the importance of a range of contextual factors in the appropriation of this technology for innovation. These included: the ability of teachers to focus on the learning goals and to review their assumptions about power and control in the classroom (Northcote et al, 2010); the importance of ensuring that technology is actually working and accessible in the classroom; and that software resources are easy to search for and download rather than hidden behind password protected sites (Winzenreid et al, 2010)

Law (2009) examined teachers’ pedagogies from three perspectives: traditionally important, lifelong learning orientation and connectedness. She found that the traditionally important perspective was the strongest and the connectedness orientation the weakest. Moreover, ICT usage was relatively low although all teachers worked in schools which had reasonable levels of infrastructure. Law concludes that ICT provision alone does not lead to pedagogical change and that teachers need professional development in 21st century skills and pedagogies for ICT. A similar argument is made by Beauchamp & Kennewell (2008) who argue that technology (in this case the IWB) has the potential to support dialogic interactive teaching but that teachers in their study worked predominantly at lower levels of interactivity (teacher-centred, didactic, authoritative).

These findings are mirrored by two studies of innovative schools and research programs by Shear and colleagues (Shear, Gorges et al, 2010; Shear, Novais et al, 2010). In the evaluation of the Microsoft Global Innovative Schools Program, Shear, Gorges et al (2010) report that students developed digital literacy skills but that
substantial pedagogical change did not take place in all of the 11 schools participating. This was ascribed to the lack of pedagogically appropriate professional development. In one school (in the UK) pedagogical changes included project-based learning, and a focus on learning to learn skills in the first two years. The same team’s evaluation of the Microsoft ITL research program focuses on innovative classroom practices (integrating pedagogy with technology). They concluded (Shear, Novais et al., 2010a) that, whilst the goals of many of the participating teachers were to change their practices, data suggest that these have yet to be realised. The most common uses of technology to support teaching and learning were described as ‘basic’ (e.g., finding information, writing a document using a word processor). Professional development which focused on the integration of technology with pedagogy rather than just on ICT skills was associated with more innovative practices. The limited professional development support and subsequent lack of impact of technology on pedagogical practices in the classroom is common to many studies (Pennuel, 2006; EUN, 2009).

The critical influence of factors outside the school in shaping innovation was also made visible in a study by Bryderup, Larson & Quisgaard Trentel (2009). In their report on the SITES study in Denmark, these researchers argue that teachers’ pedagogies shifted from the late 1990s to 2006 in unexpected ways. Teachers in Denmark moved from student-centred, active and autonomous learning, to curriculum-centred teaching and instruction partly due to changes in educational policy (e.g., a greater focus on tests).

At the same time, other studies show the need for clarity about educational goals when seeking to innovate with digital technologies. A study of handheld graphing calculators in secondary mathematics classrooms by Pierce, Stacey & Wander (2010), for example, highlights a mismatch between student and teacher perceptions of the learning objectives, with students associating the learning with technological skills and teachers with mathematical skills and concepts. The authors conclude that pedagogical practices did not change significantly during the early stages of adoption and that the focus on the development of technical skills also acted as a barrier to transforming pedagogical practices.

These studies provide an important cautionary note to any project seeking to transform ‘potential’ into real classroom practice, and emphasise the need to engage in rich debate about educational goals rather than technological potential alone, and to take account of assessment frameworks, professional development and existing cultures of schooling if real innovation is to be achieved.
3  PART 1: KEY THEMATIC AREAS

3.1  INNOVATION IN CORE SUBJECT AREAS

3.1.1  Science and Mathematics

The use of digital technologies in science and mathematics has a long history and indeed has often influenced pedagogic practice across a range of other subject areas (e.g. Papert, 1983). Today, we can see that the tradition of innovation in this area is continuing, whether using familiar tools such as data loggers and dynamic geometry packages, or newly emerging resources. Innovative projects range from using collaborative tools to promote group work and inquiry, to connecting students more seamlessly to the ‘real world’ of scientific exploration. Indicative projects from our review include:

Voogt (2009) compared secondary science teachers who made regular use of ICT with science teachers who did not. Teachers making regular use of ICT perceived an impact on student learning outcomes (motivation, ICT skills, information handling skills, knowledge). Changes in pedagogy included increased independence and autonomy, and an increase in group work, problem solving and collaboration. There was also greater variety in learning activities, and perceived improvements in coaching and classroom discussion. The teachers made regular use of media production tools, tutorial software, digital learning resources and communication tools. They also made occasional use of data logging tools, simulations, mobile devices and interactive whiteboards.

In a similar study examining mathematics, Pelgrum & Voogt (2009) looked at school and teacher level factors for high levels of ICT use in mathematics. They suggest that teachers’ pedagogies are more learner-centred and focus on lifelong learning orientations. In common with much research on ICT in schools, this project found that school leaders played a key role in supporting collaborative approaches and a flexible approach to interpreting curriculum requirements.

Crook et al (2010) present a case study of the use of data loggers in a UK science classroom with 14-16 year olds. Students used the devices to create time-distance movement graphs which were then shared with the whole class and discussed. The teacher noted that the project approach enabled a shift towards greater collaboration, learner autonomy, peer learning and peer reflection, as well as supporting authentic learning through the analysis of real-time data. Woodgate et al (2011) briefly describe a case study of the use of mobile sensing technologies (data loggers with GPS systems) with 11-14 year olds to capture data from outside the classroom and analyse it through visualisation tools such as GoogleEarth and GoogleMaps. The tools were perceived to have promoted learners’ critical engagement with data and increased motivation. The 3 year Personal Inquiry project (Gaved et al, 2010; Scanlon & Gaved, 2011; Sharples & Scanlon, 2011) in the UK also focused on the use of data loggers, cameras and GPS systems as well as netbooks to support inquiry-based learning in science and geography in Key Stage 3 (11-14 year olds) in and out of school. Software to support scripted personal inquiry learning, including...
visualisation tools, was developed including a facility for teachers to select and modify activities for their learners. Of the 7 school-based trials, one suggested that learning outcomes were improved and learner motivation increased. Across all trials learners and teachers were perceived to have developed a deeper understanding of this technology-supported pedagogical approach. Teachers perceived that learners were engaged in richer investigations.

Slangen, van Keulen & Gravemeijer (2010) describe a researcher-led project with primary aged pupils who worked with Lego Mindstorms NXT robots. The authors argue that robotics is a current and future technology which everyone should be familiar with (so it should be in the curriculum) and that working on such projects will increase technology literacy. The analysis is presented in relation to pupils’ understanding of robotics rather than in relation to teachers’ practices and pedagogies.

Veletsianos & Doering (2010) describe a study of an ‘adventure learning’ project in which learners interact with a team of scientists exploring the arctic. Such projects are often implemented using collaborative learning approaches and tools which support this. 30 learners from a primary school in Australia participated in this project during 2005-2007. The teachers involved adopted a mix of constructivist and traditional teaching approaches, readily facilitated by the project website which was designed to support different pedagogies. The teachers appreciated this flexibility. The authors conclude that the environment supported ‘dynamic, participatory, engaging, collaborative, and social’ (ibid, p293) experiences for learners.

Shirley et al (2010) report on a study of networked graphing calculators to support mathematics and science in secondary school. With features offered with audience response systems, teachers are able to set multiple-choice or open ended questions via these devices, or share a student’s work with the whole class by capturing individual screen displays. In addition the devices can be used with sensors to record data such as temperature, speed and force. Here the researchers focused on ‘congruence with classroom practice’ highlighting the use of the devices for assessment practice in relation to high-stake tests although immediate feedback was cited as a benefit. The facility to capture all students’ screens was also noted to be beneficial in terms of classroom management.

Another exploratory study of the use of networked graphical calculators to support mathematics instruction in a UK secondary school with 2 teachers (Wright, 2010) argues that the teachers felt that the learners had greater autonomy, and that the facility to share graphs and aggregate the learners’ findings in one shared space supported collaboration and peer review.

Duncan (2010) reports on a study in Scotland which focused specifically on the use of graphing calculators to support dynamically linked multiple representations of mathematical concepts. The 12 teachers from 6 secondary schools, providing data from 66 lessons overall, reported changes in their pedagogy and that student learning outcomes were improved. In terms of pedagogies teachers reported a shift to more investigative, exploratory approaches and a more student-centred approach.
The amount of discussion between teacher and student, and between students increased, as did group work.

Warwick et al (2010) report on the use of Interactive Whiteboards to promote collaborative group inquiry in Science with 8-10 year olds. The project involved the use of resources designed specifically for the whiteboard to promote dialogue and collaboration. Explicit ‘group rules’ were developed by the teachers to ensure productive talk took place and these were embedded in the software. Teacher interpretation of interactivity and creativity were also critical in shaping classroom dynamics. Interactive Whiteboards were also used by primary teachers in a study by Murcia and Sheffield (2010) to display the teachers’ own interactive notebooks. These notebooks were designed in ways that built connections between student and teacher activity and classroom conversations. These notebooks included virtual demonstrations, documentaries, pictures, diagrams, animations, films and photos. The teachers used these as part of a shift towards a pedagogy focused on dialogue and discussion.

Needham & Crellin (2009) report on a project investigating the use of data logging devices and visualisation software in science in UK secondary schools. Students used the location-based data logging approach to capture data and used online mapping applications to create visualisations of pollution and other environmental data. Students also incorporated photographs and video, as well as use of Web 2.0 tools to share their findings publicly. Teachers worked together to create open-ended investigations which supported the curriculum. Students were asked to make sense of the data using the visualisation tools and explain their findings. Students appreciated the increased autonomy.

Baki & Çakıroğlu (2010) evaluated the use of learning objects to support teaching and learning in mathematics in a secondary school in Turkey. The teacher sometimes designed a lesson around one or two of the learning objects and on other occasions allowed students to choose which ones to engage with. Students were positive about their use appreciating the autonomy offered and the underlying pedagogy of problem solving as well as finding the experience engaging.

### 3.1.2 Literacy and Digital Participation

A second major current in innovation in classroom practice with ICTs has always been in their exploitation as tools to support students to engage in rich multimodal communication practices. These tools, when combined with innovative pedagogy, allow students to participate in what danah boyd calls the new ‘networked publics’ (2009) and enables the school to act as what Henry Jenkins calls a ‘first public’ for students developing a voice and citizenship identity in the digital world (Jenkins, 2009). Indicative projects relating to developing literacy and participation practices are in evidence in our review (practices relating to the use of social software for these purposes are discussed later):

Burnett et al (2006) reported on a study of transforming literacy practices in the primary classroom which led to new kinds of texts, peer-support and a change in the
role of the teacher. Children from two primary schools in the UK emailed each other, sending digital photos of artefacts important to themselves and then produced a presentation in a face-to-face setting. The authenticity of the task contributed to the children's engagement but also allowed them to use and explore “a mode of communication in which focused exchanges of information, playfulness and experimentation are essential features.” (p25)

Ryan et al (2010) present a review of a series of projects concerning multimodal texts in primary and secondary classrooms including IWBs, podcasts, moviemaking, and animation and presentation software – notably a focus on multimodal text production. Children found these approaches highly motivating, and developed independence and technical skills quickly. Teachers became facilitators with learners able to engage in self-directed learning to a greater degree, and able to improve their communication and collaborative skills. Planning was perceived to be more complex (involving technology as well as the task). The authors conclude that teachers need to structure critical engagement, open-ended cross-curricular projects require complex planning, and that technical development speeds are challenging – teachers need to keep up.

Kervin and Mantei (2009) analysing three case studies of technology supported literacy in primary schools argue that there needs to be a clear rationale and purpose when integrating technology with literacy instruction. The children worked independently but needed support from the teacher at various points. All three cases involved group work.

Wikan et al (2010) describe the role of digital multimodal text in group work in secondary schools in Norway. Nine self-selecting teachers engaged in action research during a two-year project (2007-2009). Multimodal presentation and animation tools were employed and the teachers were provided with training. Group work is commonly used in Norway. The authors suggest that this approach led to increased discussion and learner interaction. However, they also report that some learners were not focused enough on the task in hand (for example, aimlessly searching the internet). They conclude (albeit from a theoretical perspective rather than grounded in their evidence) that the co-construction of a digital text deepens learner’s knowledge and understanding.

The CAPITAL project in England undertook a series of case studies. One of these in a secondary school (CAPITAL, 2009a) describes how a librarian used the school learning platform to create a virtual book club. All pupils at the school are automatically members and can contribute to discussions around books they have read. It has been challenging to keep the momentum up but regular competitions and engaging teachers has helped. In another case study from the same project (CAPITAL, 2009b) the embedding of creative digital media work (including animation and live action film making) at a primary school in England is presented. The aim was to support the development of literacy. The school has created a ‘film making studio’ in a resource store. Children find the work engaging, developing communication skills as well as critically evaluating their products without prompting.
Russell & McGuigan (2007) evaluated ‘digital creativity activities’ with 10 schools for learners with behavioural, emotional and social difficulties in the UK. Learners were more engaged, became more autonomous and were more willing to collaborate with their peers than they had been previously. The activities were embedded across the curriculum and included the creation and editing of music, animation, video, picture-strip format texts and podcasts.

Payton & Hague (2010) present case studies of UK primary and secondary classrooms in relation to digital literacy practices. In this project the participating teachers worked alongside the researchers to develop new ideas for using ICT in the classroom. All activities required learners to create an output for a real audience. Teachers created appropriate scaffolds, learners developed critical thinking and evaluation skills, as well as improving communication and discussion skills. Teachers found it easier to create activities around collaboration, creativity and communication than fostering social and cultural understanding. Teachers perceived that learners became more autonomous and that their roles changed to that of facilitator. Projects included animation and multimedia story creation, producing multimedia presentations to record knowledge, creating a digital prospectus including video footage, creating 3D objects using an online tool, and creating a newspaper.

Ching Yang (2009) describes an oral history project in which primary, junior and secondary aged-learners used technology to support historical inquiry through interviewing community elders. The learners created web-based resources drawing on the interviews and providing images and animations. The author argues that this approach helped students to develop their information literacy skills, critical thinking skills and problem-solving skills, as well as communication and teamwork skills. However, she cautions that students did not develop high levels of historical thinking as originally anticipated and that further development of the project structure is required to ensure that technology is used as a cognitive tool.

McMahon (2009) identified a link between technology rich learning environments and development of critical thinking skills in secondary education. Students with better computing skills scored more highly on higher order teaching skills tests.

Deaney et al (2009) report on one teachers’ use of an interactive whiteboard to promote dialogue in classrooms. The whiteboard was used to enable the extensive use of textual annotation (including labels, links, thought bubbles, agree/disagree via marking with tick or cross) to facilitate public sharing, generation and recording of ideas, make inferences and crystallise causal reasoning, assessment of historical decision-making, encourage pupils to respond to peer contributions, engage pupils and ‘give proposers a stake’ in the discussion.

3.2 BLURRING BOUNDARIES

The capacity of digital technologies to build connections across different settings, and to allow students to access resources and collate their own work, is beginning to have an impact on the way in which classroom activities are organised. A number of indicative projects that suggest that some traditional spatial and temporal boundaries
are being blurred are included below in three key areas: first, the development of remote/virtual classroom practices; second, the emergence of the learning platform as a resource for teachers and students; and third, the developing use of social software practices to support teaching and learning.

3.2.1 Remote and Virtual Classrooms

Teachers in 5 rural schools in Australia sought to provide a wider range of curriculum options for their students by connecting their classrooms via Interactive whiteboards and video conferencing screens (Murcia and Sheffield, 2010). This allowed teaching of subjects where specialists weren’t present in each individual school. The teacher used the whiteboard to bring focus to the lesson with remote students. Students in other schools could see each other. The teacher’s voice played a critical role in ensuring the success of the lessons.

Cavanaugh, Barbour & Clark (2009) present a review of literature relating to virtual schooling (online distance education) in the USA. They note that the pedagogical practices do not necessarily change and that the structure of such online environments can actually result in very didactic approaches. The authors argue that more research is needed in relation to asynchronous pedagogies and the provision of learning communities in school sector distance education programs.

Virtual schools are prevalent in the US (Bacsich et al, 2010). They offer a mix of live technologically-mediated instruction with asynchronous support and learning resources. Learners are able to follow the curriculum at their own pace. A wide range of pedagogies are employed including cross-curricular project-based learning.

The U.S. Department of Education (2009) presents a review of online learning in the school sector expressing their surprise at the dearth of empirical research in this area. Only a limited number of studies from the school sector were included in their meta-analysis, the remainder coming from tertiary and adult learning sectors. They conclude that students studying wholly or partly through online learning perform better than students following traditional face-to-face courses, and that blended learning models were the most effective. Online learning can be enhanced when learners are given greater autonomy and control, and when learners are prompted to engage in reflection.

Heck, Houwing and de Beurs (2009) report on an e-class within a learning platform at secondary level used in a blended learning approach. Students were studying discrete dynamic models in mathematics. The online provision included digitised resources, animations, simulation software and online tutorials together with a chat room where they could get advice from peers and teachers. Homework was set and submitted online. About 300 students participated in the study. The resources were designed by one of the participating teachers and a study guide was provided on a weekly basis, enabling the teacher to adjust the workload as necessary and to tailor the activities for the forthcoming week to meet the needs of the students. The evaluation focuses on student perceptions. They appreciated the learning resources, and the facility to chat to each other and teachers. They also liked the flexibility of the
approach and the level of autonomy. Teachers perceived that it had been beneficial but expressed some concerns around workload particularly in relation to communication with students (e.g. email). The authors conclude that the blended approach ensures that students still have social contact with their peers.

In the CAPITAL project in England one case study (CAPITAL, 2009c) describes a virtual school developed by a local authority in England, initially to support geographically-dispersed, disaffected, primary-aged learners but later also used to provide support for gifted and talented students. The technology supported online, real-time lessons via videoconferencing, followed by online activities through a learning platform. Learners work together, contributing to a shared online whiteboard, and are able to speak and text each other. Learners can choose whether to communicate publicly with everyone or privately with the teacher. An external evaluation suggests that this approach boosts motivation and confidence for disaffected learners. Another case study from the same project (CAPITAL, 2009d) describes the use of videoconferencing by a secondary school mathematics teacher to provide mathematics lessons for groups of primary aged pupils in local schools. As the intention was enrichment, the tasks were more open-ended and the learners were encouraged to ask questions. The learners were not monitored and generally behaved appropriately, usually engaging in constructive discussion rather than argument when disagreements arose.

### 3.2.2 Learning Platforms

In the CAPITAL project in England one case study (CAPITAL, 2009e) describes a learning platform to support pupils outside formal education with banked and live interactive lessons, learning resources, and online communication tools. Based on the ‘notschool’ approach, learners negotiate individual curriculums according to personal interests and are supported by a personal tutor together with face-to-face encounters such as drop-in sessions and home visits.

A UK primary school considered to be ‘at the forefront of ICT use with younger learners’ (Fronter, undated, p.1) provide a good example of learning platform use (Aubrey-Smith, undated; EUN, 2009a; Fronter, undated). Learners have their own e-portfolio and make use of discussion forums as well as being able to access a range of curriculum resources, podcasts and games. They are able to progress at their own pace, working individually and in groups, and access the platform outside school. Teachers perceive that it has improved collaboration in teaching and learning across the school.

Jewitt et al (2010) evaluated current learning platform practices in the UK through 12 case studies of schools identified as making good progress integrating this technology in teaching and learning. They suggest that as well as supporting parental engagement and learning at home, the learning platform in these schools offered opportunities for independent and personalised learning, interaction and collaborative learning. In relation to assessment, learning platforms facilitated self- and peer-assessment as well as more traditional assessment forms. Finally, in relation to
pedagogy, they note that learning platforms in these schools enhanced the development of digital literacy.

Wastiau (2010) reviewed the use of learning platforms across Denmark, the UK, and Spain (Catalonia and Andalucia). They report that implementation is slower than expected and usage relates to management and organisation primarily, except in Denmark where almost all schools have a learning platform, pupils are active users through project-based learning approaches and communication with parents is widespread.

Granić, Mifsud & Ćukušić (2009) describe the EC FP6 funded UNITE project in which a learning platform designed to support collaboration and facilitate mobile access was developed. It was trialled in 14 secondary schools from 10 European countries. The outcome of the validation suggests that the platform supported autonomous and collaborative learning. Some students captured data using their mobile devices and uploaded it to the platform. Teachers noted that it was also easy to personalise learning for individuals. The authors conclude that although the ICT resources supported collaborative learning the “crucial element remains the teachers and their pedagogical approaches, hence the need for a well-developed pedagogical framework” (p.1070).

3.2.3 Social Software

A strong overview of current social software and learning practice in the UK is offered by Crook et al (2008) who report on a study of web 2.0 use in secondary schools in the UK. The authors report that it was challenging to identify schools which had embraced the participatory approaches to learning that web 2.0 technologies can support but a number of individual teachers were identified. Social networking use in schools was very rare. Blogs were used by some teachers but sometimes simply to provide information rather than engage learners in online discussion and debate. “Some teachers used blogs with students, setting open-ended tasks with structured support provided through the blog, with the goal of encouraging enquiry and empowerment” (p6). “Wikis were used [by a small number of teachers] with students for peer assessment, development of behaviour guidelines, and sharing knowledge and research. However, some teachers found that wikis were unsuitable as document repositories and were unable to cope with the conversational demand generated, and moved from wikis to linked discussion forums” (p6). Discussion forums were more commonly used, often within the closed site of the school learning platform, to support debate and discussion, peer-assessment and knowledge sharing. However, 41% of teachers surveyed reported that they had never used web 2.0 tools to support collaborative learning. A small number of teachers perceived that publication of content by learners was an important aspect of Web 2.0 use. “Publication was felt to enhance a learner’s sense of ownership, engagement and awareness of audience, lending weight to peer assessment and to learning informally or outside the classroom” (p7). Luckin et al (2009) in an analysis of informal uses of social software by the young people in this study argue that there was little evidence of sophisticated uses such as collaborative knowledge production. They conclude that it is necessary for “the development of a pedagogic model which provides the in-
school learning community with a conceptual model of the learning potentials of these technologies and the kinds of connections these can engender across and between spaces for learning” (p102).

Tarasiuk (2010) presents a case study of her own practice as a secondary English teacher as she developed a better understanding of her students’ digital cultures and tried to draw on this to inform her practices. She describes how she adopted publicly accessible wikis as a means of supporting collaboration between students around vocabulary, summaries and characterisation in novels. Students she notes were more engaged, and made more thoughtful contributions. Eventually students created their own entries in Wikipedia. Students also created movie trailers about books. The author notes how she became a facilitator and a learner, discussion became more spontaneous and the learners appreciated the authenticity of the tasks.

Seet & Quek (2010) describe a study of a small group of secondary school students (n=68) who used a computer mediated communication tool for supporting project work between groups of 4-5 students, together with support from students at an international partner school. The approach undertaken was blended with the online tool used to support local and international communication as and when required. The tool offered chat, forums, document storage and a website feature. However, student autonomy was limited by timetabling constraints and task structures. The teachers in this study acted as a facilitator and supported students to become more independent learners. The authors conclude that equipping teachers with skills to facilitate such activities is essential. Students perceived that they needed more support with online communication and collaborative skills.

Open source applications were used in Italy to facilitate the creation of a class (aggregated) blog to support reflection, peer-support and communication between students, technicians and teachers (Lin & Zini, 2008). It was used to supplement classroom activities enabling the students to draw on personal interests beyond the school walls and teachers to get an insight into youth digital media practices.

Garcia, Pacheco & Garcia (2010) describe the use of web 2.0 tools to support a constructivist approach to supporting instruction in a range of subjects in Mexican primary school classrooms. The platform developed supported communication, self-assessed activities, and collaboration between learners. The vision was to facilitate “project-oriented teaching and learning in an internet-supported, collaborative knowledge space, where information resources, inquiry and discussion” (p.20). Learners accessed the platform for 2 hours a week in the classroom and 4 hours a week outside the classroom to pilot the platform in mathematics instruction. Teacher perceptions are not reported here but learners perceived that the platform supported group collaborative work well and was helpful as well as motivating. The authors conclude that the platform supports teachers to shift their pedagogies from traditional didactic approaches to teacher-led, student-centred approaches.

Woo & Wang (2009) describe an exploratory study of blogging to support critical thinking in history education in secondary schools in Singapore. After a week of instruction by the class teacher, students were set open-ended research tasks and
asked to produce a blog on what they found within a week. They were then asked to comment on at least one other student’s blog. This activity was repeated three times over a period of 6 weeks. The authors argue that students’ critical thinking skills are supported through blogging but that it is topic-dependent as well as being related to the amount of information readily available. They conclude that students need better information literacy skills to improve critical thinking skills further.

Crook et al (2010) present a case study of a music teacher in a UK secondary school who used a range of technologies to support an innovative approach to providing learners with an experience of performance. Blogs and video were used to support reflection and the learning platform was used to ‘broadcast’ the performance and provide feedback. Netbooks were used as the main recording and production device.

Grant (2006) presents a short-term, small-scale case study of a secondary teacher using a wiki to support group project work in history. However, individual learners or pairs took ownership of particular topics in relation to the overall aim and produced pages of material independently rather than co-constructing knowledge. In fact, only one student attempted to edit text produced by a peer – which was revoked. Grant notes that this approach went against other practices in the classroom, acting as a barrier to collaborative approaches. In terms of developing technical skills, however, she comments that learners did collaborate and support each other.

Hastie, Casie & Tarter (2010) describe the use of a wiki to support physical education instruction. Learners were divided into two teams and asked to develop a new game (similar to football or hockey) using the wiki as a tool to support collaboration and the shared construction of a text. In addition, a PE expert from outside the school also had access as well as the teacher and school librarian. Learning was extended beyond the classroom, the learners and the teachers were engaged, the teacher was able to monitor activity at any time and communicate in-between lessons, learners benefitted from accessing games developed by other groups, and the outcome was considered to be of higher quality than it would have been without the technology.

Abbott et al (2009) conducted a small-scale study of the potential relationship between deep learning and the use of technology for learners aged 14-19. The methodology included the support of classroom teachers engaging in action research. They employed learning platforms and web 2.0 technologies to develop new practices to facilitate deep learning – although many of the studies reported related to accessing resources via the learning platform rather than interacting with peers etc. These practices included inquiry-based learning, project-based learning and the use of learning platforms to support self-directed and independent learning. The teachers involved noted that ICT on its own does not necessarily lead to greater levels of deep learning but that some pedagogical approaches such as project-based learning and the development of metacognitive skills were necessary.

The EUN STEPS project on the impact of ICT in primary schools presents a brief case study of a primary school in England (EUN, 2009a) which used the social software features of the learning platform (blogs, social networking) to support peer review processes as well as provide an insight into some pupils’ informal learning
and personal interests. In addition, the authenticity of publishing content for peers, teachers and parents to see was believed to have improved the quality of learners’ work and raised self-esteem. In a case study of a Swedish school twinned with a school in Ireland (EUN, 2009b), pupils and teachers at both schools used a blog to share knowledge of local myths and legends. A collaborative report was produced by learners from both schools using a wiki, and a film was produced by the Swedish learners with voice-overs from the Irish learners. The examples of good practice reported in the Irish study (EUN, 2009c) also include the use of blogs, wikis and podcasting to support collaborative and authentic activities as well as promote student-centred approaches.

3.3 LEARNER AGENCY, INDIVIDUALISATION AND MOBILITY

One of the most important developments in education over the last decade and one which is likely to continue over the coming decades, is the attempt to place ‘learning’ and ‘the learner’ at the heart of educational practice. Smartphones and ‘always connected’ tablet devices such as the iPad are becoming increasingly popular both by students and educators alike. The 2011 Horizon Report describes many uses of tablets/handheld devices which are giving learners and their teachers new experiences (Johnson et al, 2011). For example, using an iPad to collect and analyse data from field trips and a 3D period table ‘App’ as well as e-book facilities.

In this area, the potential of personal and mobile technologies has long been considered to be important. In our review, there is a wide range of innovative classroom practices designed to harness the potential of personal and mobile devices to support learner agency. These are described below. Across all of these studies, however, it becomes clear that the success of these new resources in really guaranteeing changed pedagogic relationships is dependent upon thoughtful reflection by practitioners on student and teacher identity, and upon attempts to change underpinning educational structures. The attempt to ‘bolt on’ student agency in classrooms, while organising all other elements of the institution and of teacher-student relationships around traditional hierarchies, is unlikely to be successful.

3.3.1 Tablet PCs, Laptops and Netbooks

Pennuel (2006) presents a review of literature on one-to-one access in the classroom. The author notes that in most studies teachers used the technology to support existing teaching practices rather than changing them. Where student-centred approaches were adopted, they involved project work and the creation of digital resources such as movies. The most commonly reported outcome was an improvement in student acquisition of technical skills.

Li et al (2010) report on a case study of tablet PC use in a primary school in Hong Kong. Students were given the devices as ‘learning companions’. Students could access the internet and school intranet, as well as make ‘handwritten’ notes using handwriting recognition software, seen to be particularly useful for inputting Chinese characters. The tablet PCs were also linked together in order to co-construct written texts. All textbooks were provided electronically and assignments and assessment
were managed online. Teacher pedagogies included inquiry based learning, collaborative and group learning. There was a shift to self-regulated learning. Students were motivated and developed high levels of ICT competence.

Li (2010) also reports on a comparative study of one-to-one access to tablet PCs in a primary school. Four classes – 2 with individual tablet PCs and 2 without – were studied. Students were shadowed for a day, and then lessons relating to project-based learning and independent study were observed at a later date. There was no requirement for teachers to consider their pedagogy. Instead the tablet PCs were seen as ‘learning companions’ which held all learning resources and could be used to support learning as and when students decided to use it. Most observed lessons were whole class or directed instruction together with class activities. Students used their tablet PCs for note taking, annotating e-texts and completing exercises. Independent study and project-based learning, however, enabled greater student autonomy when students worked collaboratively, used mind maps, and engaged in self-initiated peer-supported learning activities.

Klieger, Ben-Hur & Bar-Yossef (2010) describe the introduction in science education of teacher and student laptops in Israel, noting that it led to a shift from teacher-centred to student-centred practices (although the actual use of the laptops is not made explicit in this paper). A series of case studies were conducted some three years after the program of laptop provision had been delivered. The program included professional development support with a focus on science education and ICT pedagogy. Changes in practices were reported as an increase in online learning which led to the development of higher order thinking skills in learners, an increase in self-directed learning, an increase in the use of forums on the school website. There were some technical issues and concerns around classroom management (controlling access to the internet).

Drayton et al (2010) describe three case studies of 1:1 laptop initiatives in relation to pedagogies in science. They comment that teachers use a range of science software to promote student engagement, reflection and student-centred approaches although less than a third of participating teachers felt this software contributed to improving collaboration between students. Teacher-centred approaches dominated however, with teachers using the technologies in ways which supported their existing practices. The authors conclude that more should be done to change school cultures through the provision of appropriate professional development.

Cramer et al (2009) report on a study of netbooks in primary schools in the USA. Although focusing mainly on technical issues such as battery life and size, they did note that the combination of netbooks and a learning management system enabled teachers to facilitate individualised learning pathways.

Balanskat & Garoia (2010) reviewed laptop and netbook initiatives across Europe identifying 33 initiatives from 18 countries. In terms of pedagogy, across all initiatives, the key pedagogical aspiration is noted as ‘personalising learning’. Some initiatives are more focused on pedagogical change, such as a shift to student-centred learning, than others which focus on addressing digital divide issues and the
development of teacher and student ICT skills. Only 8 of the initiatives have or are being evaluated; information on pedagogical practices in this report is limited.

Vuorikari, Garoia & Balanskat (2010) present a pre-evaluation report of a European project to explore the use of netbooks. This project is still at an early stage and has yet to collect data on how the netbooks are being used but almost half the participating teachers intend to use them to support collaborative activities (including online collaborative homework). Teachers also perceived that the use of netbooks could have a positive impact on student engagement and facilitate more opportunities for personalised learning.

Haßler et al (2011) report on an exploratory study of interactive teaching and mobile devices in Zambia. Although still in development, the teachers felt that that the netbooks and tablet PCs facilitated collaborative approaches in the classroom and student autonomy, as well as motivating the learners. Barriers included time and lack of internet access, but also language/cultural issues and powering the devices. The authors also note that inquiry-based and project-based approaches benefit from non-digital resources (for example mini whiteboards) as well as digital resources.

### 3.3.2 Mobile Phones

De Marcos et al (2010) describe the use of a mobile application for use on any student-owned mobile phone to support self-assessment in secondary schools as a supplement to the teacher’s usual pedagogical approach. Students accessed a multiple choice quiz which teachers had designed. Teachers were able to monitor students’ progress. There were some technical problems running the application on some of the student-owned mobile phones. Costs of internet access (required to perform the task) were also noted as a barrier. This initiative only had a statistically significant impact on attainment for younger learners (aged 14-15 years). Students found the experience positive.

Hartnell-Young and Heym (2008) investigated how mobile phones could be integrated in teaching and learning, working with 5 UK secondary schools. Teachers considered ways of using the technology in their classrooms and devised/adapted activities to include the use of the phones. Phones with cameras and videos were used to capture evidence of activities. Some students used the calculator feature of the phone and the stopwatch to time events. The phones were used to connect to the school network and also transfer documents between devices. In some cases images and video data were uploaded to learners’ portfolios. Learners also downloaded and listened to podcasts. One teacher sent regular reminders to students via text messages.

Moura & Carvalho (2009) report on a similar study of mobile phone use in Portuguese and French schools to access resources, produce text and support language learning through SMS exchanges. Scenarios were developed to support teacher’s pedagogical practices around personal reflection, enquiry-based learning and collaboration. Students made notes, undertook activities, listened to podcasts and collaboratively produced a text.
Taibi et al (2009) describe how they developed an environment to support mobile learning and piloted it with 29 teachers from 6 secondary schools with only 12 smartphones. Teachers from across the 6 schools collaborated to produce learning activities, using a concept mapping tool to support this process. When the students tried the activity, which involved travelling off site, the teachers were able to monitor their progress using various tools (including a location tool) and also to communicate with the learners via chat and instant messaging. Students worked collaboratively in groups. The students had to tag geographical locations and collect data such as photographs, which they considered relevant to the task they had been set, as well as construct a collaborative text (wiki). The authors were particularly interested in the impact of this environment on motivation (both for teachers and students). However, they note that teachers’ roles changed and that they were able to remotely support and manage a knowledge-construction, group activity.

Greenhill with Pykett & Rudd (2007) present a case study of a mobile phone and web application designed to embed physics learning through games creation and play. It was trialled in secondary schools; the authors conclude that its use was authentic and engaging, and consolidated learning, not only about science concepts but also about science design processes and digital literacy. Moreover, it was considered most effective when presented with a dialogic pedagogy (teacher as facilitator of discussion, peer-interaction and peer-learning) rather than a didactic pedagogy.

### 3.3.3 Handheld Devices

Kim et al (2010) describe a study of mobile devices in a rural and urban primary school in Mexico. The devices were pre-loaded with story books designed to support the teaching of reading (Spanish 1st grade). As well as reading the words and listening to the story being read aloud, students could record their own narrations of the story. Students were able to listen to stories again if they chose to do so or to move on to an unread story. The devices were used to supplement regular classroom instruction. Unfortunately, the devices were not taken home due to teacher concerns about high levels of drop-out and migration (which proved to be the case). The learners in the rural school benefitted to a greater extent than their counterparts in the urban school.

Eduinnova is described as a pedagogical development which uses networked handheld devices to support collaborative learning (Nussbaum et al, 2010). The mobility enables learners to move around the classroom into groups to work together and also to interact face-to-face as well as via technology. This enables a more student-centred approach and has been used with over 700 teachers in Chile over the course of the last 10 years. The software provides an online assessment tool for the teacher to use which shows graphically which groups are having difficulties with the task and what could be done to support them. Teachers using the devices claimed that their pedagogies shifted away from a purely expository style taking on the role of a facilitator. Students were perceived to take an active role in the process. The outcomes for learners included improved communication skills. The software has been trialled in the UK (Galloway, 2007) where it has been used to support discussion and collaboration in primary schools.
The Eduinnova software was adapted by Roschelle and colleagues (2010) to support the teaching of fractions in mathematics in USA primary schools through 3 activities described as ‘exchange’ (multiple representations of fractions), ‘ordering’ (putting individually assigned fractions in ascending order) and ‘aiming between’ (where learners propose and evaluate fractions which could occur between two points on a number line). In this study, which focused on the learning outcomes rather than the role of the teacher, teachers and learners were given training in collaborative approaches. The teachers received real-time feedback on each group’s progress. Students were observed to develop communication skills such as questioning, explaining and discussing which enabled them to solve the problems set as a group with less support from the teacher. Students in the control group were observed to put their hand up more often to request support from the teacher. Furthermore there was a positive impact on learning outcomes when compared to a control group.

PDAs were used in one UK school in a Media Studies class to capture video data, access the internet and the learning platform, and as a voting device (Lynch et al, 2010). Teachers involved felt that learners were more engaged and that communication and interaction between peers had been enhanced.

Hartnell-Young (2009) reports on a case study of PDA use in a primary school in the UK with one teacher and a class of learners aged 10-11 years. The teacher worked with an e-learning consultant to establish how best to use the technology to support her pedagogy. Greater levels of learner autonomy and collaboration in the classroom developed. Although the PDAs were used throughout the curriculum, the focus in this paper is on the development of digital literacy skills. For example, learners used the PDAs to create multimodal texts using video, text and animation. The teacher perceived that boys’ writing was improved as a result of participating in the project.

McFarlane, Triggs & Yee (2008) investigated the use of 1:1 personal mobile devices in 2 primary and 3 secondary schools in England. Teachers perceived a positive impact on attainment. Some use was very ‘traditional’, for example primary children used the devices independently to engage with drill and practice applications in mathematics. Teachers initially incorporated the devices in ways which supported their existing practices – largely teacher-controlled. A secondary pupil described how he used the device with a portable keyboard to support his learning throughout the day – for example taking notes, writing essays, and taking photographs. There was a slight shift towards more student-centred, open-ended activities as the teachers became more comfortable with the technologies. However, the authors note that innovation was constrained by the demands of the curriculum and concerns about high-stakes testing (where the test outcomes lead to important consequences for the learner). Some teachers experimented with new forms of assessment – for example, capturing and recording the screen to provide as evidence of activity.

Learning2Go in the UK was a study of 1:1 computer provision in primary and secondary schools from 2004 to date. Initial studies focused on PDAs (Perry, 2005) but more recent work has broadened the scope to look at a range of technologies including netbooks (Perry, 2009; 2010). In 2008 (Perry, 2009) one secondary school provided handhelds to all pupils aged 11-12 and all pupils aged 14-15. As with many
large-scale innovations such as this, uptake varied according to individual teacher enthusiasm. Some experimented with multimedia text production including animation, video, photographs and multimedia presentations. For example, in Geography and Science students used an application to capture data in the field. At another school where an A-level group (aged 16-17) was provided with the devices, students shared their work via the interactive whiteboard, and created e-portfolios using the data capturing features of the handhelds. A further secondary school (Perry, 2010a) provided all 11-12 year olds with netbooks and also re-designed the curriculum, shifting to a cross-curricular thematic approach and supporting learning through the adopting of the RSA Opening Minds curriculum. Teachers had not yet begun to rethink their pedagogy differently but planned to develop more collaborative approaches in the future. In a primary school in the same study, students aged 10-11 used smartphones (telephony-disabled) to document project work using different applications to create sketches, animations, photographs and video.

Loveless et al (2007) report a small-scale study of the use of mediascapes (location-sensitive multimedia texts) in educational settings including primary and secondary schools in the UK. The mediascapes were used across the curriculum and teachers perceived them to be engaging. Learners accessed these resources using PDAs which they carried with them as they travelled through a location, and which brought up text, sounds and images (GPS triggered) in relation to particular spots. The project enabled exploration of “locally embedded personal geographies and shifting identities among young people” (p.4).

One CAPITAL case study (CAPITAL, 2009f) describes a project which used mobile technologies (including personally owned devices) in a further education setting. The main aim was to develop the infrastructure so that a wide range of devices could be used on the college network. The college invested in a range of technologies which lecturers could use. There was an increase in the use of video and audio in learning activities. And learners could record learning activities using their preferred device.

Bunce & Reid (2009) conducted a small-scale study of the use of hand-held devices (learner response devices, mobile phones, netbooks, and games consoles) to support the development of enquiry skills in a primary school, middle school and high school in England. The report focuses on the challenges faced when trialing a range of devices and software, and some solutions/workarounds. Examples of use included using the chat room facility of the games console to download a grammatically incorrect sentence created by a teacher in Modern Foreign Languages and upload it to the chat room to share with the other learners. In another example the teacher provided the start of the story and learners collaboratively worked on developing it further by uploading sentences to the chat room. Challenges included the need to develop rules of use, and that only 16 devices could connect to a chat room at the time of the study. However, teachers organised the activity so that pairs used the same device and this was perceived to enhance communication and collaboration. The use of the technologies in different ways, with the support of frameworks developed within the project, was perceived to have contributed to learners’ development of enquiry skills including: communication, collaboration, questioning, reflection and self-management of learning.
3.3.4 Self Organised Learning

Sugata Mitra’s work (Mitra, 2010) around technology-supported, collaborative problem-solving provides an interesting and yet simple example of how an extreme form of student-centred learning (no or limited support from a classroom teacher) can lead to interesting outcomes. The work started through the ‘hole-in-the-wall’ projects in India but has recently been continued through a project in UK primary schools where teams of learners with access to the internet are asked to solve GCSE questions (the formal assessments given to learners aged 16). Mitra describes this as a ‘self-organised learning environment’ with teachers adopting the role of mediators – setting the question and then leaving the learners to work on it. Mitra comments that ‘teachers need to be trained to design simple questions that will evoke curiosity and interest while gently nudging a group towards the curriculum’. Tobin (2010) reports that one of the participating primary school teachers now introduces all new science topics using this approach. There have, however, been critiques of this approach which have argued that the withdrawal of the teacher can lead to existing inequalities playing out in which boys and children with existing educational and social capital tend to do better (Arora, 2009). There have been few robust studies of the long-term impact of such environments.

3.4 INNOVATION IN CLASSROOM-BASED ASSESSMENT

One of the key trends identified as important for transformed classroom practice in Crook et al (2009) is the potential for digital technologies to be used to support rich feedback and to enable new forms of assessment. Evaluation and assessment are notoriously under-reported in classroom studies of innovative practice, although a number of projects focusing on innovative teaching and learning necessarily engage with this issue. Our review, however, identified a number of projects where innovative practice around assessment is highly visible, these tended to cluster around the use of digital technologies to offer more opportunity for learners to participate in peer and formative assessment, and the emerging field of tagging and the semantic web as a means of reflecting upon practice:

3.4.1 Self, Continuous and Peer Assessment Practices

Kimbell et al (2009) describe the e-scape tools – handheld devices providing access to a web-based portfolio and web-based assessment system, designed to link to awarding body assessment systems. The tools were piloted in phase 3 in design and technology, science and geography and involved 19 secondary schools. Teachers design activities which are sent in units to learners’ devices and each individual learner’s work is retrieved after a set amount of time for each unit. In a further development of the system (Patterson, 2010), teachers provide prompts and formative feedback (e.g. target setting) using both text and audio. Learners in both secondary and primary schools used the handheld device to record their ‘design story’ through the multimedia capabilities of the device (video, audio, image capture). The learners engaged in self and peer evaluation. All feedback, whether learner or teacher initiated, was recorded in the e-portfolio. One learner did note that using the
technology to provide feedback to peers seemed to take longer than it may do if provided verbally – however, using the technology did provide a record of this.

Weir & Connor (2009) report on a trial of the use of digital video to support teaching, learning and assessment in physical education. The use of video clips to support formative and summative assessment was examined. Students also produce e-portfolios. Teachers felt that students’ technical skills improved the most, with 12 of the 31 participating teachers claiming that it was most beneficial in enabling students to identify their strengths and weaknesses. However, the teachers and the learners felt that it was very time-consuming.

Clark-Wilson (2010) described a similar study working with 7 teachers in England, Scotland, The Netherlands and Sweden, focusing on the development of new formative assessment practices. The teachers decided how to integrate the graphing calculators into their pedagogies. Some teachers also used the devices in conjunction with IWBs. The teachers reported on 25 lessons with the screen capture facility reported to be the most useful feature. Pedagogical practices were identified as: “develop new and support existing formative assessment practices; enable the development of innovative mathematical tasks; support the use of the handheld technology for both individual and whole-class work; support teachers’ lesson planning to include desired pedagogical approaches, lesson organisation and classroom management strategies.” (ibid, p753). These practices were used to support teacher interventions, classroom discourse, peer and self-assessment, mathematical generalisations.

3.4.2 Learner Response Devices, Feedback and Innovation in Assessment

Learner response devices have been enthusiastically taken up in many university settings and are increasingly being used in schools. We could have reported on these devices in the section on personal and mobile devices. Our reading of the current innovative practice in this area, however, is that their use is qualitatively different. It tends not to be aimed at building learner responsibility and autonomy, but might more usefully be considered part of the ongoing development of more effective feedback mechanisms to teachers and as part of the developing panoply of tools for in-classroom assessment.

The literature on the use of learner response systems (also referred to as clickers, classroom response systems, audience response systems, voting systems) is as yet fairly limited and tends to relate to their increasingly common use in HE settings prompted by the opportunity afforded for introducing a more varied pedagogy in the context of lectures delivered to very large classes (Kay and Lesage, 2009).

However, Moss and Crowley (2011) working in a substantial science outreach project involving 5,000 learners in the 15-19 age ranges see the devices as offering a highly flexible and transferable approach to engaging learners of all ages in the use of interactive technology. The devices are generally considered easy to use by both teachers and students, thus enabling more interactive teaching (Draper & Brown,
2004; Siau et al, 2006) and they have been found to have the potential to support learning when underpinned by appropriate pedagogies (Fies & Marshall, 2006).

An analysis of 56 studies undertaken by MacArthur and Jones (2008) has identified clear learning gains from the use of these devices under certain conditions. A number of the affordances, including the primary advantage which they identify, the option of being able to submit either identified or anonymous responses thus providing formative assessment and function supporting student collaboration appear relevant to all phases of education. Their analysis suggested that the devices were instrumental in supporting collaborative learning and constructivist pedagogical approaches.

Furthermore, learners themselves perceive they are more involved and making a contribution rather than being passive receivers (Trees & Jackson, 2007; Walsh, 2009). Evidence from a comparative study of students using no formative assessment, paper questionnaires and voting systems suggests that the use of learner response systems does impact positively on attainment (Mayer et al, 2009). Their use in the classroom can increase attendance and retention (Caldwell, 2007; Stowell & Nelson, 2007; Moss & Crowley, 2010).

The use of learner response systems is underpinned by beliefs that active learning and student engagement is worthwhile (Simpson & Oliver, 2007). This is now being interpreted in a more sophisticated and holistic way, looking beyond the assumption that using handsets equates to meaningful interaction (ibid, 2007).

Other studies suggest that the devices have helped to alleviate boredom in classes, increasing motivation and engagement (Hoekstra, 2008; Trees & Jackson, 2007; Draper & Brown, 2004; Boyle & Nicol, 2003; Walsh, 2009). For example, they provide opportunities to discuss material, break up the lecture, help students stay focussed and generate ‘noise’ that helps to alleviate the boredom (Hoekstra, 2008). The system also enabled students to see how theory could be applied and to test their understandings. Moreover, the audience can be given ownership which can be powerfully motivating (Wilson, 2006; Caldwell, 2007).

Anonymity can positively affect confidence levels (Caldwell, 2007, Walsh, 2009; Draper & Brown, 2004) and students are more likely to respond honestly (Stowell and Nelson, 2007). Bannister et al (2010) comment that, while some learners are reticent to respond verbally for fear of embarrassment and clearly value anonymity from their peers, there are advantages in the teacher being able to identify individual’s errors rather than seeing only an aggregate result. It may also be beneficial sometimes for learners to see others’ contributions (Draper and Brown, 2004) and seeing that others had similar responses/opinions can build self-confidence (Caldwell, 2007).

From a teacher’s perspective in relation to the management of learning, feedback from learner response systems can be an indicator of how well the teacher is getting the message across (Draper and Brown, 2004; Walsh 2009). With just-in-time...
information such as this, teachers can then alter pace of session, try a different approach or backtrack as appropriate.

The introduction of these interactive devices can also prompt teachers to reconsider their overall pedagogies. For example, in History lessons, learner response systems can prompt teachers to reconsider their use of questioning and its nature and purpose (Walsh, 2009).

The use of learner response systems increases opportunities for formative feedback (Roschelle et al, 2004; Simpson & Oliver, 2007). Staff can assess all members of the teaching group rather than the individual who is chosen (or has volunteered) to answer the question, keeping a permanent and individual record of each student’s contribution (Caldwell, 2007). Whilst clearly able to support assessment, learner response systems also have the potential to support discussion (Boyle and Nicol, 2003; Simpson and Oliver, 2007; Hoekstra, 2008), foster peer interaction (Hoekstra, 2008), tackle misconceptions (Caldwell, 2007) and can challenge learners to justify their responses (Boyle and Nicol, 2003). They can enable staff to test students’ application of theory in a concrete way (Hoekstra, 2008; Trees and Jackson, 2007).

Students value the feedback provided (Trees and Jackson, 2007) and like to compare individual answers with whole class responses (Caldwell, 2007; Draper and Brown, 2004).

However, there are also some issues which need to be considered. The use of learner response systems in the classroom can be time-consuming (Boyle and Nicol, 2003; Caldwell, 2007; Draper and Brown, 2004) and a distraction (Draper and Brown, 2004). Sometimes use of learner response systems detracts from learning objectives rather than enhancing them (Draper and Brown, 2004). Students do not appreciate overuse (Caldwell, 2007) or uses that are not perceived to be purposeful (Caldwell, 2007; Draper and Brown, 2007).

Some students do not feel comfortable working collaboratively in discussion groups with learner response systems (Hoekstra, 2008). However, this could be due to not having done the required preparation, preferring not to have to listen to their peers’ potentially incorrect reasoning, or simply personal preference.

Cutrim-Schmid (2007) and Moss and Crowley (2010) provide a number of imaginative examples from modern language and science teaching respectively of the use of quizzes involving a range of question types which enable both teachers and students to identify a baseline knowledge of the topic and to monitor progression as knowledge and understanding evolve.

Much of the research published to date was conducted prior to the introduction of devices such as ActivExpression, which have greater functionality (for example text responses) than the early voting systems and which are now widely available. Chambers (2009) reports on the use of such devices for the planning and teaching of history lessons in a secondary school. The findings supported those of Walsh (2009) regarding the positive benefits of the devices for increasing learner engagement and
the devices were popular with learners across the secondary age range. Opportunities to support a more student centred pedagogy were identified by virtue of their support for collaborative learning with pupils comparing and contrasting their individual responses and sessions where students determined their own routes of enquiry.

Chambers' findings are consistent with those of Cutrim-Schmid (2008) who observed increasing levels of interactivity and an increase in participation among learners who were previously comparatively reticent to contribute to discussions. The need to broaden the range of questions beyond those where there was a right answer was identified and the emergence of advanced historical thinking which can be developed through debating more open questions and issues proved more difficult to assess.

Bannister et al (2010) report on a large scale evaluation of similar devices involving data from 100 questionnaires over 130 lesson observations involving 70 teachers, and 80+ interviews with teachers learners and local authority advisers gathered over three phases of visits. Their findings were consistent with the body of research reported above (e.g. Simpson and Oliver, 2007; Hoekstra, 2008; Chambers, 2009; Walsh, 2009) in terms of the use of the devices to support constructivist pedagogies, collaborative learning, more active participation from somewhat reluctant learners and the value of instant feedback for formative assessment purposes. The scale of the project and the research design enabled the project team to address the issue identified by Chambers (2009) (regarding the limitation of responses based on questions requiring a correct answer) by working with teachers to design other types of response. They also identified a need for teachers to recognise that accurate responses are not always evidence of complete understanding and the need for careful consideration of the learner's ability to read and interpret the question.

Conducting the research over three phases of visits served to highlight how teachers’ use of the devices became progressively more sophisticated with experience. They identified five phases in the teachers' development of their expertise and drew attention to the need, where sets of devices are limited, for teachers to be given sufficient access to enable them fully to develop their expertise.

Early findings on the use of a new generation of learner response devices which incorporate additional "self-pacing" software for enhancing the formative assessment process have been reported by Haldane and Smith (2010) working with secondary school students in biology classes. The software enables questions to be planned and levelled in advance of the session by the teacher with pupils being required to answer correctly a certain number of questions at a particular level before being able to progress.

The data generated can be easily followed and interpreted live by the teacher throughout the lesson and individual and class records of progress pasted into Excel for more detailed analysis and to inform the planning of targeted differentiated provision. The teacher is able to identify and respond to difficulties encountered by individuals or those common to a number of learners, to address them as they arise, and to set differentiated homework accordingly at the end of the session. The
devices themselves, the improved quality of feedback, the rapid intervention within the session in response to difficulties arising and the differentiated homework all proved popular with students who also perceived that they stayed more engaged with lessons during which the devices were used.

### 3.5 GAME-BASED LEARNING

Game-based learning is highlighted as a trend that is likely to become increasingly prevalent in educational systems within the next 2-3 years (Johnson et al, 2011). As well as the benefits of playing games, engaging young people in developing their own games can be very beneficial, developing both critical thinking and creative design skills (ibid). More recently there has been a growth in online and mobile phone app games.

Wastiau et al (2009), reporting on the Games in Schools study, present a review of game based learning in schools in 8 European countries, taking a broad view of what counted as games play, as identified examples were limited in number. Focusing on six case studies they suggest that games have the potential to support motivation, improve skills (for example social skills) – but not necessarily subject knowledge, and provide stimulus for multimedia production and the development of literacy skills. In the concluding report on the EU funded IMAGINE project, Blamire (2010) noted that the use of games in school settings is still at an early adopter stage in most European countries with more advanced uses in Scotland, Denmark and Catalonia. Blamire argues that teachers need support if they are to begin to integrate games based learning into their pedagogies but also noted there is still much resistance from teachers. The two studies from European Schoolnet echo earlier findings from Sandford et al (2006) who reviewed the use of commercial-off-the-shelf games in formal education. This report argued that there were important barriers to the use of games in education including technical, cultural and logistical issues. They argued that, when students had greater autonomy over games play, they were more engaged and that teachers need a good understanding of the curriculum in order to ensure that games play supports learning objectives.

Papastergiou (2009) presents a review of literature on games and learning in physical and health education. The focus on this review was on the potential of games in these disciplines rather than the impact on classroom pedagogies specifically. The empirical evidence in relation to effectiveness was limited but participants of the studies reviewed were positive about the potential benefits including: motivation and engagement, knowledge acquisition.

Williamson (2009) considers desk-based research, a survey of practicing teachers and interviews with 10 teachers already making use of games in the classroom. A third of respondents in the survey reported using commercial games in the classroom. Often teachers made the games fit their existing educational objectives. Games have been used to support literacy and communication development, as well as developing learner’s design skills. Teachers perceived that games support greater learner autonomy and increased social interaction as well as the development of media literacy skills.
Ulicsak with Wright (2010) reviewed the literature on serious games to support learning with the aim of providing guidance for teachers to evaluate and select appropriate games to support learning objectives. The authors argue that, based on current and previous research, games are part of young people’s digital cultures; teachers now recognise the educational potential of games and are becoming more willing to experiment with them in the classroom; games can support constructivist learning approaches (i.e. different pedagogies); they can be motivational; they should be used alongside a range of approaches; games technologies are continually developing and this will facilitate greater levels of interaction in the future. However, they caution that games do not suit all learners as they often demand significant investment of time to achieve mastery through experimentation and repeated failure at tasks. And some games require teachers to think creatively about how to use them to achieve learning objectives and meet the demands of the curriculum, which in turn demands time from the teachers.

While games use is still at an early adoption stage, because of the interest in games in student informal learning cultures and a significant interest in games and learning in academic education research, there is a wealth of innovative practice in this area. Indicative examples of the range of games-based learning activities are presented below. It is noteworthy, however, that there are still no widespread, taken-for granted, games-based learning activities across Europe or elsewhere. Innovation in this area may therefore need to consider, early on, what would make for a sustainable long-term development rather than a one-off experimental project.

3.5.1 Location-Based Gaming

The shift of gaming onto mobile platforms combined with the development of GPS functionality in mobile platforms is leading to a growth in location-based gaming and augmented reality gaming.

Wijers, Jonker & Drijvers (2010) present a study of location-based games for handhelds to support mathematics and also geography education in secondary schools, developing a geometry game (MobileMath). Students were introduced to the game then spent about 1 hour playing in teams on the school field using mobile phones with GPS facilities. Students created geometrical shapes, using online maps and placing vertices on the school field by entering geographical location details on the phone. If correctly placed, the online facility shows the shape created on the map. Teams score points according to the area of the shape. Shapes cannot overlap adding to the challenge. Shapes can also be ‘deconstructed’ by opposing teams. Students found this activity motivating and used different strategies to construct the shapes. They perceived that they learned more about geometrical shapes and also developed collaborative skills. There were technical issues in relation to the GPS readings.

The emapps.com project involved mobile technologies, GPS systems and games designed to be used beyond the school walls (Brophy, 2008). The focus of this report is the impact on children but the author also touches on pedagogical practices. The games, produced by teachers (together with children in some of the schools),
involved collaboration and the co-construction of knowledge, and were described as being intellectually challenging for the children involved. Teachers were positive about the use of mobile learning, perceiving it to be very motivating. There were some technical issues, particularly in relation to the use of GPS in urban areas and teachers were concerned about safety issues (learners were provided with devices which they took home). The author concludes that there was a change in the relationship between teacher and learner – it became less formal leading to different kinds of interactions. Emapps.com used game templates but it was still time-consuming for teachers to prepare the activities.

Matthews (2010), a secondary teacher, developed a new approach to supporting community studies education developing a project with three activities: place-based inquiry learning, learner authored games and finally the creation of an augmented reality game for mobile devices. The intention was to develop students’ understanding of design processes through an authentic task within a culture of participation. Learners worked both independently and in groups. This innovative teacher concludes that developing such new approaches is not an easy task. However, he felt that the project was successful in facilitating collaboration, offering an authentic experience, engaging students and developing their digital literacy skills.

Squire (2010) evaluated the use of an augmented reality game in seven secondary classrooms in the US in 2007. The cross-curricular science mystery game was designed to be played over 2 weeks by groups of students, with one day collecting data in the field using a PDA with GPS. Video and data (readily available public documents) were shared with the learners as they approached geographic hotspots. Teachers provided support in interpreting the data acquired. In the classroom, learners role-played investigators (doctors, chemists, environmentalists) researching the cause of sickness of students who spent a day at a local beach. The author concludes that integrating game-based pedagogies together with problem-based approaches is a powerful catalyst for learning in the classroom.

Squire and Klopfer (2007) report on 4 case studies of secondary environmental science students participating in an augmented reality game which was designed to be flexible such that teachers could integrate it in different ways. The game was designed to be played in a 2-3 hour window. In their observations the teachers in this study did not develop sophisticated mentoring and facilitation skills yet the game was perceived to have ‘helped students understand the socially situated nature of scientific practice’ (p.406). They surmised that this was partly because the game offered a degree of scaffolding

The Netherlands case study presented in the final report of the Games in Schools project (Kearney, 2009) describe a location-based game, developed in 2005, in which students had to travel around Amsterdam and learn about medieval sites in the city. One class of secondary school students piloted the game in 2005 and a further larger-scale pilot with 10 classes was undertaken in 2007. Students playing the game achieved higher scores on knowledge tests than those undertaking traditional instruction. Teachers felt that the students participating in the game had developed collaborative skills. As a result of these pilots a games-authoring tool was developed
for students to create their own location-based games using one of three templates. The underlying pedagogy was to promote constructivist and collaborative learning. The tool was piloted from 2007-08 and, as the findings were promising, they were then made available for all secondary schools in The Netherlands to purchase.

3.5.2 Virtual Worlds and Simulations

Wrzesien & Alcaniz Raya (2010) investigated the use of virtual worlds for teaching natural science and ecology (in groups of 4 with a virtual tutor), comparing its use with a traditional approach (a whole class with a teacher) in primary school. There was no difference in outcome between the two groups but the learners using the virtual world were reported to be engaged and motivated, although possibly distracted by the 3D visual effects and novel interaction via paddles.

Ulicsak with Wright (2010) provide a case study of a business simulation game used to support Business Studies courses for 14-16 year olds in the UK. Students play the game over a period of 5 weeks towards the end of their course. It enables them to consider all aspects of business, holistically, through exploring the impact of decision making. Students here play in pairs and so are able to discuss decisions and reflect on the outcomes. The teacher adopts the role of facilitator.

Schwarz, Mayer and Sharma (2007) reporting on the use of computer simulations to support science pedagogy with pre-service elementary teacher trainees suggest that their experience helped them to develop their understanding of technology, science pedagogy, and epistemology. However, the trainees felt that use of software in the classroom should be fun and provide science information within a structured learning task. The authors conclude that trainees understand science pedagogies in very traditional ways – as teaching and learning science information rather than developing models and building theories from evidence. They also noted a lack of quality software at the time of the study for supporting the teaching and learning of elementary science.

Ketelhut et al (2010) describe a project which investigated inquiry-based approaches to science instruction through a virtual world environment. Over 2000 students collaborated in teams to solve problems around disease and bacteria through interacting with each other via avatars and accessing digital artefacts. In addition, learners could also interact with computer-based ‘agents’ which acted as mentors. The study was designed to support teachers to change their practices and included a professional development programme to achieve this. The focus of this paper is on students rather than teachers’ experiences but the authors conclude that the environment was effective in enabling teachers to incorporate inquiry-based learning in their classrooms.

Thomas, Barab & Tuzun (2009) describe three case studies of the use of Quest Atlantis in primary classrooms in the USA. Teachers chose this virtual world because they could see an alignment with their learning objectives yet at the same time appreciated the flexibility of the environment and its support for social interaction.
Learners try to solve missions (quests) which may or may not be assigned by teachers.

### 3.5.3 Incorporating Games into Practice

Miller & Robertson (2010) report on the use of ‘brain training’ games in primary schools in Scotland. Set up as an experimental study they argue that regular use improves learners’ mental computation skills and self-esteem. However, arguably the use of games here was as a supplement to classroom practices and did not have any impact on the participating teachers’ pedagogies.

Groff, Howells & Cranmer (2010) provide an evaluation of Learning and Teaching Scotland’s Consolarium project which is designed to promote the use of console games in the classroom. The use of games is perceived to be engaging but require careful planning. Participating teachers were prepared to change their classroom practices in order to incorporate game-based learning effectively. Teachers felt that the benefits included “teamwork and skills for life, including problem-solving, communication, collaboration and negotiation” (p.39). They also perceived that they became more of a facilitator in the classroom than they had been prior to using console games. Games including Nintendogs, Guitar Hero, Endless Ocean, Gardening Mama and Cooking Mama, were used to support cross-curricular and literacy projects.

Partington (2010), as a classroom teacher, describes the use of game authoring to develop media literacy skills in a UK secondary school with 12-13 year olds. He provides insights as a classroom teacher into the process of developing and refining a ‘course’ delivered through 2 lessons a week over 9 weeks, drawing on the digital cultures of his pupils. It involved playing commercial games, producing posters representing learner’s personal experiences with games outside school, working in teams to create games for each other, peer assessment and reflection on what had been learned.

Barendregt & Bekker (2010) reported on a study of educational computer games to support English language learning in The Netherlands, comparing learners’ use in school and at home. The internet-based game was presented as a game world with quests and mini activities in order to ‘find’ 91 English words to fill a dictionary. The game was positioned by its developers as an ‘informal learning activity’ but clearly recognised by learners as relating to formal education and hence not many of them chose to play it in their own time at home.

Vos, van der Meijden & Denessen (2011) compared primary school students who created their own ‘drag and drop’ games with those who used existing games to support the same learning objective (to learn a Dutch proverb). Students who created their own games were more motivated and exhibited deeper strategies developing problem solving, critical analysis and thinking skills. However, this study did not provide evidence of impact on learning outcomes and the authors acknowledge that the existing games may not have been challenging enough.
Charsky & Resler (2010) explored the use of concept maps as a conceptual tool to be used alongside the use of a commercial game in history in order to enhance the educational value of the games playing. However, learners in the control group were more motivated and engaged than those with an expert-generated concept map and those learners required to produce their own concept map.

Watson, Mong & Harris (2010) reported on a study of an education game designed to teach about World War 2. The use of the game resulted in an active student-centred approach with learners more engaged and motivated rather than a teacher-centred passive approach. The teacher had incorporated the game into the classroom pedagogy over a number of years and had adopted strategies to maximise the effectiveness of its use. Shifts included moving from large groups to pairs, encouraging face-to-face interaction around gaming strategies rather than restricting this to the online game environment, and the framing activities around the game including linking the outcomes to formal assessment. During game play the teacher interacted with the students, not only in relation to technical issues, but also to scaffold learning opportunities.

Phillips (2010) describes the use of handheld games consoles in a secondary school which was supported through the creation of a new post – a learning technologist (also a trained teacher) – who worked with teaching staff to turn ideas into purposeful activities. PSPs were used in different subject areas as devices to capture, analyse and review audio and video, creating multimedia texts/portfolios to support project work or self-assessment of performance. Teachers felt that the technology supported new approaches in the classroom, and had an impact on both motivation and attainment.
4 PART 2: COUNTRY SUMMARIES

4.1 DIFFERENT PATTERNS OF ADOPTION ACROSS EUROPE

The use of ICT in education has evolved rapidly over the last ten years. Recent studies documented by EACEA Eurydice (2011) have mapped these developments in schools across the European Union in light of evolving national policies and practices.

By 2009, the percentage of households that allowed children access to computers and the Internet had increased in all countries. Recent research data from PISA has indicated that computers are used by students within the home environment primarily for entertainment and seldom for school work.

The following table shows this computer usage for students at Year 4 and then again at Year 8:

<table>
<thead>
<tr>
<th>Country</th>
<th>Y4 % using computers at home</th>
<th>Y8 % using computers at home</th>
<th>Y4 % using computers at school</th>
<th>Y8 % using computers at school</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU Average</td>
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<td>92.4</td>
<td>60.7</td>
<td>68.1</td>
</tr>
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<td>x</td>
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<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
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<td>51.1</td>
<td>84.4</td>
</tr>
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<td>37.5</td>
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</tr>
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<td>x</td>
<td>x</td>
</tr>
<tr>
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<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
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<td>x</td>
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<td>x</td>
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<tr>
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<td>42.9</td>
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<tr>
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<td>83.2</td>
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<td>Poland</td>
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<td>x</td>
<td>x</td>
<td>x</td>
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</tr>
<tr>
<td>Iceland</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>
X represents countries which did not take part in the survey. Data taken from EACEA Eurydice (2011, p.23, original source: IEA, TIMSS 2007 database).

In respect of specific activities, the PISA (2009) study found that many students browse the Internet for fun twice as much than they use it for schoolwork (83% as opposed to 46% respectively). It found a similar trend for email, with 67% of students using email regularly (i.e. at least once per week) but only 37% using it for school-related activities.

Although ICT as a subject or as a specific set of tools that facilitate learning is recognised and recommended in nearly every European country, there is a broad range of practice at the level of individual schools and classrooms.

As we can also see, computer usage in the school in most countries is much less than in the home. In most cases there seems to be a slight increase in usage from Years 4 to 8 which our anecdotal data would support.

But this overall statistical data does not tell the whole story. In some countries, ICT is identified as a separate curriculum subject and taught in a discrete way. In others, ICT is included within another technology subject (e.g. Design & Technology). And in other countries, ICT is considered as a general tool and adopted, almost in a cross-curricular way, within other subjects in the curriculum. The following figure from the EACEA Eurydice (2011, p40) report, drawing on data from curricula and policy documents, shows these three trends in more detail:
In terms of the technology that is available to individual schools and their students, recent studies (EACEA Eurydice, 2011; PISA, 2009) have shown that across the European Union at least 50% of students are in schools where one computer is available for every two students. The following table drawn from the Eurydice research (2011, p.76) provides us with the most recent analysis of student/computer ratios (EU average is 2.15):

<table>
<thead>
<tr>
<th>Country</th>
<th>Student/Computer ratios</th>
<th>Country</th>
<th>Student/Computer ratios</th>
</tr>
</thead>
<tbody>
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The processes of training teachers in the use of technology vary from country to country. The standard division between initial teacher education (normally done by universities often in partnership with schools) and continuing professional development is noted in much of the literature. The regulations in more than half of the European countries ensure that the knowledge and skills required to use ICT effectively within processes of teaching and learning is included for all teachers as part of their initial teacher education. However, many countries give their higher education institutions autonomy in respect of the decision whether or not to include ICT. All countries, except Denmark and Iceland, have reported that the development of teachers’ ICT is included within nationwide, centrally promoted, programmes for continuing professional development.

This brief overview of the EACEA Eurydice (2011) and PISA (2009) data has set the scene for more in-depth country analysis of the use of ICT in education within the iTEC partner and associate countries, as well as other countries for which up-to-date data is readily available (The Netherlands, Cyprus). Each country is explored in turn, and further literature sources are provided for those readers who want to follow up in more detail about specific countries.
4.2 ITEC KNOWLEDGE MAP: AUSTRIA

4.2.1 Key Groups

The Ministry of Education, part of the Federal Authority in Austria, is the main educational body. During 2000 – 2008 it undertook an initiative of consolidating the implementation of new technology in education. This took a number of forms, including:

- **eFit (2000-2006)**, a funding mechanism from the Ministry of Education which helped to launch innovative ideas and projects concerning ICT in education. Efit helped to consolidate and fund the implementation of new media across the education sector and spawned two companion projects (eContent and eLearning Cluster – see below);
- **eContent**, the development of teaching/learning software and e-learning materials (further details below);
- **eLearning Cluster initiative** developed pilot schools in each of the Austrian provinces which collaborated together in clusters to implement practical models of eLearning (further details below);
- **Future Learning Program (2007-2010)**, an initiative that supported new forms of teaching and learning using ICT in education, especially forms that moved away from traditional teacher-centred classrooms towards a more individual learning pathway approach. This included the development of the 'Edumoodle' program which provided all schools with access to a free VLE;
- **IWB development**, which has spread across some schools (a survey in 2007/08 found that 21% of state schools were equipped with IWB).

Several of these initiatives are worthy of further comment. Firstly, eLearning Cluster Austria is a network of clustered schools that work together to offer their students and teachers certified qualifications in IT and e-learning skills and knowledge. Secondly, the eLSA eLearning Project has funded a number of middle schools (students aged between 10 – 15) and provided a high level of up-to-date ICT infrastructure. This has a very positive impact on teachers 'new media competence. Thirdly, the Virtual School Austria, run in collaboration with the European Schoolnet, has been an important portal of ICT educational projects. It has become the centre for interdisciplinary ICT projects across Austria, leading to further e-content development and an exemplar of good practice for other educators.

Finally, the Future Learning Program has fostered a new concept of ICT linked to Web 2.0 technologies. The use of IWB has accompanied this program, but these are mainly focused in secondary education and adoption is slow. The Future Learning Program targets young people aged between 6 – 19, adult learners, teachers and other target groups (e.g. isolated children and children in hospitals). The various strands of activity include:

- Digital content and ICT services;
- Social software and Web 2.0 within the school setting;
- New equipment including laptops, mobile phones for learning, PDAs, iPods;
• Teacher training including e-learning didactic course, online academies;
• Equipment guidelines and initiatives for schools;
• Developing networks within other groups outside the immediate educational context (e.g. the Ars Electronica Centre in Linz).

The overall computer per pupil ratio in Austrian schools is 16:100 and 59% of schools have broadband (STEPS, 2009).

4.2.2 The Current Curriculum Context for ICT

ICT is taught in a cross-curricular way and should be part of all curriculum subjects. Most schools do not have specific ICT projects but integrate ICT as part of a route of ongoing educational activities. Typical applications of ICT include the use of information search tools, word processing, audio, video and administrative tools.

There has been a lack of engagement at a policy level relating to other ICT functionality within education. For example, computer gaming, the use of IWB, mind-mapping and other social software is generally underdeveloped in Austrian schools although things are developing slowly, especially within the secondary phase of education. The secondary school curriculum specifies professional as well as social competencies, such as self-management, self-directed learning, and ability to collaborate and to take responsibility. ICT is taught as a separate subject (Network Technologies), although it is not compulsory and therefore not offered by all schools (OECD, 2009, p24).

Computer Science is a compulsory subject in the fifth year of all schools. It is taught in two lessons each week. More generally, ICT supports teaching and learning in each curriculum subject at each phase. The initiatives outlined above all feature a clear subject component that the use of ICT as a tool for teaching and learning can support.

4.2.3 ICT Usage in the School

Research shows that computers are used by 88% of teachers in Austrian primary schools. Of these teachers, 59% of them use computers in class for presentation or demonstration; 97% of them have pupils working with computers during their classes.

Almost all (99%) Austrian primary schools have access to computers within the school and are connected to the Internet.

Primary school teachers in Austrian are broadly supportive about the use of ICT when compared to other European countries. However, they are amongst the most sceptical about the impact that ICT can have on a child's learning. This should not be mistaken for utter scepticism. Rather, research points to these teachers having a balanced attitude profile (STEPS, 2009, p4). Austrian teachers 'somewhat agree' rather than 'strongly agree' about the motivational effects of ICT on pupils.
The vast majority of Austrian primary school teachers feel confident about their use of ICT (87%). Around 11% can be classified as novice ICT users.

In terms of barriers to the further use of ICT within this part of the Austrian educational sector, the following issues have been identified by some teachers:

- Dissatisfaction with the internet connection speed (29%);
- A lack of computers (31%) and associated maintenance and support of the ICT infrastructure within the school (62%);
- Difficulty in finding adequate learning materials for teaching (19%);
- Lack of quality learning materials (20%).

4.2.4 Digital Learning Resources

The development of digital learning resources has been helped by specific Government funded projects such as the eContent Initiative. Within this, teaching and learning software, alongside other eLearning materials, have been developed and distributed through networks under the control of provincial (federal) groups, independent subject-focused groups and individual schools. There seems to have been a significant collaboration between teachers, developers and publishers in this initiative. It is hoped that half the classes in Austrian schools will be provided with eLearning materials in all subjects by the end of 2010.

The Ministry of Education's education portal (www.bildung.at and http://bildungspool.bildung.at) provides a 'one-stop-shop' for all matters related to using ICT in education. This is set to undergo further development over the next few years to become an 'eContent clearing house' that will offer a broad range of quality web-based educational content for teachers and students.

The 'Education Highway' is another important portal with more than 36 various subjects (http://www.eduhi.at/index.php?changeurlto=gegenstaende), an informatics specific portal (www.informatikserver.at) with advisors on open source solutions, and a platform to teach government related issues (www.edugov.gv.at).

The national development of the Edumoodle program has shown that VLEs are in great demand in Austrian schools. The free Edumoodle VLE has been taken up by many schools (with ILIAS and dotLRN being popular in two other Länder); 1200 further school locations are currently being developed.

4.2.5 Other Issues

The establishment of an eLearning strategy group in 2007 has considered new forms of teacher education which include e-Coaching and EPICT. The 2009/10 European Schoolnet report discusses the launch of a pilot program that may lead to the implementation of the European Pedagogical ICT License (EPICT) across Austria.
4.2.6 Innovative Practice

In order to describe innovative practice in this country, National Pedagogical Coordinators have been asked to specify 3-4 criteria against which they would judge innovative practice and also to describe innovative practitioners who are making exemplary uses of ICT.

The three criteria against which innovative practice might be judged in Austria are as follows.

1. Using an e-learning web site or a blended learning platform for everyday work.

2. Using interactive learning features including an interactive whiteboard or beamer.

3. Sharing content with other students (including international students) beyond the classroom or school through for example social networking tools such as blogs and wikis more than once a month.

In Austria a lot of teachers have experience with national ICT projects. The main goal over the next few years should be to develop students’ use of interactive whiteboards. The main pedagogical issue will be the change of focus from "teacher-centred work" to "student-organised modules". This should involve using the Internet for collecting information and evaluation/rating of learning resources. Content should be shared beyond the school walls via ICT, for example through Skype, and the use of IWBs and smartphones in the classroom. The use of "modules" to provide specialised education on the second level education (in Austria at the age of 14 to 18) will be another very important topic for the next years.

4.2.7 Key Sources


4.3 ITEC KNOWLEDGE MAP: BELGIUM

4.3.1 Key Groups

The Flemish Ministry of Education and Training is responsible for funding schools, developing educational attainment targets, checking that these targets are reached and developing/running specific projects according to contemporary policy or societal requirements.

The four Educational School Networks (ESN) act as the representative association for each individual school's governing body. They are responsible for pedagogical and organisational issues such as curriculum development, timetabling, school support, etc. Each network, along with each school, is largely autonomous.

In recent years, the central authorities have stressed three goals in relation to ICT in schools:

- Providing infrastructure;
- Delivering training;
- Supporting schools.

4.3.2 The Current Curriculum Context for ICT

The ICT curriculum provides the general framework ICT in Flemish schools. However, in line with the autonomy outlined above, each ESN, or individual school, can decide for themselves how these competencies are taught and, fundamentally, what the principles of a digital 'pedagogy' might be.

Generally, ICT competencies are taught through the daily classroom activities. A set of cross-curricular 'final' and 'developmental' ICT objectives were implemented across all schools in September 2007. These objectives were seen as challenging. Therefore, the Flemish Government has developed a five-point implementation policy to help support the education system, as a whole, in their use of ICT. The five points are to:

- Strengthen the policy-making capacities of educational establishments at institutional level;
- Promote the professionalism of educational staff;
- Provide a high-quality infrastructure;
- Develop a suitable teaching aid policy;
- Research and ICT monitoring.

Within the curriculum itself, ICT is a separate subject in secondary education but not in primary education. The ICT-related cross-curricular final objectives and developmental objectives (referred to above) are designed to be employed in primary education and/or the first level of secondary education. This cross-curricular dimension is important. The aim is not to create a separate 'subject' at primary level. Rather, ICT is seen as providing opportunities within all subjects and fields of study.
The individual class teacher is responsible for examining each pupil in light of these objectives.

In secondary education these skills are included in the cross-curricular themes:

- Learning to learn;
- Social skills;
- Citizenship;
- Health education;
- Environmental education;
- Expressive-creative education;
- Technical/technological education.

Changes to the cross-curricular part of the core curriculum, with a particular focus on key competencies, will be introduced in 2010. Schools decide themselves how to achieve the cross-curricular objectives; there are no guidelines or models from the Ministry. Similarly, there is no assessment of these skills, although the inspectorate ensures that sufficient efforts are made by the school in order to fulfil the cross-curricular objectives during school audits (OECD, 2010, p24).

At the second level of secondary education, ICT becomes a more specific set of components and does, in the traditional sense, become an individual subject.

4.3.3 ICT Usage in the School

There are 2,505 primary schools in Belgium that pupils attend between the ages of 6 to 12. As we have seen above, digital competence is a cross-curricular competence in two out of the three language communities (Flemish and German speaking); in the French speaking community it is integrated within the subject ‘education and the media’ and taught through specific pieces of software. In primary schools some 21st century skills are included in the core curriculum either as concrete objectives or as broader goals or underlying principles.

Primary school teachers in Belgium have good or very good ICT user skills and only 9% can be classified as novice ICT users. The computer/pupil ration is 7.7/100 and 69.3% of schools have a broadband connection.

Recent research (STEPS, 2009) has reported that 67% of teachers use computers regularly within their classrooms. Of these, 70% of teachers make use of the computer themselves (e.g. to demonstrate or present something) whilst 93% of this group regularly allow pupils to use computers for particular sequences of learning within the classroom.
Teachers in Belgium access learning materials from school networks in line with the European average, but make more use of offline material (85%) than teachers in other countries.

Whilst nearly all of the primary schools in Belgium surveyed within the STEPS (2009) research used computers at some point for teaching and learning activities, they were generally ranked towards the middle in terms of specific ICT usage and equipment items. For example, 61% of schools have a website, 58% offer email to teachers and only 16% offered email to their pupils.

Like teachers in Austria, Iceland, France and Luxembourg, teachers in primary schools across Belgium are generally supportive of ICT but amongst the most sceptical about its benefits, in particular in respect of the motivational effects for pupils that ICT can bring in the classroom.

Teachers in this sector have identified a range of barriers that affect the use of ICT (STEPS, 2009, p4). These include:

- Dissatisfaction with the internet connection speed (25%);
- Requiring better technical maintenance and support of ICT within school (77%);
- Teachers lacking sufficient computer skills (59%);
- Difficulty in finding adequate learning materials for teaching (45%).

The MICTIVO study (2010) confirms these barriers. It demonstrated that the computers within schools are more often used to present and search for information than for other curriculum tasks. 20% of pupils said that they used the computer only several times a year. Only 28% students (primary school) and 48% (secondary school) mentioned that they used the computer regularly in a week. Whilst 3% used the computer daily in the classroom, 15% of the pupils use the computer for their homework at home. The infrastructure at home seems better than that within the school.

Tondeur's study (2008) tested the determinants of educational computer use in 68 primary schools across Belgium. In particular, the research focused on teacher and school characteristics that are associated with different types of computer use by primary school teachers. Besides the importance of school characteristics, the results reveal differential effects of particular characteristics on particular types of computer use. Cultural school characteristics for instance, such as the schools’ openness to change and the availability of an ICT school policy plan, are positively related to the use of computers as a learning tool and to the adoption of ICT in view of basic computer skills. In contrast, no cultural school characteristic seems to be associated with the use of computers as an information tool. In a comparable way, the research explored how teacher characteristics are associated with particular types of computer use, e.g. the gender. In general, male teachers reported integrating computers more often. In this study, it appears that gender differences only exist in relation to the adoption of computers as an information tool. The results demonstrated that a multi-
dimensional approach provides more insight into the characteristics affecting computer use.

The focus on media and non-computer ICT (the use of iPods, cameras, voice recorders, etc) has got more attention recently. While the infrastructure in the MICTIVO (2010) is seen as old and not up to date, some schools since 2010 have begun to provide each of their students with their own netbook.

### 4.3.4 Digital Learning Resources

The Ministry of Education has not engaged specifically in software development, but has invested heavily in providing a 'program matrix' which presents an overview of commercial software linked to curriculum attainment targets and a central database of secondary school software.

Digital Learning Resources are developed through a Government policy on the development of educational software. The first stage hands over responsibility to educational publishers to develop materials that 'flesh out' the curricula. At a second stage, the Government may take action to develop resources in areas where there is a lack of content (e.g. in recent years this has included special needs education). The policy also encourages teachers, other artistic and heritage organisations, commercial and open-source developers to contribute to the production of high quality educational resources.

One of the key projects in recent years has been the development of an educational portal which acts as a central point for educational information and support in the use of ICT. It includes examples of good practice and is organised thematically. The portal allows individual teachers, alongside other publishers, to share their own digital resources. The portal can be found at: [www.klascement.net](http://www.klascement.net). This year, new portals have been developed including: [www.knooppunt.be](http://www.knooppunt.be) and [www.bingels.be](http://www.bingels.be).

Smartschool is the most widely used VLE. It is a local, commercial tool. Some Catholic schools make use of EloV. Open source products such as Moodle are used less frequently.

### 4.3.5 Other Issues

Valcke's study (Valcke et al 2007) explored the approach to ICT teacher training in Flanders. It focused on two main questions:

- What is the validity of the content and format of the teacher training?
- To what extent is the ICT teacher training linked to the policies of schools?

In-depth interviews were organised with respondents of primary, secondary, and adult education schools. The results indicated that ICT school policies are not well developed and revealed a partial match between policies, needs, and the actual in-service training. Innovative applications of ICT were not promoted.
In response to these findings, the Klascement portal makes use of Web 2.0 technologies. This has also been a specific theme in in-service training for teachers since 2007. It has resulted in a significant amount of user-generated content, along with the rating and commenting on existing content by the users themselves. The free blog service 'Classy' has also been offered to schools, teachers and students.

Teacher education in Belgium currently comprises of a set of basic competences which subsume the use of ICT. There are not specific ICT competencies at this stage of training. The EduBIT project focuses on the role of the ICT coordinator. Their research showed that the ICT infrastructure of a school and the technical competencies of the ICT coordinator are two major determinants of the successful adoption of ICT practice within the school.

### 4.3.6 Innovative Practice

In order to describe innovative practice in this country, National Pedagogical Coordinators have been asked to specify 3-4 criteria against which they would judge innovative practice and also to describe innovative practitioners who are making exemplary uses of ICT.

The three criteria against which innovative practice might be judged in Belgium are as follows:

1. The used technology ameliorates a classic way (it presents better) of education.
2. Technology makes learning more learner-centred without losing a social dimension (also facilitating learning beyond the classroom).
3. There is community where teachers can try out new technologies in a collaborative and supportive network. The community enables teachers to share their ideas and offer advice to each other; a place where they can share their experiences in a systematic way. Evaluations of the technologies that are used take place and include children in the process.

Innovative practitioners can maximise the potential learning benefits with a minimum investment in technologies whilst addressing pedagogical challenges. Sometimes the simplest ideas with basic (and cheap) technologies can be the most effective. They know how to use technology in a creative and adapted way with respect for individual skills. They use new technology only when it ameliorates the traditional educational process. They have confidence to try out new technologies.

### 4.3.7 Key Sources


4.4 ITEC KNOWLEDGE MAP: CZECH REPUBLIC

4.4.1 Key Groups

The Ministry of Education, Youth and Sport has overall responsibility for the educational system in the Czech Republic. ICT is included with the Framework Educational Programmes for primary and secondary levels of education. Working through fourteen regional authorities, each school has a responsibility to devise an ICT plan and implement this within their teaching. Each school's work in this area is evaluated by the Czech School Inspectorate.

The 'National Strategy for ICT in Education' was drawn up by the Ministry of Education, Youth and Sport and completed in 2006. The key strands of this programme were to:

5. Increase the accessibility of ICT, namely infrastructure for schools and general public, in particular for targeted citizen groups;
6. Support the establishment of a corresponding offer of information literacy programmes and opportunities for electronic education;
7. Develop information literacy, motivation and confidence in electronic communication with the government and local government authorities;
8. Create and raise confidence in electronic content and services, as part of increasing information literacy;
9. Co-ordinate individual government departments' initiatives and co-operation on projects.

There was no official evaluation of the programme. Unofficial appraisals of the impact of the programme by the Czech media were negative, often focusing on allegations of corruption and inefficient investment. However, the programme did allow schools to finance internet connections, order hardware and software and conduct some teacher training. Through these activities, schools were able to set their own ICT policies and curricula in line with national standards.

The current Ministry of Education strategy is called 'A Strategy for ICT Development in Education 2009-2013'. This strategy contains nine key programmes designed to support the use of ICT in education in all schools. The main support programmes for primary schools, secondary schools, colleges and music academies are:

10. Connectivity Programme – support for high-speed internet connection by MoEYS as a basic condition for the further development of ICT usage at schools;
11. Infrastructure Programme;
12. Programme of support for teachers' education in the field of ICT usage in lessons;
13. Monitoring Programme;
14. Quality Management Programme;
15. Entrance Exams Management Support Programme;
16. Results in Education Programme;
17. Integration into the Concept of eGON Programme
- a strategy plan for eGovernment in all national sectors;
18. Portal for Education.

4.4.2 The Current Curriculum Context for ICT

In accordance with these policies and strategies, a new curriculum for the education of pupils aged between 3 and 19 has been introduced. This curriculum is based on an educational strategy that emphasises key competences, their interconnection and application to real life scenarios.

The educational content of the elementary education programme has been divided into nine main areas, of which Information and Communication Technologies is one area. This area is divided into a range of pupil competences in three main stages, with each competence defined under the following three main headings:

19. The basics of working with a computer;
20. Information searching and communication;
21. Information processing and application.

4.4.3 ICT in the Primary School

There are around 3,700 primary schools in the Czech Republic. Just over one third of these are in remote locations. The subject 'informatics' is compulsory in the primary phase. Whilst each school is essentially independent, it has to comply with the national curriculum set by the Ministry of Education. ICT is both taught as a separate subject and used to support other subjects.

The computer per pupil ration is 1:12 within these schools. The vast majority of schools (over 80%) also have broadband internet access. Fewer schools (around 30%) have access to a virtual learning environment.

With respect to the usage of computers within the classroom environment, the Czech Republic ranks 11th in Europe. 73% of teachers use computers to present and demonstrate key information or learning processes in their classrooms; 81% of teachers have pupils working with computers on a regular basis.

Around 83% of Czech teachers have good or very good ICT user skills. Only 5% reported have no or very little ICT user skills (12% can be counted as novices in this area).

The 'Special Report about the Usage of ICT at Primary Schools' (2005) summarised inspection surveys carried out by the Czech School Inspection in May 2005 at randomly selected primary schools. The focus was on establishing how ICT is used in non-ICT subjects (i.e. Czech, English, history, mathematics etc, as opposed to subjects such as informatics). It also looked at how frequently, and for what
purposes, ICT is used in school.

The study found that:

22. The use of ICT in non-ICT subjects is very low;
23. ICT is, however, used frequently in ICT subjects and during free time by both pupils and teachers.

Reasons for low use of ICT in non-ICT subjects included:

24. Computers concentrated in special computer labs rather than in “normal” classrooms;
25. Low motivation for non-ICT teachers to work with ICT;
26. Teachers’ low level of didactic skills needed to work with ICT in their subject area
27. Few educational resources available to use in class.

The 'Usage of ICT at Schools in the Last Two Years' study, published in 2008, aimed to establish the level of progress in ICT implementation at primary and secondary schools during the preceding two years. The study was conducted at a time of great political change, but data was collected from 513 schools using interviews and lesson observations. Respondents included head teachers, ICT teachers, subject teachers and pupils.

The study found that, when compared with data from previous surveys in 2005 and 2006:

28. There is more extensive usage of ICT in schools.
29. Schools have better prepared curricular documents and ICT plans, and these are important for effective ICT implementation.
30. Teachers have a greater interest in training to enhance their ICT skills and the didactics of education with ICT support.
31. Head teachers and teachers have a greater interest in innovation processes using ICT (against a backdrop of limited economic resources).
32. Teachers have a greater interest in preparing their own electronic educational content.
33. There is an increased awareness that ICT usage at school is attractive for pupils (and parents, for example for finding and selecting schools).
4.4.4 Digital Learning Resources

The content development of educational resources is supported and controlled by the Ministry of Education. There is a central reviewing system for textbooks and learning resources. Any publisher wanting to gain approval for creating learning resources for use within the state education system is required to gain an approval stamp for each book according to firmly set rules.

Specifically, in terms of digital learning resources, the teachers’ portal (http://rvp.cz/) is primarily targeted at the curricular reform outlined above and contains only evaluated materials. Apart from this project, there are several projects focusing on specific areas. The portal Veskole.cz focuses on IWB and Metodik.cz offers pedagogical e-learning support.

There are also a number of examples of regional and school projects which collect digital content on a local basis. To this date, no system, evaluation or rules for sharing digital educational content has been introduced in the Czech Republic.

Despite this, digital content and online services have become integral parts of modern education in schools and their importance is constantly rising. Czech teachers access a range of learning materials to help support their teaching. They make of school networks, when available, to access resources, but some studies (European Schoolnet 2010) indicated that they made little use of teaching materials from established online sources. Around one third of teachers reported that they found it hard to find adequate learning materials, and a similar number think existing material is of poor quality.

4.4.5 Other Issues

One of the main issues facing the Czech Republic education system is how to finance the provision of ICT equipment in schools.

4.4.6 Innovative Practice

In order to describe innovative practice in this country, National Pedagogical Co-ordinators have been asked to specify 3-4 criteria against which they would judge innovative practice and also to describe innovative practitioners who are making exemplary uses of ICT.

The three criteria against which innovative practice might be judged in the Czech Republic are as follows:

1. Use ICT to develop active and independent learners.
2. Use similar ICT tools as pupils use outside the school and use them to the same extent.
3. Use ICT to connect the real world with the classroom (inquiry based learning).

Innovative teachers:
• use a virtual learning platform/social network that enables pupils and teachers to share different educational content (results, essays, blogs, useful links etc.) and to actively involve pupils in the learning process;

• use a wider range of current technology than just the PC and internet (mobile phones, GPS, camera, 1:1 computing etc.);

• make active use of technology every day in all subjects, not only the "information technology class";

• use, create and share digital learning resources;

• share their professional experience with others, are members of virtual national or international communities of practice etc.;

• use ICT for international cooperation (for example eTwinning).

4.4.7 Key Sources


Special report about usage of ICT at primary schools (2005). Praha, Czech Republic: Česká školní inspekce. Available from: www.csicr.cz/upload/1.%20U%C5%BEit%C3%AD%20ICT%20ve%20%C3%A1kol%C3%A1ch%20za%20uplynul%C3%A9%20dva%20roky.pdf


Usage of ICT at schools in last two years (Praha, Czech Republic: ěská školní inspekce. Available from: www.csicr.cz/upload/1.%20U%C5%BEit%C3%AD%20ICT%20ve%20%C3%A1kol%C3%A1ch%20za%20uplynul%C3%A9%20dva%20roky.pdf
4.5  ITEC KNOWLEDGE MAP: ESTONIA

4.5.1  Key Groups

There are three main groups responsible for ICT in schools in Estonia. These are:

- The Ministry of Education;
- Universities;
- The Tiger Leap Foundation.

Simply speaking, the Ministry of Education is responsible for strategy, the legal framework, ICT infrastructure and initiating research. The universities are responsible for developing the initial teacher training curriculum and providing Master's level frameworks for continuing professional development.

Practical implementation of the Ministry of Education's plans for ICT is delegated to the Tiger Leap Foundation. This foundation has a broad range of responsibilities. These include:

- Creating a repository of virtual learning resources;
- Supporting schools in web-based projects;
- Developing innovative learning environments;
- Supporting new and in-service teachers in their use of ICT;
- Developing conference opportunities and running campaigns (e.g. on internet safety);
- Supporting the development of educational resources.

The Tiger Leap programme was launched by the Estonian Government in 1997. Its principle aim is to improve the quality of Estonian school education through the use of ICT. Two previous phases of the programme have been completed (in 1997-2000 and 2001-2005). The focus of the 2006-2009 development plan was on eLearning and the development of various eLearning-related content services. It aimed to increase the quality of the curriculum and its effectiveness through the use of ICT and by introducing eLearning as a part of daily classroom activities.

In 2008 the Ministry of Education launched the 'Laptops for Teachers' programme. This saw 4,000 teachers receive a laptop (out of 15,000). A smaller scale 'Laptops for Students' programme took place in five schools (with one class in each school receiving laptops to be used during one school year).

At the present time, there is no school-related ICT policy work taking place. However, the Tiger Leap Foundation has a plan for work across 2010-2013. This will cover the following key areas:

- ICT in science education;
- Robotics;
- Virtual schools, including a learning resource repository, VLE, web-based tools for creating content, teachers' virtual networks;
4.5.2 The Current Curriculum Context for ICT

There have been major reforms of the curriculum in Estonia over the last few years. This year (2010) saw the launch of a new curriculum across all schools. It gives greater flexibility in choice of subjects, with fewer compulsory subjects. Although ICT is seen as a separate subject within this curriculum, it is also conceptualised as a tool which spans across curriculum subjects. The balance between ICT as a core subject in its own right, and the cross-curricular use of ICT, has been something that Estonian educational policy has considered on many occasions (Plomp et al 2009, p285). It tends to err on the side of a specific curriculum subject rather than cross-curricular usage. A report by the European Commission in 2006 saw this as a trend in new member states (European Commission, 2006).

Specifically, the new K-12 curriculum divides students' ICT competencies into four main levels. For example, a Level 1 student would be able to 'prepare and store user generated/self-created content in a computer; a Level 3 student would be able to 'collect and systematise data and perform simple statistical analysis'. At Level 4 (high school) the ICT competencies are developed through group-work scenarios based within research or development projects, where possible in collaboration with local technology firms or research centres. Part of the rationale for this is to develop a positive student attitude towards technological innovation and related career possibilities.

It is important to note that individual schools have a considerable degree of autonomy in respect of these matters, including the type of ICT infrastructure that they provide and the type of curriculum they offer.

Reiska's study (Reiska, 2009) has investigated this in more detail. In particular, it aimed to discover and describe the differences in schools' approaches to teaching and learning integrated themes, especially ICT. Through questionnaires to 67 schools (with pupils aged between 9 and 15), and detailed qualitative research within six of these, Reiska reported the following key findings:

- ICT is generally regarded as a separate subject and individual subject lessons that use ICT are rare;
- Subject teachers do not assess ICT skills. These are taught and assessed in ICT lessons by ICT teachers;
- There is some evidence that ICT promotes new teaching methods, but only in cases where ICT is fully and successfully integrated into subject lessons;
- Students feel that their ICT Skills are mainly developed outside of the school;
- Students' motivation is high, and they want to learn more ICT than most schools in this sector (upper primary/lower secondary) are willing to teach;
- ICT integration into subjects is the key way to transforming teaching practices;
School managers are not encouraging the integration of ICT into the curriculum;

Many teachers believe that old methods are better and provide good results (Estonia holds the top 10 places in the international PISA test in various subjects);

Students are ahead of their schools when it comes to ICT skills and willingness to use ICT;

There is a growing gap between the ICT experiences that schools offer and the demands of the work place.

### 4.5.3 ICT Usage in the School

The STEPS (2009) report has analysed in some detail the use of ICT within Estonian primary schools. Here, 61% of teachers make regular use of computers in their classes, with 85% of teachers using them for presentational purposes or for demonstrations of various types, and 89% of them regularly allowing pupils to use them within their learning.

Estonian primary school teachers access learning materials from school networks broadly in line with teachers from other surveyed countries. However, they make significantly less use of offline materials. Estonian teachers are amongst the most frequent users of self-research materials from the Internet.

Almost all Estonian primary schools use computers for learning and have internet access. Estonia was ranked highest across Europe (96%) for schools connected to the Internet via a broadband connection.

In terms of the impact of ICT on students' learning, Estonian primary school teachers were amongst the most optimistic, with the vast majority (91%) agreeing with the statement that 'pupils are more motivated and attentive when computers and the internet are used in class'; and 84% of teachers disagreed with the statement that 'using computers in class does not have significant learning benefits for pupils'.

In terms of their individual skill with ICT, 79% of Estonian primary level teachers have good or very good ICT skills. Only 13% were classified as being novice ICT users.

Estonian primary school teachers expressed the lowest levels of concerns related to potential barriers to ICT use in their schools (STEPS, 2009, p4). Whilst 68% would prefer better technical maintenance and support, 80% were satisfied with the speed of the internet connection and 70% agreed that their school was well-equipped with computers.

Finally in this section, Uibu & Kikas (2008) conducted a qualitative study to explore the role and impact of ICT on the instructional process within primary schools in Estonia. According to their results, some of the teachers' roles were similar whether they were delivering a traditional as opposed to a computer-aided lesson. Other roles
were easier to perform with ICT and some new roles had emerged once ICT had been embedded within the school. For example,

*All the interviewed teachers confirmed that introducing ICT into their teaching had not brought about any essential changes in their roles, but admitted that the proportions of their role related activities and tasks had changed (Uibu & Kikas, 2008, p18)*

But there were implications for the preparation of teaching materials noted by Uibu and Kikas:

*Nearly all the teachers emphasised that an enormous amount of new material had brought about the necessity to fulfil new tasks—to assess the authenticity of the materials and aptness to the students’ age. (ibid, p.19)*

In conclusion, they state that:

*The teachers who regularly used ICT in their work did not think that the very nature of the teachers’ role had changed, however, they brought out that ICT had made some of their tasks easier, while at the same time increasing their workload. At least partly, their conceptions of teaching were in accordance with the traditional teacher-centred education. Similarly, Blom and her colleagues (2001) noted that the use of ICT offers new options to make lessons more varied and effective, but this is not enough to change the nature of learning. (ibid, p20)*

4.5.4 Digital Learning Resources

The Tiger Leap Foundation promotes various open source initiatives. The recent Schoolnet report indicates that in 2009 there were over 3,000 groups of study materials created and shared by teachers or groups of teachers. There were no initiatives in place to produce materials with commercial publishers. The Tiger Leap Foundation provides funding for some of this type of learning resource development. There is also a private firm, Miksike, which produces materials for the primary education sector. Many of these resources are freely available to Estonian teachers, with much of the training delivered by the Tiger Leap Foundation through Web 2.0 media such as wikis, Twitter and Moodle.

There is a range of learning platforms in use across Estonia. These include WebCT and Moodle, alongside university developed platforms such as IVA and VIKO. Educational administration for all schools is held within an online education database called EHIS. Students’ grades are stored and managed in the national central digital class register – e-Kool.

4.5.5 Other Issues

As ICT is not a compulsory subject within the curriculum, there is no official assessment scheme. Individual assessment frameworks are generated by individual
teachers. There is work being done by the National Examinations and Qualifications Centre to create an ICT-based examination for the country.

There is also no official system for monitoring or inspecting the progress of individual schools in relation to their adoption and use of ICT.

In terms of teachers and their level of ICT competency, the Estonian Government has a set of standards for teachers. However, there are no assessment accreditation schemes for teachers' ICT competencies and no official demand for integrating ICT in initial teacher education (universities are free to choose to integrate it or not). As seems to be the case in the majority of ICT school-related work in Estonia, the Tiger Leap Foundation has a significant network of trainers providing opportunities for teachers to develop their skills through courses, campaigns and competitions.

Ongoing developments in Estonia seem to be prioritising the development of ICT across the educational sector. The Estonian Development Fund was established by the Parliament of Estonia in order to consider the economic development and Estonia and how it could invest further in technological innovations. The 'ICT Foresight' project was one of three undertaken by this fund. The EST_IT@2018 report contained three main recommendations. The third of these contained a reference to the development of a roadmap for ICT development and implementation in six key areas, including education. It seems likely that there will be significant developments in the use of ICT in education within Estonia in the years between today and 2018.

4.5.6 Innovative Practice

The three criteria against which innovative practice might be judged in Estonia are:

1. The role of a teacher is changed. The teacher does not give right answers. He/she helps students to learn, investigate, and explore for example.

2. The students reflect their learning process using ICT.

3. Group work using web 2.0 tools takes place.

Innovative practitioners like changes and they are curious about new things (hardware, software, new methods). They participate in different workshops and usually they are educators themselves. Active learning methods are common in their lessons. Quite often they create learning materials and take part in different international projects.
4.5.7 Key Sources


4.6  ITEC KNOWLEDGE MAP: FINLAND

4.6.1  Key Groups

The Finnish education system comprises one year of pre-primary education followed by nine years of basic education (comprehensive school). The National Board of Education is responsible for education across Finland. As part of this role, they implement a national ICT strategy within all primary and secondary schools. All schools are required to construct their own ICT strategies in light of this national framework. Each municipality has autonomy in assessing their schools' requirements for ICT.

Generally, local education authorities and the schools themselves draw up their own curricula for basic education within the framework of the national core curriculum. The schools can develop their own profiles within these curricula arrangements (e.g. focusing on languages, mathematics, music and other areas). Teachers in Finland are nearly all qualified to Masters level.

4.6.2  The Current Curriculum Context for ICT

Over the last ten years there have been a number of initiatives that have affected the development of ICT in Finnish schools. One of these, OPE.FI, was launched in 2004. It aimed to improve the ICT skills of in-service teachers and other teaching personnel. There were three main stages. Stage one helped all teachers achieve mastery in basic ICT skills such as word processing, internet browsing and email. Stage 2 provided skills in using ICT for educational purposes. These included the use of generic tools, pedagogical applications and digital materials within each subject area. It also taught teachers how to produce their own digital learning materials. The final stage developed these approaches through specialised knowledge related to content-specific and professional applications, further production of digital learning materials, institutional management systems and the development of broader education support networks to cascade knowledge and skills.

In 2004 the Finnish Government adopted a resolution to provide broadband access to all schools by 2007. It provided financial assistance for the setting up of high-performance telecommunications in all schools and colleges.

ICT is not taught as a separate subject within the Finnish curriculum. But it does form an important part of, and should be embedded within, every subject that is taught.

The Finnish national core curriculum has the following cross-curricular themes:

- Personal growth;
- Cultural identity and internationalism;
- Media skills and communication;
- Citizenship and entrepreneurship;
- Environmental responsibility;
- Safety and traffic;
Technology and the individual.

Other skills and competencies are defined in the learning objectives and core content of education of the different subjects. The Finnish National Board of Education has published a guidebook for teachers on cross-curricular themes. Schools and teachers decide for themselves, however, how competencies are taught. There are currently no assessment regulations or guidelines on these 21st century skills and competencies.

The computer per pupil ratio across Finland is 14.3/100 and, as reported in the European Schoolnet STEPS report (2009), 76% of students currently have a broadband connection. Larger schools have dedicated computer laboratories but there are still very few interactive whiteboards. There are no schools without any ICT.

4.6.3 ICT Usage in the School

Access to computers in Finnish schools is very high. This is matched by an equally high degree of access to computers within the home environment. As an example, an OECD report in 2005 (OECD, 2005) found that over three-quarters of students said that they used computers at home on several occasions throughout the week. The same report found that 15 year-old students were using computers more frequently at home than they were at school. In both cases, recent years have seen a large increase in computer usage both within the school and home environment across Finland.

Within the primary schools in Finland, 88% of teachers make regular use of computers in their teaching. Of these, 93% of them have pupils working with computers during class time on a range of activities. Finnish teachers are amongst the most frequent users of self-researched teaching materials from the internet. Primary schools excel at ICT usage. 82% of schools have their own website, 93% offer email to teachers and 26% to students (European Schoolnet, 2009, p2).

Interestingly, whilst primary school teachers tend to be supportive of ICT, they are the most impact-sceptical (ranking 20th out of 27 other European countries). When asked whether 'pupils are more motivated and attentive when computers and the internet are used in class', 23% disagreed or strongly disagreed with the statement.

The majority of Finnish primary school teachers (64%) expressed dissatisfaction with the level of technical maintenance and support within their schools and also identified a lack of computers as being problematic (43% agreeing that there were too few computers in their schools). Nearly 50% of teachers found it hard to find adequate learning materials and around 20% considering existing materials to be of poor quality.

Finally, the belief that using ICT has positive impacts on the motivation of pupils or learning benefits is correlated with the level of computer skills of the responding teachers. This is true in nearly every European country. In Finland, the teachers with very good ICT user skills show only somewhat higher levels of impact optimism.
4.6.4 The Impact of ICT on Teaching and Learning in Finland

Kaisto’s study from 2007 explored and assessed the impact of educational use of ICT in schools across Finland. This mixed methods study surveyed 6,000 pupils through questionnaires and drew data from 33 interviews with teachers (from 12 schools). The study found that:

- Teachers realised the possibilities of ICT but most of them lacked the pedagogical vision to integrate ICT effectively within their teaching;
- All teachers had basic ICT skills. But the technical infrastructure between schools varied considerably and, therefore, the opportunities to develop these skills also varied in practice;
- The vast majority of teachers used ICT to help with their planning but few used it in their teaching;
- Pupils disliked, and were not motivated by, highly structured, ready-made learning tasks. They preferred open, enquiry-based tasks but these were seldom evidenced in the research;
- Those pupils with a positive attitude towards ICT had a more positive attitude about their school and themselves in general. They were able to use their knowledge in more critical and creative ways.

Pedersen’s study (Pedersen et al, 2006) indicated similar findings. Here, whilst the positive impact of ICT on students’ learning outcomes was noticed, a broader criticism of Nordic schools failing to realise the full potential of ICT was also noted. As others have discussed (Plomp, 2009, p308), trends like these ‘raise questions on how to support and encourage schools to become more diversified ICT users, in order to help students become competent members of the Finnish knowledge society’.

Rymnin’s study (Rymnin et al, 2008) examined the network structure of a teacher community in relation to their use of ICT. Their participants were 33 teachers in an upper comprehensive school in suburban Helsinki. Through social network analysis, participants were asked to assess their networking relationships in respect of five particular dimensions. The results indicated that whilst there were few central actors in the community who dominated the exchange of technical or pedagogical knowledge, there were two ‘hybrid’ actors who were central to the exchanges. These teachers’ networks were characterised by their own external networks which helped them develop and maintain a high level of ICT competence. The study concludes with the categorisation of networks into four principle types:

- The Counsellor, who offers advice actively without seeking information in return;
- The Collaborator, who works collaboratively in web-based learning using several different media;
- The Inquirer, an active seeker of ICT-related information by capitalising on their social relationships;
The Weakly Social, who prefers media rather than face-to-face encounters in their search for information.

Finnish schools have adapted well to the fast pace of change in ICT development and usage. Like educational systems across the European Union, they will have to continue to be flexible to meet the challenges associated with ongoing changes in society and the diverse perspectives of different ICT users. Developing pedagogically innovative and quality practices is a challenge for all participants within the iTEC project. There is much that can be learnt from Finland's educational system in this respect.

4.6.5 Innovative Practice

The three criteria against which innovative practice might be judged in Finland are:

1) Chosen practices and solutions are learner based.
2) The transferability, diversity, flexibility and functionality of practices and solutions in both individual and communal use.
3) Chosen practices enable change in old procedures, provide alternate roles for those who adopt them and support goal-oriented use of various resources.

An innovative participant is cooperative, has good social interaction skills and is able to view the future with an open mind. A wide pedagogical and didactic knowledge is the basis for a strong, work supporting theory-in-use. Typical characteristics of an innovative participant are human-centred attitude towards work, a way of thinking that creates ideas, and a desire to learn. The activities of a participant like this show courage to leave old procedures and try out new ones. An innovative participant masters various teaching and learning methods and is able to integrate technology into a natural part of teaching and students’ work. With the help of these characteristics and skills, an innovative participant can build a communal, inspiring and enabling operational culture. Characteristics that are typical of an operational culture like this are need-drivenness, open mindedness, permissiveness and future-orientedness.

4.6.6 Key Sources


4.7 ITEC KNOWLEDGE MAP: FRANCE

4.7.1 Key Groups & Programmes

France’s Ministry of National Education has oversight of all aspects of the French educational system. It is responsible for providing a National Curriculum. However, this power is devolved in many significant ways through 30 educational units called académies. These regulate and establish national educational policy. This decentralisation of power is a long-standing feature of the French educational system. It has resulted in schools and teachers having a great deal of freedom in choosing their pedagogical approaches in accordance with the national curriculum.

The Department of Information and Communication Technology in Education (DGESCO-A3) is responsible for coordinating ICT development in education. The department’s mission covers the following main areas:

- Encouraging teaching practices using ICT;
- Developing school equipment;
- Creating networks;
- Teacher training (both initial teacher education and continuing professional development);
- Supporting the production and distribution of multimedia resources;
- The product and services industry.

The académies (the regional structures of the Ministry of Education) are responsible for implementing national directives and policies. This includes the development of ICT. The overall ICT policy in France covers a number of key areas relevant to the iTEC project. These include:

- Proposing and implementing measures for increasing the use of the internet and ICT;
- Providing training for families, children and others in the use of ICT;
- Preparing and implementing guidelines for the development of ICT for educational purposes in schools and higher education;
- Monitoring the use of ICT in these contexts;
- Supporting the production of digital resources;
- Establishing partnerships and agreements with regional authorities and companies.

The DGESCO-A3 is part of the Ministry of Education. It is currently running a number of programmes that have bearing on the iTEC programme. The 'Infrastructure and Services' programme aims to provide the educational community with the infrastructures and services necessary to support the development of good practice with ICT.

There is a particular focus within this programme, as well as in the 'ICT Uses in Education' programme (see below), on how teachers and students can benefit from the use of ICT in their work.
The 'Digital Resources for Teaching and Learning in Schools and in Higher Education' programme supports the production and distribution of high quality digital educational content for pupils and teachers.

The 'ICT Uses in Education' programme focuses on how ICT is adapted to particular school subjects at the various educational levels. It encourages various groups to produce and share the educational uses of ICT and digital learning resources.

Examples of specific projects developed in the context of these programmes are:

- The '1000 visioconférences pour l'école' (2008 ongoing) project is a plan to support and develop foreign language learning in primary schools. It has equipped 1000 primary schools with video-conferencing in order enable primary pupils to get in touch with native speaking peers in other countries;
- PRIMTICE (2004 – ongoing) is a directory of several hundred teaching scenarios involving the use of ICT. The PRIMTICE portal opened in 2009 and identifies, presents and advertises digital resources and pedagogical usage scenarios for primary educators;
- EDUBASES (2002 – ongoing) is a collection of directories of several hundred teaching scenarios involving the use of ICT. It covers all disciplines and school grades from secondary school. EDUBases are collections of resources created by teachers for teachers.

Finally, the 'ICT Training and Support' programme has systematised the training and support of staff working within the educational sector as they develop their skills with ICT (this includes teaching and non-teaching staff). It also has supported the adoption of the IT and Internet Proficiency Certificate within schools. This programme is currently conducted by the French Ministry of Higher Education and Research.

4.7.2 The Current Curriculum Context for ICT

France has a National Curriculum in place that defines the subjects to be studied at primary and lower secondary levels. Within this framework, there is flexibility for individual teachers to adopt their own pedagogical approaches. ICT itself is not taught as a specific subject. It is embedded within all the other subjects that are taught at these levels.

The ICT skills that pupils develop during their education are first assessed at the end of primary school. Then, at the end of their lower secondary education, the “Brevet Informatique et Internet (B2i)” (national certificate of ICT standards) recognises the level of achievement of the pupils. Failure to validate enough B2i items may prevent the candidates from passing their Diplôme National du Brevet (a diploma taken in year 10 covering French, mathematics, history, geography and civic education). ICT skills are also assessed at the end of their upper-secondary schooling and at the beginning of higher education. Moreover, since 2009, all new teachers must pass a certificate, the "Certificat Informatique et internet appliqué aux métiers de l’éducation (C2I level 2)", attesting that they possess the professional skills which will allow them to use ICT in an educational setting. In addition to this, all students have to take the
ASSR Road Safety Certificate (a Highway Code test at the ages of 14 and 16) using a specially designed piece of computer software.

Each year, there is a national survey of the use of ICT across primary and secondary schools. This aims to provide indicators related to the equipment, infrastructure, human resources and digital services that are currently in place to support the use of ICT across the curriculum.

4.7.3 ICT Usage in the School

France has 55,329 primary schools for pupils aged between 6 and 11. The STEPS (2009) research reports that the pupil to computer ratio across these schools is 12.5 to 1, with computers mainly being located in computer classrooms. In some larger schools computers are also located within other classrooms. Just over two thirds (69.3%) of primary schools have a broadband Internet connection whilst 5% of primary schools have interactive whiteboards.

Within this sector, 66% of teachers use computers in their classroom. The focus here is more on the use of computers by pupils than teachers, with 83% of the pupils of these teachers using computers regularly as part of their classroom experience.

French teachers within the primary sector are much more likely to use offline learning materials (85%) rather than access materials from a school network or the internet (38%). Self-research materials are used even less often.

Like teachers in other countries such as Austria and Belgium, French primary school teachers are somewhat sceptical about the impact and benefits of using ICT in comparison with their colleagues across the EU. 76% of French teachers were classified as having good to very good ICT user skills; 17% were classified as complete ICT beginners.

Within the STEPS research (European Schoolnet, 2009, p5), French teachers were the most outspoken in identifying the barriers to using ICT in classrooms. These barriers included:

- Dissatisfaction with the internet access speed within the school (28%);
- Lack of computers within the school (50%);
- Better maintenances and support for ICT infrastructure within the school (78%);
- Lack of computer skills amongst the staff of the school (48%);
- Difficulty in accessing adequate learning materials (43%).

According to a report from the Higher Council of Education (2010), five major projects of ICT use in secondary schools have taken place in the recent years. Four of them concern the equipment of 6th-9th graders and their teachers with portable computers connected to the Internet. Named 'Ordina 13', 'Ordi 35', 'Ordi 19', and 'Un collégien, un portable', these projects have been conducted at the local or regional level,
sometimes with financial support from the national government. In one of these projects (Un collégien, un portable), 75% of the students obtained the national certificate of ICT standards after they were equipped, and 57% of the teachers declared using the computer in one out of two courses they teach. However, not all schools were equipped at the same rhythm and some teachers estimate that they did not receive sufficient training in using the computers in class.

The second major project concerns the use of digital textbooks and virtual learning environments by sixth graders. More than 8,000 students from 21 regional educational authorities were included in this project, which was conducted at the national level in partnership with publishers and computer software companies.

4.7.4 Wider Issues in the Use of ICT in School Teaching

Research conducted by Pragma (Société Pragma, 2006) on behalf of the Ministry of Education examined the practices and perceptions of ICT by teachers and pupils in primary and lower-secondary schools (105 primary and 92 lower secondary). The study found that:

- Teachers have a positive perception of ICT;
- ICT helps teachers organise their work;
- ICT is pedagogically underused, and some teachers do not have a clear vision as to how it can support the learning process and are unaware of its potential;
- There is, therefore, a wide gap between the perceived positive role of ICT and its actual use in practice;
- Interactive whiteboards and video projectors have helped to integrate ICT into daily classroom activities without causing disruption;
- There is limited use of ICT for assessment in primary schools;
- ICT is seen as having a positive role in regard to pupil behaviour, attendance and concentration;
- ICT helps peer learning and social interaction and also increases autonomy in the learning process;
- ICT is underused in monitoring learner and also in helping to diagnose and identify individual learners’ issues.

4.7.5 Digital Learning Resources

Commercial resources are generally produced through licensed arrangements with particular publishers. The Ministry of Education plays a role in ensuring quality. There is a commissioning process that certifies appropriate products as having RIP status (i.e. they have educational value in the view of the Ministry of Education).

Additionally, the Ministry of Education provides advice about open-source products through a website called SIALLE. This website presents technical and legal analyses of certain pieces of open-source software by experts. It then allows users to
download software, use and test it before giving it a mark for pedagogical/technical aspects and content. Products that obtain good marks are integrated within a broader information system that the Ministry of Education supplies to schools alongside tutorials about how to use them.

PRIMTICE is a collection of pedagogical scenarios created by teachers at the primary school level. These resources are validated by the Inspectorate before they are included on the database. Research published in 2009 (Macedo-Rouet, 2009) considered the ways in which teachers use ‘learning scenarios’ that had been shared within a database of this type. Most teachers found that the scenarios were useful to give them ideas for a course, but also as a model to learn how to write a scenario. Those who found the scenarios “not useful” thought that searching for adequate scenarios is time consuming and they do not identify any need to use such materials. The study concluded by setting several objectives for future investigations to improve the usability and effectiveness of learning scenarios.

Recently, there has been a focus on some Web 2.0 technologies such as blogs, RSS, etc. These have often been driven forward by particular schools or groups of schools and have been encouraged by the local education authorities.

Since the beginning of 2009 all the académies have had a VLE project. About 2/3 of the académies have now deployed these VLE and are working in partnerships with their various groups of schools to help continue to fund, maintain and support these environments.

4.7.6 Other Issues

The ICT training of teachers through their initial teacher education and continuing professional development has been facilitated through a balance of distance learning and on-site training. The ‘C2i level 2’ certificate is the benchmark for teachers in validating their professional skills in this area (level 1 is mandatory before entry into initial teacher training institutes). ICT is a compulsory element of all initial teacher education.

4.7.7 Innovative Practice

The three criteria against which innovative practice might be judged in France are:

1) Quality of teacher-pupils (and pupils-pupils) interactions;
2) Use of ergonomic criteria to improve teaching and learning (e.g., cognitive load management);
3) Efficient use of technology.

Innovative teachers use virtual learning environments and/or other interactive technologies to promote individualized learning (adapting learning goals to each student's needs), inquiry learning and collaboration among pupils, inside and outside school (e.g., by interacting with external experts). Another characteristic of innovative teachers is that they are prepared to experiment with new methods and technologies.
when these are made available to them. Also, they engage in planning, writing and carrying out experimental projects, in coordination with ICT and pedagogical advisors. Possessing good technical skills is an advantage, but it is not a requirement for being an innovative teacher, since these skills can be acquired through training and practice.

4.7.8 Key Sources


4.8 ITEC KNOWLEDGE MAP: HUNGARY

4.8.1 Key Groups

The main responsibility for public education in Hungary lies with the Ministry of Education and Culture. Their responsibilities are assisted by a number of other institutes, councils and offices, including the National Office of Research and Technology. At the regional level, education is under the control of politically autonomous elected bodies, with schools having a responsibility for developing their own ICT infrastructures and their compliance with the different educational programmes that are legislated.

The Hungarian education system comprises of three main stages. Basic schooling is provided by the primary schools and lasts eight years (from the age of 6-14). Following this, students can choose from three types of secondary schools: the secondary grammar school, vocational secondary school or the short vocational training school.

The Ministry of Education has a strategic role and focuses on policy development and general administration. Regional administration has an important role in delivering national policy. County councils set up their own educational strategy plans for their particular regions and ensure proper funding of the educational institutions therein.

Current policy developments that affect the use of ICT within Hungarian education are centred on the Second National Development Plan (2007-2013). Within this plan, the 21st Century School Flagship Program (CSFP) has aimed to disseminate and draw on the findings of ICT-related trial programs in order to accomplish the following aims:

- Renovate and modernise school buildings so they can accommodate up-to-date ICT infrastructures;
- Provide training and support services necessary to implement and integrate ICT in school teaching and learning programmes;
- Train teachers and produce digital resources;
- Ensure financial and consultancy support for schools to allow them to integrate students with various learning difficulties.

As will have become apparent, this program is primarily about providing an appropriate infrastructure in each of Hungary's educational institutions. A sub-set of the CSFP is the Intelligent School of the 21st Century program. This program extends the influence of the CSFP by focusing on a range of further issues to do with the effective use of ICT in education. Amongst a range of aims, these include:

- Supporting a competence-based educational methodology;
- Supporting teachers' pedagogical work;
- Establishing community communication networks and providing digital teaching and learning resources.
The program has trained 40,000 teachers to integrate ICT skills within their teaching. This has included the use of a range of digital content, electronic lesson administration, online help and support.

The Intelligent School of the 21st Century program is deemed the most important ICT-related initiative of the Second National Development Plan. It is a phased approach, with phases 2 and 3 spanning into the iTEC project. The program is due to end in 2013.

4.8.2 The Current Curriculum Context for ICT

Hungary has a National Core Curriculum (NCC) which sets national goals for education, the main subjects to be taught and the key educational objectives within these. The NCC sets the framework and local authorities have to set in place curricula in accordance with these principles.

Informatics is a compulsory subject in public education across Hungary. This includes ICT knowledge, digital literacy and a range of other themes (including using different pieces of ICT for particular aims).

The NCC implemented in 2007 includes digital competence as a key competence. It is defined as follows:

*Digital competence comprises the confident, critical use of Information Society Technology (IST) in work, communication and leisure time. This is based on the following skills and activities: recognition, research, evaluation, storage, preparation, introduction and editing of information, and communication and networking through the internet.*

At the present time, there is no national system for the assessment of this digital competence. However, work is being done to construct and implement an ICT qualification framework over the next few years.

4.8.3 ICT Usage in the School

Within the primary school, 37% of teachers use computers for presentational purposes, with 33% incorporating computers within tasks that their pupils undertake. This places Hungary at 25th place in terms of European rankings.

Hungarian teachers also access fewer learning materials from schools’ networks than their European counterparts (42% compared with 64%) and rely less on offline materials. The recent STEPs report stated that Hungarian teachers use particularly little material from established online sources (European Schoolnet 2009, p2). Similarly, although nearly all Hungarian primary schools have access to the Internet via a broadband connection, there is relatively little use of this in comparison with other European countries (44% of schools have a website; 35% offer email to teachers and 20% to their pupils).
Primary teachers in Hungary, when compared to the rest of European countries, are very optimistic about the impact of ICT on their teaching and learning. 57% of teachers agreed strongly that ‘pupils are more motivated and attentive when computers and the internet are used in class’. This ranked Hungary at 15th position (out of 27) when compared to other European countries. 67% of primary school teachers were assessed as having good or very good ICT skills with only 16% of teachers being classified as ICT novice users (European Schoolnet, 2009, p4).

Whilst Hungary is somewhat below average in regard to the level of school ICT equipment, there teachers are neither too optimistic nor too pessimistic in their identification of potential barriers to the use of ICT in their teaching. 80% of teachers stated that their school was well equipped with computers, and 87% said that the internet connection was sufficiently fast. However, 83% of teachers expressed the view that better technical support and maintenance was desirable and nearly 50% of teachers found it hard to find adequate learning materials online.

The Network of Multi-grade Education (NEMED) project, part of the EU Socrates Programme, aimed to improve the pedagogy in multi-grade classes using ICT schools. Working with children aged between 6 and 10, the project trained teachers to use a mentored innovation model to adopt ICT more fully in their classrooms. The study found that ICT improved pupils’ motivation and attendance, reducing the gap between pupils with poorer educational conditions and the national average by making them motivated to go to school. There were also reported successes in raising the skills levels of pupils in poor, disadvantaged areas to the same starting point as those pupils who had more privileged backgrounds (European Schoolnet, 2009, p6).

### 4.8.4 ICT in Hungary Romani (Gypsy) schools

Hungarian teachers optimistic tone related to the positive impact of ICT in teaching and learning in the primary school was also identified in an interesting study exploring the impact of ICT on the educational skills and abilities of a group of young people aged between 13-15 in a difficult educational situation. The study created ICT-enriched, constructivist learning environments in ten schools. Teaching programmes for Hungarian Romani children were developed and delivered in these spaces. The study found that ICT-integrated teaching methods generated significant developments in these students’ performance, even those starting from a lower level (report in European Schoolnet, 2009, p6).

### 4.8.5 Digital Learning Resources

The Ministry of Education has aimed to promote the use of digital content. They have increased the proportion of digital learning resources created by private companies, alongside some centrally developed resources. Digital IWB resources are available for almost every school subject via the Sulinet Digital Knowledgebase.

Sulinet provides internet access to the whole Hungarian public education system. It also provides a range of online content and advice, including:
• Approximately 10,000 digital learning objects;
• 3,000 animations;
• 600 activities;
• Two complete sets of interactive curricula;
• Over 10,000 images;
• 510 movies;
• Specialist e-books.

In addition to this content management system, teachers are encouraged to create their own digital content with the help of IWB software. In some local networks of schools, 'digital exercise-banks' have been created where teachers can integrate their own digital content with that created by other teachers. However, there does not seem to be a way in which teachers can share their work more widely at the present time.

A usability study conducted by Hunya (2005) suggested six ways in which teachers could be helped to access, select and use resources within Sulinet. These included:

• A general introduction to the aims and pedagogical requirements of the resource;
• The resource’s technical requirements and previous knowledge needed to access it;
• Keywords or tags that describe the content of the resource;
• Task sheets for students or teachers, additional resources, and related links;
• Ideas on and activities for teachers and students, tips on classroom management, and guidance on forming learning groups based on competence assessment;
• Methods of evaluating student learning.

There are a number of companies and book publishers who offer a variety of digital content to educators.

In respect of VLEs, Moodle has been taken up by a few high schools.

4.8.6 Other Issues

According to the Educatio Nonprofit Plc., (an institution of the Ministry of Education and Culture responsible for ICT developments within education), all teachers should have a basic knowledge of ICT and associated pedagogical issues. However, ICT in initial teacher education is not compulsory at the present time; nor is in-service teacher education related to ICT either. The strongly centralised developments in teacher training have had the tendency to homogenise the target group and led to an absence of innovation in this area (European Schoolnet, 2009, p7). This is worrying. Plomp (2009, p367) states that:

The key to successfully disseminating the outcomes of innovative projects and sound use of ICT in teaching and learning seems to rest with teacher
education. ... Accordingly, between 2000 and 2006, the Hungarian government provided large-scale, national in-service courses for teachers. In the near future, ICT-based educational reforms will hopefully reach university level.

As universities are responsible for all initial teacher education in Hungary (as well as providing ongoing continuing professional development), this seems like a vital area of work for the continuing developing of ICT usage in all Hungarian schools.

4.8.7 Innovative Practice

In order to describe innovative practice in this country, National Pedagogical Co-ordinators have been asked to specify 3-4 criteria against which they would judge innovative practice and also to describe innovative practitioners who are making exemplary uses of ICT.

The three criteria against which innovative practice might be judged in Hungary are as follows.

1. Pedagogical innovation is a new praxis that is new either in the content (such as a new topic in the curriculum, or a new educational situation or problem), or in the methodology or in the tools involved.

2. It is an answer to a new challenge, or a more effective solution compared to a previous one, fulfilling more to a greater extent the needs of the learner.

3. It is a solution that can be disseminated in a range of institutes, and can be reproduced in a different context.

Innovative practice is considered to be exemplified through teachers being members of online professional communities, taking part in webinars, and training which supports teachers' professional development. Also, it is exemplified through teachers sharing best practice and self-made content. Teachers should also use a VLE and mobile learning. There is conscious development of pupils’ multimodal text production and understanding skills. Such teachers use projects in teaching and learning, such as those allowing differentiation and individual learning paths based on interest, or cross-curricular projects with more than one teacher involved. Innovative practice also includes collaboration of classes inside and outside of the country. Furthermore, it includes development of life skills, the involvement of experts, using resources to introduce professions, support and inclusion of pupils with special needs, and finally, ICT-supported communication with parents.

4.8.8 Key Sources


4.9 ITEC KNOWLEDGE MAP: ISRAEL

4.9.1 Key Groups

Israel’s education system is a complex one. It contains multiple streams at primary and secondary levels and also includes military conscription. Significant population growth and economic expansion have brought a massive increase in demand for all levels of education. There are also significant gaps between Arab-Israelis and the rest of the population. The Ultra-orthodox community’s independent education system presents specific concerns and challenges (Hemmings, 2010, p2).

Education is compulsory and free for all children aged between 3 and 16. The education system itself reflects the country’s cultural and ethnic diversity. There are four main streams in primary and secondary education comprises four main streams. There are three streams for the Hebrew-speaking community and one for the vast majority of Arabic speakers. The Hebrew-speaking streams comprise State, State-religious and Ultra-orthodox schools. All streams are supervised and fully funded by the state, except the Ultra-orthodox stream, which is independent and receives partial state funding. Private mainstream schooling occupies a relatively small share of the market (Hemmings, 2010, p6).

In terms of policy making, primary and secondary education is fundamentally split between the supervised and unsupervised sectors. In the supervised sector (i.e. this includes the State, State-religious and Arab streams), the Ministry of Education has considerable powers to influence and monitor the type and quality of learning. For the Ultra-orthodox stream government, policy makers are not without influence but, by definition, do not have the conventional means of implementing reform (Hemmings, 2010, p13).

Primary and lower-secondary schooling is directly administered by central government whilst most upper-secondary schooling is under the authority of local government. These supervised, fully state-funded schools provide the vast majority of mainstream education (Hemmings, 2010, p14).

4.9.2 The Current Curriculum Context for ICT

During the 1990s the Ministry of Education began a systematic process of implementation in respect of ICT within all Israeli schools. This approach has continued to the present day. It is represented by the following three phases.

Phase 1 (1993-1998): The National Computerisation Program

- This phase involved the following key activities:
  - Supplying infrastructure to all Israeli schools;
  - Supporting ICT-related skills and knowledge acquisition;
  - Fostering ICT implementation in different disciplines;
  - Intensifying pre- and in-service teacher training in ICT implementation;
  - Encouraging and supporting other national programmes and initiatives.
During this phase around 45,000 computers were allocated to around 1,350 schools; during 1999-2001 an additional 30,000 computers were allocated to an additional 1,150 schools. Most of this hardware was funded through public sources.

**Phase 2 (2000-2005): The Second ICT in Education Program**

This second phase constituted the education system's response to the challenges posed by rapid advances in ICT and the implications of these advances on the processes of teaching and learning (as well as other aspects of life generally). Melamed (2000) reports that the pedagogical goals and recommendations here covered seven main areas:

- Knowledge and skills: the requirement that students master a wide range of ICT-related skills and have a broad knowledge of various technologies;
- Independent learning: the ICT-enriched environment should support self-directed and constructivist learning; educators need to act as mediator and schools accommodate changing pedagogical goals and values;
- Values and moral issues: students should exercise good self-judgement and make ethical decisions involving ICT appropriately;
- A sense of belonging and social commitment: accessing ICT in schools should reduce the digital gap and collaborative projects between schools should strengthen students' sense of belong and commitment to their community;
- Teacher training: the program needed to bring about changes in teachers' roles;
- Pedagogical support: ICT instructors supported the work of each school during the first two to three years of ICT implementation within that school;
- Experimentation, research and control: some schools experimented with ICT and served as indicators for other schools, particularly in terms of making visible the advantages and disadvantages of ICT-related pedagogy.

During this stage, another evaluation was completed that focused on schools' use of computers and other peripherals. This led to an upgrading of the ICT infrastructure in schools.

**Phase 3 (2006 onwards): The Third ICT in Education Program**

This third phase is the education system's response to the ongoing needs posed by 'constant ICT-facilitated educational change, such as ubiquitous learning, sharing, collaboration and joint ownership of knowledge' (Plomp, 2009, p410).

The work in this phase is characterised by two main sets of issues. The first of these are logistical issues. These include issues such as the use of one-to-one devices and the associated pedagogical practices that might accompany these devices within communication networks within and outside schools. Secondly, pedagogical issues centre on issues that develop models for the promotion of wider use of ICT within every area of the curriculum and the facilitation of pre- and in-service teacher training.
4.9.3 ICT Usage in the School

Research done in 2007 by the Ministry of Education gave the following ratios for computer/student: 1/18 in primary schools and 1/14 in secondary schools. Obviously, these have lowered considerably in recent years.

As Plomp comments (Plomp, 2009, p416), schools vary markedly in their use of more innovative pedagogical approaches with ICT. Common word-processing software and graphical packages are frequently used in schools, along with students in lower secondary schools making use of the Internet for communication and research purposes.

The availability of other subject-specific educational software varies according to school level. Primary and lower-secondary level schooling tends to make greater use of these than high schools.

More recent developments in ICT usage in Israeli schools (evidenced in data from SITES-M2) has included a growing number of students participating in online learning (including virtual courses being delivered by two schools that have focused on distance learning). Other institutions, such as educational institutes, not for profit organisations and commercial agencies are establishing their own virtual communities (e.g. the Center for Educational Technology) which are delivering educational content in various subject areas.

4.9.4 Other Issues

The issue of teachers' professional development with ICT has been examined in recent studies. Klieger's study (Klieger et al, 2010) explored the implementation of laptop computers in the work of science teachers at junior high schools. It found that science-based disciplinary training in the use of ICT was most relevant and successful. The laptop computers themselves were considered to contribute 'significantly' to the teachers' professional and personal development and did facilitate a shift from teacher-centred to student-centred teaching.

Their recommendations for the implementation of future models of professional development emphasise this link to disciplinary communities, the location of such training and the importance of mentoring:

'Special focus should be placed on meeting the needs of the disciplinary communities. Building a disciplinary teachers’ community, and providing support for the professional community contributes more than anything else to the PD of teachers and provides solutions to their immediate needs.

The in-service training sessions must take place in the teachers’ natural teaching setting, where they experience the changes and feel less threatened i.e. their schools. In addition to holding training sessions in the schools, virtual
sessions and guidance must take place in order to save the teachers time and allow them to work and ask for counsel at the time which best suits them. Furthermore, this allows the teachers to get instruction using different tools.

Co-mentoring by a disciplinary instructor is recommended along with an instructor who is an expert on ICT. In other words, pedagogy should be the key word that guides along the ICT and correctly integrates the digital tools. It is also recommended to integrate cooperative platforms: building an environment enabling co-learning, where every participant is able to equally contribute to everyone’s general knowledge. (Klieger et al, 2010, p197)

4.9.5 Innovative Practice

In order to describe innovative practice in this country, National Pedagogical Co-ordinators have been asked to specify 3-4 criteria against which they would judge innovative practice and also to describe innovative practitioners who are making exemplary uses of ICT.

The three criteria against which innovative practice might be judged in Israel are as follows.

1. Recognition by the wider environment, the community, that the ICT practice is innovative.

2. Use of technologies and pedagogical practices defined in the framework of the Ministry of Education program for adapting the educational system to the 21st Century: equipment of teachers and students with laptops; access and application in the core matters of the curriculum of well developed ICT based content from external providers and those developed by the teachers themselves; using ICT to adapting the teaching to the variability among the students; using ICT to increase the interest of the students in connecting the studies with the external world; using ICT tools for obtaining information and communication literacy, cooperation and team work, independent learning.

3. Application of innovative ICT technologies recognised as such in international comparisons.

The Israel educational system presents much variability expressing the heterogeneity of its population. Innovative practitioners should be judged against the background of their community. Innovative ICT in schools in a well to do town or neighborhood should include advanced constructionist applications of the computer: personal and group work using advanced tools in the whole gamut of curricular matters: seeking information with advanced search tools, involving the students in ICT based social environments relevant to the curricular content, shared learning with other distant located schools and teams, planning and carrying out scientific experiments, researching and analysing documents and texts in the humanities, carrying out experiments and products with embedded ICT, creating projects and reporting on them using advanced producing tools. In more disadvantaged environments...
innovative practices may be limited to enabling the students to use ICT to reach information and reporting using ICT tools.

For further information see: Experiments and Projects Division http://cms.education.gov.il/EducationCMS/Units/Nisuyim/english/English.htm

How Islands of Innovation can buffer pressures for system innovation see the article by Orit Avidar-Unger (English abstract) at: http://telem-pub.openu.ac.il/users/chais/2010/noon/3_3.pdf

4.9.6 Key Sources


4.10 ITEC KNOWLEDGE MAP: ITALY

4.10.1 Key Groups

Formal schooling in Italy has two main phases: primary and lower secondary (students aged 6-14) and upper secondary and vocational education (students aged 14-16 (compulsory), with some vocational courses being offered to students up to the age of 25).

The Ministry of Education, University and Research (MIUR) is the principal administrative body, although in recent years many of its powers have been decentralised. Schools now have a considerable degree of autonomy in how they organise tuition and conduct the teaching and learning processes. The National Curriculum also allows for individual schools to adapt their approach in light of their specific context. Responsibility for school education is represented at the local level by regional and provincial education officers.

Central governmental bodies such as these support schools in their use of ICT in teaching and learning. A widespread reform in 2003 across all schools reformed the provision and use of ICT. It supplied schools with multimedia equipment, connected schools to the Internet, set up networks and services and undertook a revision of how teachers were trained with ICT. These developments have continued into more recent years. The Ministry of Education has undertaken a number of recent projects. These projects include the Digital School which has focused on two main areas.

Firstly, a large implementation of interactive whiteboard technologies has been undertaken. This saw 18,000 interactive whiteboards supplied to lower secondary schools in 2009, with an additional 10,000 boards going to primary and upper secondary schools by the end of 2011. The National Agency for the Support of School Autonomy devised and implemented an in-service teacher training program for the proficient use of these interactive whiteboards and have trained 75,000 teachers.

The Cl@ssi 2.0 project has experimented with a range of innovative learning environments at the lower secondary school level. This investigation into the impact of ICT and the new learning environment on students' performance and skills will continue for a further two years. As part of this project, one-to-one provision is being monitored. Emerging evidence suggests that teachers like this model but often experience serious management issues.

The School Family project has provided new services to assist the communication between schools and families, including online reports, digital registers, surveys of students' attendance and access to online student files. The project began in December 2009 and has spanned the work of 4,180 schools.

In the field of teacher training, eLearning initiatives have been developed for the training of school staff. The ForTic Program saw the development of a web portal that
offered teachers and others technological training through a blended learning approach. The program ran from 2005 – 2008 with the following three key aims:

- To improve teaching and learning processes in specific ICT subjects and through general ICT-related skills;
- To empower students in gaining practical understanding of different ICT tools, styles of learning, communication and dissemination of information;
- To enhance teachers’ professional capabilities by training them in the use and application of ICT as part of their administrative role and within their pedagogical approaches.

ForTic also examined and implemented different models for the provision and location of ICT resources within schools. A range of solutions were implemented, including:

- Setting up multimedia laboratories for all students within a specific class;
- Including a few workstations within a classroom to encourage blended learning and group work;
- Providing ICT service centres within schools.

4.10.2 The Current Curriculum Context for ICT

There are national guidelines and curriculum guidelines for the introduction and support of ICT within education in Italy. The Guidelines for the Curriculum are the reference framework for the curriculum which individual schools, being largely autonomous, have to implement. Within these guidelines there are various competences. For example, the goals for primary schools are the pupils can use ICT and multimedia to develop their work in various subject areas, etc. At the lower secondary school, pupils are required to use ICT and multimedia to support their work, make and validate hypotheses, make self-evaluations, etc. Teachers are responsible for the assessment of students’ knowledge, skills and competences in these respects.

4.10.3 ICT Usage in the School

ICT is not taught as a separate subject within Italian schools (with the exception of some of the vocational secondary schools which fall outside the remit of the iTEC project). Individual subjects have responded differently to the adoption of ICT skills and competences within them. For example, within the mathematics curricula there is a considerable focus on ICT-based concepts and methods.

Nesler’s study (Nesler, 2004) investigated the advantages of using ICT in the curriculum as well as its pedagogical limitations using a range of qualitative methods (including action research). Working with 1000 teachers and 3000 pupils in primary schools across Italy, the study found that:
ICT improves pupils' performance provided that software is used appropriately and coherently with the curriculum objectives;
ICT can offer meaningful opportunities for communication and cooperation;
ICT impact is affected by five key factors including the relationship between learning and internet cooperation, the availability of multimedia software for learning, school networks, and professional development for teachers and opportunities for multimedia education online.

Falcinelli’s study (Falcinelli, 2006) worked with a smaller sample of around 260 pupils and 22 teachers (again in primary schools). Through a three phased program of research, the study found that better results are with ICT are achieved when:

- More classes, and particularly pupils of different ages, are involved working together in ICT projects;
- Teachers work together and share their experiences of using ICT;
- ICT activities have been undertaken by within and outside the school;
- A well-defined and specific time has been provided in the weekly schedule for using ICT.

The computer to pupil ratio within Italian primary schools is 1:14. Computers are located in ICT laboratories. Schools have a great deal of freedom in how they meet the demands and objectives of the national curriculum for ICT. At primary school, this is centred on the concept of digital literacy and there is a growing demand for specific educational quality software and more teaching training and support.

At the present time, 72% of Italian primary school teachers make use of computers in their classrooms. For these teachers, more use of the computers is made by the pupils (66%) rather than solely by the teacher (59%). There is a good integration of computers and the internet into traditional subjects or basic skills (e.g. reading and writing), teaching foreign languages and most other subjects in the curriculum (with around 80% of head teachers expressing agreement of the use of ICT in each of these areas). However, teachers make much greater use of offline materials (85%) rather than online materials.

Italian primary schools adopt a lower midfield position with regard to ICT usage and equipment when compared to other European countries. Whilst 63% of schools have access to the internet via a broadband connection, only 65% of schools have a website and only 7% of schools offer email to their pupils (European Schoolnet, 2009, p2).

Italian teachers within primary schools are amongst the most optimistic about the impact that ICT can make on the teaching and learning process. 90% of then agreed or strongly agreed with the statement that ‘pupils are more motivated and attentive when computers and the internet are used in class’ (European Schoolnet, 2009, p3). This places them at 6th (out of 27 countries) in terms of their optimism. Interestingly, Italian teachers are also the most vociferous in terms of their identification of potential barriers to the use of ICT in their schools, expressing dissatisfaction with both the
internet connection speed and the level of equipment in their schools, alongside expressing their desire for between standards of technical maintenance and support (European Schoolnet, 2009, p4). Furthermore, whilst attitudes to ICT are generally very positive, 60% of teachers indicate a preference for traditional teaching approaches as they are believed to support greater interaction; ICT use in the classroom is still relatively low (Parigi & Rossi, 2010).

4.10.4 Digital Learning Resources

PuntoEdu is the principle environment within which multimedia educational content has been developed. It is a learning platform, launched in 2001, and designed to be used in a blended learning model to support teacher training and professional development. It currently contains over 3,000 learning objects which have been developed for teachers' online training by the teachers themselves. The majority of teachers' training is supported through this platform although use for professional development purposes is decreasing and teachers see PuntoEdu more as a library of resources (Parigi & Rossi, 2010). Over time, teachers' interest in this platform has grown and evaluations of its use have improved. Several aspects are being improved.

In addition to this, there are other user-generated databases of curriculum materials. These include Dia (a digital database of 25,000 images dealing with every subject in the curriculum), Gold (a database of 'best practices') and Musiknet (a virtual museum of music).

Since 2000, common technical issues with the platform have been replaced by issues concerned with pedagogy. This is probably because the change in attitudes towards social networks and their increasing prevalence have ensured that teachers are happier operating and finding materials within PuntoEdu. The challenge then, of course, is what to do with them, and the environment itself, within their pedagogy.

4.10.5 Other Issues

Currently there are no ICT competence targets for teachers, nor is there a defined framework for the assessment of any ICT competence. However, ANSAS has been asked to create a prototype framework for teachers' digital competence. Initially, the prototype will be piloted only in four regions (Sicily, Apulia, Campania, Calabria).

ICT does form part of initial teacher education at high education level, but it is not compulsory. As we have discussed, the PuntoEdu online training environment is the most commonly used source of training in using ICT for in-post teachers.

4.10.6 Innovative Practice

The three criteria against which innovative practice might be judged in Italy are as follows.

- Digital technology should be "invisible", deeply embedded in the practice.
• Digital learning content should be relevant according to specific learning goals.
• Practice should have a significant impact on students’ attainment.

Innovative teachers are described as those with a strong attitude towards active learning methodologies and problem solving in particular. These teachers are skilled in lesson planning (this doesn’t happen very often in our country) and possess a good level of digital competence. Their efforts are usually directed to design learning environments/activities that fit specific learning strategies or goals. They are able to include digital technology and select/create resources within the design process. They are also focused on evidence-based practices, rather than ‘hype-driven’ ones. There are not necessarily ‘geek’ teachers, but they are technology-savvy.

4.10.7 Key Sources


4.11 ITEC KNOWLEDGE MAP: LITHUANIA

4.11.1 Key Groups

The educational system in Lithuania is managed on several levels. The Ministry of Education and Science (MoES) is the national, central government group, but below this there are regional (county) governmental bodies, municipal (local) governmental bodies and, of course, the governing bodies of individual schools.

As part of the work of the MoES, the Centre of Information Technologies of Education (CITE) has been formed. CITE is responsible for the national policy formation and the implementation of main governmental programmes for the introduction of ICT within education. At the level of the individual state, there are other national educational networks and services being established. But, increasingly, power is being devolved outwards to the individual municipalities and schools. So, the purchase of new hardware and software, the training of teachers to use these, and the production of educational software and content are all increasingly the responsibility of individual municipalities and schools rather than delivered through a county or nationwide framework.

That said the central Government programme is still important. At the moment, a Strategy and Programme for the Introduction of ICT into Lithuanian General and Vocational Education is in place, covering the time period from 2008 – 2012. The vision of this strategy is to create new and flexible student and teacher learning environments and personalised learning possibilities. It covers a number of goals, including:

- Digital learning content;
- The provision of appropriate hardware and software for all schools;
- Competence in the use of these technologies for all;
- The development of school management strategies within new electronic spaces.

4.11.2 The Current Curriculum Context for ICT

Lithuania has a National Curriculum in place which is organised around individual subjects, each with their own objectives, didactic principles and themes.

Information Technology is taught as a discrete subject within this framework. Although the National Curriculum is open to the idea of information technologies being integrated within other subjects or used as a means to encourage cross-curricular learning, there is almost nothing concretely prescribed within the other subjects about how technology might be used.

Students are expected to develop their ICT knowledge, skills and attitudes according to two main standards. These are the General Information Technology Standard and the Students General Computer Literacy Standard.
Both standards relate closely to the European Computer Driving License model. They have certain key areas of study and learning objectives (e.g. to use ICT possibilities to search for, process and present information). The standard of a student’s ICT literacy is assessed by formal examination.

4.11.3 ICT Usage in the School

Recent research into the use of computers in Lithuanian primary schools has shown that 59% of teachers make regularly use of computers in their teaching. This ranks Lithuania at 24th position in relation to other European countries. Of this 59%, 94% use computers for demonstration or presentational purposes; 79% develop activities which involve the pupils using computers in the classroom environment. 83% of head teachers reported that ICT is integrated in the teaching of most subjects within their primary school (European Schoolnet, 2009, p2).

In terms of the internet, the European Schoolnet STEPS survey showed that nearly all primary schools have access to the internet, but only 32% have a broadband connection. This places Lithuanian primary schools in the lower rankings (23rd) when compared with other European countries (European Schoolnet, 2009, p2).

Most Lithuanian primary school teachers are well skilled in their own use of ICT, with 67% having good or very good skills. However, 9% of teachers are assessed as having no or very few ICT skills, and 25% were classified as novice users (European Schoolnet, 2009, p4).

The provision of ICT equipment, particularly computers, in the primary school is a major concern for teachers in Lithuania. There is also a high demand for increased maintenance and support of the ICT equipment (90% expressed concerns in the European Schoolnet STEPS survey in 2009, see p4). However, despite these problems these teachers remain positive about the potential impact that ICT can make on teaching and learning (being more positive than the average response to these questions in the STEPS survey; European Schoolnet, 2009, p3). This belief is correlated with the level of computer skills of the teacher. In Lithuania, increased levels of impact optimism were observed from teachers with very good ICT skills themselves; those with fewer skills were less optimistic.

4.11.4 Digital Learning Resources

The European Schoolnet report identifies that there is still a significant lack of quality educational software and content across Lithuania. For example, the Institute of Mathematics and Informatics study (2006) surveyed the e-learning contexts and services for primary and special needs education across Lithuania. It analysed policy documents, computer teachings aids provisions for schools, e-content and e-services across 250 schools and 60 municipalities. The study found that:

- A lack of suitable interactive learning objects that matched the curriculum requirements;
A positive correlation between the impact of well implemented learning objects and virtual learning environments on students’ knowledge, skills and competences and their motivation;

The requirement for a further increase in the number of computers in classrooms for purely educational purposes.

More recent research into the use of digital learning resources within primary schools has shown that teachers access a range of online and offline materials broadly in line with the average primary school teacher in the EU (obtained from a survey across all European countries; European Schoolnet, 2009, p2). There has obviously been an improvement in resource and provision since the Institute of Mathematics and Informatics study in 2006.

Other recent initiatives have tried to make up some of the identified shortfall (e.g. the Digital Teaching Aids Methodical and Technological Evaluation Criteria were approved by CITE in 2008). These criteria have set a benchmark for the design and functionality of digital learning resources.

Once a specific resource has been officially recognised through CITE’s procurement and assessment process, there are several CITE repositories within an educational portal where it can be stored and then accessed by schools. These include:

- Textbook search services;
- Centralised meta-data repositories;
- Collections of materials produced by teachers as a result of their engagement in national and international projects;
- Subject-focused collections of educational content;
- Distance learning courses for talented children or those with SEN.

The development of new educational digital resources are being encouraged through public tenders for CITE funding, funding from the European Social fund for specific purchase or creation of e-content at a national level, and the production of methodological materials by teachers through their involvement in project such as the CITE/Microsoft Corporation ‘Virtual Classroom Tour’ project. This project is part of a larger ‘Partners in Learning’ project through which teachers create lesson plans and ideas using Microsoft PowerPoint.

In terms of VLEs, in 2006 a version of Moodle was adopted by CITE and proposed as the most suitable VLE for use across the Lithuanian general educational system, as well as in vocational training institutions and for teacher in-service training.

4.11.5 Other Issues

There are national requirements for the integration of ICT into all pre-service initial teacher education programmes in Lithuania. However, as these programmes are delivered by autonomous institutions such as teacher training universities and colleges, the level of ICT integration is variable. (European Schoolnet, 2009, p1).
Lithuania has a set of ICT competence targets that teachers are expected to reach. There is a national ICT training programme to help teachers develop their skills in this area. These are assessed at three levels through the production of an e-portfolio of evidence. To help support teachers in this process, teachers can use a specially prepared distance learning course to assist the production and collection of the required evidence of their knowledge and skills.

4.11.6 Innovative Practice

In order to describe innovative practice in this country, National Pedagogical Coordinators have been asked to specify 3-4 criteria against which they would judge innovative practice and also to describe innovative practitioners who are making exemplary uses of ICT.

The three criteria against which innovative practice might be judged in Lithuania are as follows.

- Pedagogy
- Content
- How the use of ICT extends and enhances the opportunities for learners

Innovative practitioners are considered to be those for whom

- ICT is only a tool for achieving learning aims;
- Educational process is child-centred;
- Any use of technology extends and enhances the opportunities for learners.

4.11.7 Key Sources


4.12 ITEC KNOWLEDGE MAP: NORWAY

4.12.1 Key Groups

The Ministry of Education and Research has the overall responsibility for administering the educational system in Norway. Within this, the Directorate for Education and Training is responsible for the development of primary and secondary education. In 2010, a Norwegian Centre for ICT was established.

A new National Curriculum, called Knowledge Promotion, was established in 2006 to help all pupils develop fundamental skills that will enable them to participate actively in the knowledge society. Within this curriculum, digital literacy is defined as a basic skill and, therefore, is a legal directive. It is the most important ICT policy framework for schools.

Knowledge Promotion defines goals generally and specifically for each subject and each key stage within primary and secondary education. Although this is a central Government directive, there is room for individual choice and adaptation at the level of individual schools regarding the pedagogy and approach they wish to take to deliver this curriculum framework.

4.12.2 The Current Curriculum Context for ICT

Within the Norwegian National Curriculum, ICT is defined as 'the ability to make use of information and communication technologies' and is one of five basic skills. ICT should be integrated within all the learning activities of the school across all subjects. Targets for students’ use of ICT relate to the usage of various ICT tools, broader issues associated with assessing information using these tools, and other management skills. As ICT is an important element in most subjects, ICT-related skills are assessed through traditional school subjects. There is no separate test or examination of ICT skills across the whole country, although a small number of local initiatives have explored this option.

Norway's latest curriculum reform (the Knowledge Promotion, 2006) defines the following basic skills of learning:

- The ability to express oneself orally;
- The ability to read;
- The ability to do arithmetic;
- The ability to express oneself in writing;
- The ability to make use of ICT.

This applies to all levels of primary and secondary education.
As a result of the implementation of this piece of curriculum reform, the following results have been noted:

- New subject syllabuses in all subjects, clearly indicating what students and apprentices are expect to learn;
- New distributions of teaching hours per subject;
- New structures governing available choices within education programmes;
- Freedom at the local level with respect to work methods, teaching materials, and organisation of classroom instruction. (Plomp, 2009, p556)

Although national definitions of skills and competencies do not exist, several 21st century competencies are mentioned in the core curriculum or subject curricula documents. Teaching and assessment guidelines for a selection of subject curricula are in the process of being developed. In addition there are national tests in the basic skills of reading, mathematical literacy and reading in English (OECD, 2010, p26).

In terms of assessment of quality within this system, the Norwegian approach emphasises the role of local responsibility to ensure high quality. So, based on the British self-review framework for the use of ICT in schools, an online tool has been provided for schools so that they can evaluate their achievements in this area.

Alongside these pieces of curriculum reform, there has been recent Programme for Digital Competence which has covered primary and secondary education and training, higher education and adult learning. The programme's priority areas have been related to ICT infrastructure, competence development, research and development, digital teaching resources, curricula and working methods. The programme had the following key objectives to meet by 2008:

- Access to high quality ICT infrastructure and services;
- Digital competence at the heart of all levels of education and training (focusing on how all learners could be able to use ICT in a secure, confident and creative manner in order to develop the skills and knowledge needed to participate in society);
- To establish the Norwegian education system as one of the best in world in regard to the development and use of ICT in teaching and learning;
- To use ICT as an integrated tool for innovation and quality development in Norwegian education.

The evaluation of this programme by the University of Oslo highlighted that, despite improvement to ICT infrastructure across the various contexts, the use of ICT in schools particularly did not reflect the increased possibilities that this infrastructure could provide. Moreover, it was noted that there was a lack of a holistic understanding as to how digital competences could be nurtured and developed which often led to educational strategies and policies being too specific and narrow in their focus.
Additionally, there have been longitudinal studies of the use of ICT in basic education across Norway. One of these (Arnseth, 2007) provides interesting data drawn from web-based questionnaires completed by teachers, pupils and school leaders from 499 schools. The study found:

- An increase in teachers' time spent using computers at all grade levels between 2005 and 2007;
- An increase in the use of e-portfolios for marking and assessing student work;
- An increase in the amount of time that pupils spend using computers in classroom work;
- Digital learning resources not being widely used in primary and lower-secondary schools;
- Pupils using multimedia resources more at home than at school;
- Significant variations in digital literacy skills amongst pupils within the same grade;
- Positive use of learning management systems in all schools.

These improvements noted in 2007 have continued to be built upon as we will see below.

Digital literacy is defined as a basic skill in the Norwegian national curriculum. The Knowledge Promotion curriculum defines general and specific goals in each subject and for each Key Stage. The use of digital tools includes the skills to apply critical assessment and use of sources, exercising digital judgement.

It is the responsibility of school owners to ensure that schools have the necessary equipment in order to meet the competence aims regarding digital literacy, and each municipality or county authority has its own programmes or initiatives in order to meet these demands. In upper secondary schools, most students have their own laptop provided by the school. This development happened as a result of a national requirement to provide free teaching materials for students in upper secondary school.

There are government initiatives regarding digital exams and tests, as well as initiatives on e-Safety. The Government’s policy is to reduce the number of national strategies. As a consequence of this, a number of National Centres have been established and given responsibility for developing initiatives in various areas of the education system.

Recent responses to country surveys (2011) reveal a number of key ICT priority areas within the Norwegian educational system for the coming year. The following table is drawn from the report:
As described above, the Ministry of Education and Research has strongly emphasised the role of ICT as part of learning activities in schools. The actual implementation of ICT for the promotion of learning differs between syllabuses. The major change from former plans on ICT in education is the specific educational use of ICT in different subjects, often with specific learning goals for digital literacy itself (European Schoolnet, 2011).

The National Network for IT-Research and Competence in Education (ITU) undertakes an annual survey of the use of ICT across the Norwegian education system. There most recent report (ITU, 2009) provides a helpful overview of the current issues facing the Norwegian education system as they increasingly adopt ICT and develop approaches to digital literacy within their schools. Key findings from the 2009 survey included:

- Primary schools still lag far behind upper-secondary schools in their use of ICT in daily school work;
- There are major variations in use amongst student groups, schools and when compared to grade levels;
- Teachers in upper-secondary schools use ICT a lot more than teachers in the 7th and 9th grade;
- Computers are best integrated and used most frequently in the teaching of the Norwegian language;
- Digital divides have been noted between students in respect of their computer utilisation and digital literacy;
- A positive correlation has been noted between ICT usage in subjects like Norwegian, English and Mathematics and the fact that the school has a person employed full-time as an ICT coordinator;
- Teachers report a relatively limited use of digital learning resources.
Despite primary schools lagging behind upper-secondary schools in their use of ICT, Norway ranks as one of the highest uses of ICT in the primary school when compared to other European countries, with 90% of teachers making regular use of computers in their daily work (European Schoolnet 2009, p.2). Unlike many other countries, the major focus here is on pupils using computers within the classroom, with 97% of this 90% of teachers stating that pupils work regularly with computers in classrooms. In terms of the spread of use across subjects, Norway ranked as 3rd with regard to ICT use in traditional subjects such as numeracy and literacy; 81% of head teachers reported that ICT was embedded across the whole curriculum which is broadly in line with the European average.

Almost all Norwegian primary schools have internet access through a broadband connection. Therefore, it is not surprising that teachers make good use of online teaching materials and rely less on offline materials.

In terms of primary school teachers' perceptions of the benefits of ICT in teaching and learning, Norwegian teachers are nearly all optimistic, with 93% expressing agreement with the statement that 'pupils are more motivated and attentive when computers and the internet are used in class'. A minority of teachers (15%) agreed with the statement that 'using computers in class does not have significant learning benefits for pupils' (European Schoolnet, 2009, p4).

The overwhelming majority of primary school teachers (90%) have good or very good ICT skills themselves. Only 2% are classified as having no ICT skills.

Despite these very positive developments within the primary education sector, Norwegian teachers are quite outspoken about the barriers or obstacles that they face to using ICT in their classrooms. Approximately half of them find it hard to find adequate learning materials for teaching and consider existing teaching materials on the internet to be of poor quality. However, they did express satisfaction with the number of computers and the infrastructure to provide technical maintenance and support. This has led to the following conclusion in the STEPS survey of 2009:

*It should be clear that the demands with regard to availability of high quality learning material and higher levels of ICT proficiency of teachers increase with the overall level of sophistication of ICT deployment in teaching. The wide range of barriers expressed by Norwegian teachers here seems to point to a situation where the supply of learning materials and skills is not keeping up with the technical infrastructure.* (European Schoolnet, 2009, p4)

**4.12.4 Digital Learning Resources**

The Ministry of Education provides funds to the local authorities across the country to enable them to choose and purchase digital learning resources and content. The Ministry also funds the development of specific learning resources in those cases where the market is too small to sustain a commercial approach.
As the use of digital tools is one of five basic skills within Knowledge Promotion (the Norwegian National Curriculum), the provision of a range of digital learning resources is essential in all schools. Therefore, as part of the Knowledge Promotion reform, a three-year plan for funding the upgrade of learning resources was put in place.

At the upper-secondary level, the majority of county authorities (18/19) have formed a digital learning portal called the National Digital Learning Arena (NDLA). This has facilitated both the purchase of commercial resources and also encouraged the development of resources by teachers and others. These 'user-generated' resources are moderated by universities and colleges. Within the NDLA, all content is freely available to all.

In addition to the NDLA, there are two other national education portals for primary and secondary education. These portals collect, index and make available digital content for schools free of charge.

There are also some other commercial developments in this area.

Almost all schools in the Norwegian education system make use of a learning platform of some sort. The most widely used by far are Fronter and It's Learning. Microsoft's Learning Gateway and Pedlt have smaller shares of the market. Although well developed systems, digital learning platforms have limitations and bottlenecks that hinder use. Transport of information and resources in a simple, yet safe, manner is a challenge that applies to all systems. Security has been criticised from relevant authorities, although security within the systems has improved in time (European Schoolnet 2011).

At the current time, there are no national initiatives addressing the use of Web 2.0 technologies within education.

The Norwegian Publishers Association has established a new portal for all the digital learning resources of the publishing houses in Norway. This can be found here: http://www.digitaleressurser.no/.

Their ambition is to create a viable commercial solution for simple access to digital learning resources, and to simplify the distribution of digital learning content for primary, secondary and higher education. The portal's distribution solution can be accessed by all content vendors and learning platforms.

Through EUN-projects like Calibrate and Celebrate, digital learning resources have been made available to other European countries. Norway participates in the European Schoolnet Learning Resource Exchange initiative and eQNet project, which targets the use of digital content across borders. The latter evaluates resources from the different national initiatives to find "resources that travel well" and if possible add these to the LRE.
4.12.5 Other Issues

As ICT is integrated within the subjects of the Knowledge Promotion curriculum, there are no specific targets set for ICT competence for teachers. However, there are targets set for ICT competence related to how ICT is used within each subject.

Similarly, with initial teacher education ICT is not taught as a separate subject. It is integrated within the subjects. There is a concern that ICT is not sufficiently integrated at this level and work is being undertaken to revise the curriculum framework for initial teacher education to strengthen this element. The STEPS survey (European Schoolnet, 2009, p2) indicates that there have been recent improvements in this area.

4.12.6 Innovative Practice

In order to describe innovative practice in this country, National Pedagogical Co-ordinators have been asked to specify 3-4 criteria against which they would judge innovative practice and also to describe innovative practitioners who are making exemplary uses of ICT.

The three criteria against which innovative practice might be judged in Norway are as follows:

1) Great professional strength and interest in the subjects taught
2) Risk-taking
3) Motivation

The teacher must possess great professional strength and interest in the subjects taught in order to be able to use technology and see how technology could be used to make teaching innovative. The learning process should take creative advantage of technology learners are already using in their everyday life, not only make use of the ordinary tools that are available in schools. This could involve a certain amount of risk-taking, as in using technologies which may not be designed for learning such as mobile technologies (mobile phones, GPS, tablets, iPad), digital games or social media.

Norway also considers motivation an important aspect of innovation. The teacher should motivate learners as well as influencing the rest of the school in e.g. sharing resources, writing/producing for an audience (contributing to Wikipedia, writing blogs on subjects), and building personal learning networks online and offline.

To count as innovative in the national context, a teacher should be able to inspire, motivate, and guide learners, by using a mix of methods, approaches, media and ICTs. There are two teachers (both teach in upper secondary schools) who can be seen as a benchmark when trying to define innovative practice in the national context.
Example 1: Teacher Magnus H. Sandberg uses the console game "Assassin’s Creed 2" to teach about renaissance Florence. A wiki was set up for the project, the students brought their own consoles, and the producer Ubisoft provided the class with games. Video and wiki (in Norwegian): http://dl.dropbox.com/u/12555800/StovnersCreed.wmv http://stovnerscreed.wikispaces.com/

Example 2: Teacher Liv Marie Schou uses Facebook in the second language nynorsk, which has a reputation among learners for being boring.

Article in the newspaper Drammens tidende:

http://dt.no/nyheter/facebook-i-norsktimen-1.5339469

Open Facebook Page for the nynorsk project: http://on.fb.me/lrNUnv

As these two examples show, innovation should include exploring different methods of assessment in association with the learning processes, and be fully fluent in adapting web 2.0-tools for learning.

The use of ICT across the Norwegian education system seems well integrated within the subject boundaries developed through the Knowledge Promotion curriculum. Research done by Ottestad (2010) has compared the approach in Norway with other Nordic countries (Finland and Denmark). Since 2006, all three countries have developed significant policies in this area and implemented large investment programmes to promote digital literacy and readiness (for teachers and students) facing the information age. Ottestad (2010) notes some interesting differences in teachers’ pedagogy and approach to ICT across the three countries, but concludes that most ICT-using teachers in all countries surveyed make use of ICT in confined periods of time and not on a daily basis. This is contrary to the various policy statements and goals of the various countries and is a reminder of the complex nature of these reforms and the difficulties in ensuring that they impact fully on the work of individual schools and the teachers therein.

As Plomp (2009, 566) notes, in Norway the issue is not one of lack of technical resources:

Rather, the most important issue confronting ICT within education in Norway is a pedagogical one: how should we use this technology as a didactical tool in education? … Further research is needed to address not only the issue of whether ICT is being used in the various school subjects but also how (in what kind of learning activities) it is being used.

This is clearly a question to which iTEC can respond most positively.
4.12.7 Key Sources


4.13 ITEC KNOWLEDGE MAP: PORTUGAL

4.13.1 Key Groups

The Portuguese education system is managed by the Ministry for Education. The centralised Ministry of Education works alongside regional agents and services which are responsible for the direct administration of state schools at all teaching levels.

Since 2007 the Ministry has implemented a national strategy to modernise every school in respect of the ICT infrastructure and resources. This plan, called the Technological Plan for Education (PTE), is based around three key areas: technology, content and training.

The PTE is the current program to modernise every school’s use of ICT across Portugal. The main goals of this plan are:

- To turn classes into interactive spaces of sharing knowledge without barriers or obstacles;
- To certify teachers, students, and other school staff, with ICT competences;
- To prepare students for the information society.

Since 2007, much has been achieved through this plan, including:

- Every state school has been connected to the Internet by broadband;
- There has been a large additional number of computers and other equipment such as interactive whiteboards provided to all schools;
- The ratio of school students per computer has dropped each year;
- There has been an increase in the number of students enrolling for the first time in university ICT courses.

In July 2008 the Government launched the Magellan program through which every child can apply for a laptop for free or at a very low price (with, or without, an internet connection). The Portuguese Government has also placed a high priority on new pedagogical materials, internet safety services and resources, including those for special needs pupils.

4.13.2 The Current Curriculum Context for ICT

The curriculum framework is centralised and coordinated by the Ministry for Education. It is based on the development of a set of competencies. ICT is one of these competencies but it also crosses over into every other subject and competence area. Consequently, in education up to the 8th grade, ICT permeates through each subject area; in the 9th grade ICT exists as a specific subject. Here, the aim is to give ICT competences to every student. Students are assessed during the school year. There is no national examination in ICT.

There are interesting examples of how ICT has been integrated within different subject areas. For example, the Ramos study (Ramos, 2005) into the use of ICT
within schools for language learning combined lesson observations with interviews with teachers and students. It found that:

- ICT in the classroom stimulates students' curiosity and interest;
- Students demonstrated a strong engagement with their tasks;
- The interactions of students with their peers, teachers and ICT have a positive impact on their ability to communicate effectively.

### 4.13.3 ICT Usage in the School

As a result of the Technological Plan for Education, the resources within Portuguese schools have increased dramatically. Figures released in 2010 (Pedro 2010, p.5) reveal that the ratio of students per computer is now 2/1 (in 2008/09 this was 5/1), the vast majority of schools (94%) have access to a high-speed broadband connection with a smaller number of schools (35%) having access to a wireless connection within their classrooms.

In recent surveys done by the European Schoolnet (2009), 70% of teachers in this phase use computers regularly within their classroom teaching. Of this 70%, 59% of teachers use the computer for demonstration or presentational purposes; 49% get their pupils using computers to complete various curriculum tasks or activities. The average ratio of pupils/computer is 15/1. Although many teachers use the internet to access teaching materials (49%), this is well below the European average of 64%. (European Schoolnet, 2009, p2).

Many primary schools (70%) have a broadband connection to the internet but, by and large, they fall behind the European average in respect to ICT usage and equipment items (e.g. 56% of primary schools have a website, 29% offer email to teachers and only 10% to pupils). 65% of teachers have good and very good ICT skills and many teachers are optimistic about the benefits of ICT use in teaching and learning.

Ponte's study (2006) surveyed over 604 primary school teachers across Portugal and attempts to describe the impact of a national project (Internet@EB1) on the development of more sophisticated and significant use of ICT within the primary school. Using a mixed-methodology, the evaluation found that:

- The project significantly contributed to teachers' use of ICT in their teaching;
- Teachers' competence to promote ICT integration in the classroom and their students' competences improved through the project;
- The development of school websites helped strengthen local partnerships and collaborations.

Ponte's 2007 report (Ponte et al, 2007) focused further on the development of primary school teachers' competences with ICT. The main aim was to promote the use of ICT in the primary school and foster learning in all curricular subjects and develop cross-curricular approaches. Again, the project received a positive evaluation.
4.13.4 Digital Learning Resources

As part of the PTE, a repository of digital content for teachers has been developed called the Schools' Portal (www.portaldasescolas.pt). This includes digital learning resources designed to support each area of the curriculum, including lessons plans and other activities. It now includes a section on educational blogs, (Catálogo BloguesEDU) i.e., blogs maintained by teachers and which include students’ contributions. It is also a repository of good practice in this field.

The portal aims to be a reference for other educational web portals and it is intended to provide the following services:

- Digital educational resources (DER’s) repository;
- Online communication and collaboration tools;
- Dissemination of international/national educational initiatives and local ongoing projects with support of educational partnerships;
- E-portfolio system;
- E-learning tools and services.

It is possible for teachers to contribute their own resources to the Schools’ Portal. Submitted resources are validated by the Ministry of Education before being released.

Pedro's report (2010, p10) states that at the present time only the digital educational resource repository of this portal has been fully implemented. The total amount of shared resources has exceeded the 1300 educational resources that were planned although the distribution of these shared resources is not balanced across curricula areas or phases of schooling.

There are several initiatives in Portugal to promote the use of Web 2.0 technologies. Many of these were summarised in a handbook which described the uses of Web 2.0 technologies in education that was put together and made available online in 2008.

Almost every school in Portugal from the 5th to 12th grade makes use of a Moodle virtual learning platform (98.1% according to research done by Pedro et al, 2008, p12). Within these schools, the usage made of the learning platform has been analysed on a subject basis (Pedro et al, 2008, p16). This shows that ICT teachers are the most intensive users followed by mathematics and science teachers.

The most common usage of the learning platforms within Portuguese schools is for cooperative work between teachers, followed by the development of teaching and learning activities between teachers and students (Pedro et al, 2008, p22). There is also a significant administrative function that is facilitated through these learning platforms (both within the school, between schools and with other educational partners).
4.13.5 Other Issues

The training of teachers with ICT has been a focus of recent activity in Portugal. In 2009, legal guidelines concerning teaching training and the certification of ICT competencies were compiled. This document identifies the core ICT competencies that all teachers should exhibit. There are three levels of teachers' certification:

- Digital competences certification (level 1): teachers are expected to develop an instrumental and functional use of ICT tools in their professional context, this level is mainly linked to knowledge related to efficiently master tools and technical procedures;
- ICT pedagogical and professional competences certification (level 2): teachers' acquired knowledge and evidenced skills should make possible the effective use of ICT as a teaching resource, also understanding ICT importance in the practice of developing pedagogical and didactical strategies and in promoting real improvements in students learning processes,
- Advanced ICT in education competences certification (level 3): the teacher is able to develop innovative teaching practices using ICT, to reflexively evaluate his own professional experiences and practices and to incur in shared and collaborative activities with the educational community (Pedro, 2010, p.12).

Initial teacher education is the responsibility of Higher Education Institutions in Portugal. They are responsible for delivering the training component related to the development of ICT competencies in teacher trainees according to the established principles of the program (as defined by the PTE). Pre-service training of this sort assesses the competences of individual teachers through the use of general tools like word processors, email and internet browsers and some educational software.

The last few years have witnessed a considerable change in Portuguese schooling. The national statistics suggested that primary, middle and secondary schools have been properly equipped for the technologically-rich future that is expected. Pedro's report (2010) is very clear about what should happen next:

*It's truly the most demanding moment for the required transformational process of what truly matters, the teaching and learning practices. Now that the lack of resources and the inadequacy of infrastructures have slowly vanished, the 'ICT-competence' factor will tend to appear as a determinant element of the process.*

4.13.6 Innovative Practice

In order to describe innovative practice in this country, National Pedagogical Coordinators have been asked to specify 3-4 criteria against which they would judge innovative practice and also to describe innovative practitioners who are making exemplary uses of ICT.
The four criteria against which innovative practice might be judged in Portugal (selected from the items referred to below) are as follows.

- Students use ICT within and outside the classroom.
- Teachers concentrate on pedagogical rather than on technical matters and issues.
- Students use ICT services and tools that: (i) are appropriate to the task at hand; (ii) allow sharing and collaboration; (iii) foster media-rich final products.
- Teachers use ICT not only to impart information but to promote an active learning approach.

A teacher may be considered innovative when he/she acts in the three dimensions below. Some of the items may be missing from an innovative teachers’ practice, but he/she will tend towards this kind of teaching.

The items in the three dimensions should then be seen as trends rather than as strict ‘obeyances’.

**Pedagogical view**

- Presents students with challenging problems to solve or real-life tasks to complete.
- Supports them through the information collection phase.
- Gives them directions on how to collect, process and present relevant information on the topic at hand.
- Instructs them on how to be critical towards the information they find.
- Asks students to diversify their information sources.
- Fills missing information whenever necessary, either by directing students to relevant sites or other materials.
- Whenever necessary, gives direct instruction on some difficult point or topic.
- Treats students as people and not as mere recipients of knowledge.
- Fosters cooperation and whenever possible collaboration amongst students inside and outside class.
- Tries his/her best not to leave any student behind.
- Promotes autonomy and self-direction in students.
- Establishes a fluent connection between formative and summative assessment.

**Technological dimension**

- Uses Moodle (or any other learning platform) not just as an information store but as a basis for extended/collaborative learning.
- Makes use of appropriate and student-empowering ICT tools.
- Has students themselves use computers and ICT in general in and out of class.
- Promotes the use of services and tools that encourage sharing and collaboration.
Social dimension

- Fosters strong links with parents and the community in general.
- Establishes open communication channels with parents.
- Invites outside experts whenever he/she feels necessary or useful.

4.13.7 Key Sources


4.14 ITEC KNOWLEDGE MAP: SLOVAKIA

4.14.1 Key Groups

The Ministry of Education is responsible for implementing educational policy in Slovakia. Slovakia has a diverse education system, with basic school grades going from grades 1 to 9. Primary schools cover grades 1-4 and lower secondary schools grades 5-9. Since a significant change in the law in 2008, a new education system was adopted which regulated the conditions, extent and content of education training, the length of compulsory schooling, and aspects relating to teachers' pay, terms and conditions. The governance and financial arrangements for schools are provided through national and regional bodies.

One of the key national policy frameworks for ICT is the Strategy for ICT in Education which runs from 2008 to 2011. The policy is mainly concerned with the development of students' and teachers' ICT skills. Schools receive equipment such as computers, data-projectors, and free internet access and teachers are trained to use these to develop a greater degree of innovation in their pedagogy.

Another important project, the 'Fluency in Information Technology: Application of ICT in Subjects' ran between 2006 and 2008. This was funded by the European Social Fund and aimed to train teachers in innovative pedagogical practices with ICT in subject lessons and cross-curricular projects. It involved 27,000 teachers at primary and secondary schools.

More recently, Elfa, a private company, is responsible for the national project called 'Modernisation of Education at primary and secondary schools in Slovakia' on behalf of the Ministry of Education of the Slovak Republic. The project runs from 2009 – 2013 and aims to further the education and training of teachers, focusing on modernisation of the educational process at all primary and secondary schools in Slovakia. Besides basic courses introducing the latest ICT and methodology of teaching to the teachers, there are also some specialised courses prepared for selected subjects. For primary schools these include: Slovak language, Mathematics, Science, Chemistry, Biology, Geography, History, Music, Arts and all subjects of the first level at primary schools. For secondary schools these include Slovak language, Mathematics, Science, Chemistry, Biology, Geography and History.

In the project, 4,683 teachers from primary schools and 2,132 teachers from secondary schools are involved and are participating in trainings through a specially designed virtual learning environment (www.modernizaciavzdelavania.sk). Online training is supported by teachers attended face-to-face training at various locations across the country.

4.14.2 ICT Usage in the School

Schools are autonomous and able to make their own decisions about the integration of ICT into the teaching process. The computer to pupil ratio across Slovakia is 1:14 and around 43% of schools have access to a broadband connection.
State educational programmes for primary and secondary education include specification of the following competencies:

- Communication;
- ICT competencies;
- Problem solving;
- Personal, social and civic competence;
- Ability to learn how to learn.

Most of these competencies are integrated in the teaching of several subjects, although ICT, media education and media literacy are taught as separate subjects (OECD, 2010, p27).

Dado’s study (2006), commissioned by the Ministry of Education, sought to identify new pedagogical practices and define models using ICT and network platforms for teaching and learning. It started by analysing the situation in Slovakia with other countries and regions, before measuring and comparing student achievements via experimental and control groups (e.g. in one school pupils used ICT and in another one they did not). The study found that:

- ICT raised students' motivation, attitudes and engagement in the learning process;
- Teaching with ICT had a positive impact on the digital competences of learners as well as their interpersonal, intercultural and social competence;
- Teachers were often not prepared with the necessary ICT skills to prepare materials, teach and assess students using the learning platform;
- Teachers considered that the use of ICT was time consuming.

Around 72% of primary school teachers make use of computers in their teaching. Of these, 68% use computers to support their own role whilst 98% of them get their pupils using computers regularly. The majority of Slovakian teachers are happy downloading materials from online sources (75%) and are amongst the most frequent users of self-researched teaching materials from the internet (European Schoolnet, 2009, p2).

Whilst the majority of Slovakian primary schools have computers and other pieces of ICT, only 31% of them have access to the internet via a broadband connection. Despite this, these teachers are, broadly speaking, optimistic about the potential of ICT (ranking 12th out of 27 when compared to other European countries; European Schoolnet 2009, p.4). 84% of primary school teachers are classified as having good or very good ICT skills within only 12% having no or very little ICT user skills. The recent European Schoolnet STEPS report (2009) provides evidence for Slovakia’s poor ICT infrastructure (when compared to other European countries) and hypothesises that the ‘demands with regard to availability of high quality learning materials and higher levels of ICT proficiency of teachers will increase with the overall level of sophistication of ICT deployment in teaching’ (p4).
4.14.3 Innovative Practice

The three criteria against which innovative practice might be judged in Slovakia are as follows:

1. The use of new technologies (both hardware and software, e.g. interactive whiteboards, e-books, VODcasts, social networking sites).

2. The use of any technologies only if the didactical practice has potential to have clear impact on students (increased motivation to study, quality of students outcomes or teachers outcomes, awards in competitions), for example, learning by doing, project learning, collaborative or group learning.

3. Achievements (products, processes) which are results of creative learning and in which new ideas, new ways or new outcomes are developed. For example, development of new e-content, new assessment strategies, experimenting with new content or processes.

Innovative teachers are those who provide such environments for students in order to make them creative. They are teachers who support the work of students in teams on cross-curricular projects, use Web 2.0 tools, share with their peers, organize field trips, engage in competitions or encourage their students to do so.

The working environment is important and should be:

- Democratic (for example, with rules which facilitate teachers to coordinate and evaluate the didactical process and enable students to work with freedom of choice, work with errors and mistakes, have possibilities for experimental thinking, and take responsibilities for their actions).
- Non-discriminative (no prescribed "best" results, no psychological pressure through "opinion of the majority of students" or the teacher's authority).
- With no time pressure (which can lead to use routine techniques).
- Supportive, inspirational, non-directive, but purposeful (with agreed rules).
- Ethically correct, tolerant.
- Free thinking, open minded, with not too many commands and restrictions, where imagination, ingenuity, and speculations, which lead to conclusions, decisions and attitudes, are valued.

4.14.4 Key Sources


4.15 ITEC KNOWLEDGE MAP: SPAIN

4.15.1 Key Groups and Programs

The Spanish administration is a highly decentralized system where each local community (Autonomous Community) administers its educational resources and legislates under the general umbrella of national law. All Autonomous Communities are fully responsible for the schools in their territory. This also includes the promotion of ICT in schools. The latest reform is the 'Ley Orgánica de Educación' (LOE), dating from 2006, which builds on the previous 1990 law in various ways. The LOE retains the system introduced by the previous law and tries to establish the legal framework for improving the quality of the system by addressing new challenges that face Spanish society. In particular, it addresses a more heterogeneous student population and more developed regional control in the Autonomous Communities, which, by 2000, had been given full responsibilities in education.

Since 2005, there have been several different types of action programmes for the integration of technology in schools across all regions. These sets of programmes represent a firm commitment to incorporate new technology in schools within each Autonomous Community, as opposed to implementing a comprehensive plan to coordinate the integration of new technologies in the Spanish educational system as a whole. The Institute of Educational Technology, the unit of the Ministry of Education responsible for the integration of ICT in non-university educational stages, has coordinated these various programmes. It also maintains some initiatives at a national level in collaboration with the Communities such as:

- **Proyecto Agrega**: The construction of a national repository for digital resources;
- **Escuela 2.0**: A nationwide ICT plan for schools launched in 2009 that builds on the developments already achieved in each region. It tries to generalize the access to hardware and digital content. All fifth-grade pupils are provided with a notebook, and their classrooms with IWB and wireless connections, while training is being implemented for teachers according to their level of competence.

4.15.2 The Current Curriculum Context for ICT

The Spanish Ministry of Education has established a minimum curriculum for every school which takes up 65% of the total curriculum time. In primary and secondary education, ICT is considered as a transversal competence and is covered in all subject areas in the curriculum. ICT as a subject is first encountered at the secondary school level. Here, students can study ICT each year from 7th to 10th grade. ICT targets can be divided in those which are subject related and the more generic ones, which coincide with the digital competence of the European key competences framework.
These digital competencies show how ICT can be used for two functions:

- To transmit and to generate information and knowledge;
- To identify and resolve problems on software and hardware and critically analyze the information obtained through the autonomous and collaborative work.

These competences must take place in all the subjects of the curriculum.

4.15.3 ICT Usage in School

Almost all schools in Spain have Internet access (99.7%), 87.1% (72.0% in the previous year) with broadband connections (above 512 Kbps). In 2008/2009, the number of pupils per computer for teaching and learning was 5.3 (in the previous year was 6.1) (MEC 2009).

About 70% of schools have a person responsible for coordinating ICT technical functions, teaching and, to a lesser extent, providing support services for students. Policies on the integration of ICT in the different regions vary in emphasis and depth. Research in recent years has been analysing the impact they have had different policies in each of the regions.

For example, in Andalucía during 2006-7 research showed that ICT had an occasional or very limited presence in school activities. The impact of these technologies in teaching practices is still much lower than expected (Aguaded y Morueta, 2008). In Galicia, research undertaken during 2004 concluded that ICT is used mostly for administration and management rather than for teaching.

More recently, there is evidence of teachers who have developed their teaching practice in meaningful ways with ICT, integrating digital technologies into their daily work. Correa & Martinez (2010) report from a school in the (http://amaraberri.org/ab/index) in the Basque country where digital technologies have found their place in the teaching of this school system consistent with its model of educational innovation (Correa & Martinez, 2010).

4.15.4 Digital Learning Resources

The most recent key initiatives have been actions embedded in two wider plans: 'Internet en la escuela (2002-2005)’ and its continuation 'Internet en el aula (2005-2008)’. The first plan produced digital content for each subject in the primary and secondary curriculum. In both cases all the material has been made available for free on the Internet. Publishing companies routinely develop a variety of commercial products that are widely adopted in schools.

Each year, prizes are awarded to educational materials in electronic format that are developed by teachers and suitable for use and dissemination on the Internet. The School 2.0 project has also produced a bank of digital educational content available to teachers and the wider school community.
4.15.5 Key Sources


http://agrega.educacion.es/visualizadorcontenidos/Portada/Portada.do;jsessionid=E252C64F17AD0D6428E786A52A55D3BD

http://www.educacion.gob.es/dctm/mepsyd/horizontales/iniciativas/educacion-primaria.pdf?documentId=0901e72b80027c20

http://www.ite.educacion.es/

http://recursostic.educacion.es/buenaspracticas20/web/
4.16 ITEC KNOWLEDGE MAP: TURKEY

4.16.1 Key Groups

The Ministry of National Education provides leadership, supervision and administration to the formal state education system in Turkey. It is responsible for the preparation of the curriculum, maintaining coordination between educational institutions and the construction of school buildings. The Ministry of Education also appoints Provincial Directors of Education who have regional authority and accountability.

4.16.2 The Current Curriculum Context for ICT

Compulsory schooling in Turkey begins in the primary school for children aged 6 and continues until the age of 14. The curriculum is determined by the Ministry of National Education and comprises of compulsory courses (e.g. mathematics, sciences, history, etc) and elective courses. Computer education is an elective course (alongside other subjects such as drama, tourism, local handicrafts, etc).

The establishment of a comprehensive information technology infrastructure within schools is the responsibility of the Ministry of National Education. In the last ten years a number of national plans have been implemented, including the 'Basic Education Project IT Policy Report' (2004), the 'Information Society Strategy' (2006-2010) and the 'Information Society Action Plan' (2006-2010).

The 'Information Society Strategy' (State Planning Council 2006) outlines the following key actions for ICT within schools:

- IT infrastructure in schools
  - Installation and updating of IT labs with multimedia libraries in all designated schools;
  - IT labs open to the public during non-student use.
- Public Internet Access Points (PIAPs)
  - Free access to all citizens without a home internet connection;
  - Digital literacy courses twice a day, including special needs groups;
  - On-site tutor assistance.
- Computer and internet campaigns
- Computer and broadband connection packages for special needs groups at affordable rates.
- Basic ICT education in schools
  - Scope of ICT courses in secondary education curriculum to be improved and rolled out;
  - Digital literacy taught within dedicated certificate programmes;
  - Students informed on benefits of using ICT in daily life and guided on its effective use.
- Basic level ICT courses for adults
  - ICT training programmes at PIAPs, with priority given to disadvantaged and marginalised groups;
o ICT training certification;
o Certification programme identified by both the public and private sectors to achieve standards in ICT training.

- ICT-supported formal education
  o Updated secondary education ICT curricula to sustain and complement ICT education in primary education;
  o ICT-supported basic and auxiliary courses in the education system and access to education curricula on the Internet.

- ICT-supported informal education
  o eLearning courses designed to contribute to the personal and vocational development of all citizens, regardless of special needs;
  o Special focus on training programmes for disadvantaged and marginalised groups to assist in the inclusion of ICT.

By December 2009, just over 28,000 Information Technology Labs had been established throughout the country in schools with at least 8 classes and 150 students. Another 17,261 schools that did not meet this capacity requirement were provided with one PC per 15 students, digital projectors, scanners and printers with the aim to reduce the digital divide. Digital literacy courses have now become part of both the primary and secondary education curricula.

According to recent reports, 96.3% of Turkish primary schools have access to internet-connected computers through ADSL or satellite connections (European Commission 2010).

**4.16.3 Digital Learning Resources**

Textbooks are set by the Board of Education and teachers are not given the freedom to select alternative resources. Although teachers can choose the way to teach, the selected approaches within these textbooks do force them to stick to certain pedagogical styles in accordance with the approaches utilised within the provided textbooks.

**4.16.4 Innovative Practice**

In order to describe innovative practice in this country, National Pedagogical Coordinators have been asked to specify 3-4 criteria against which they would judge innovative practice and also to describe innovative practitioners who are making exemplary uses of ICT.

The four criteria against which innovative practice might be judged in Turkey are as follows.

1. Teachers should use their pedagogical expertise in selecting and adapting digital learning content into their educational setting so that the content is in tune with the course’s learning aims.
2. Peer learning and practice-sharing opportunities should be taken up by the teachers.
3. Teachers are able to use a range of tools and resources when trying something different in their classroom.
4. Teachers should be familiar with how to use the learning management system for their classes.

In terms of technical aspects, innovative practitioners operate in schools where there is wireless internet access everywhere in the school, including the classrooms. This type of school has a very good level internet connection so that at least 40 students can surf on the net without connection errors. Each student has his own netbook or computer. There is an interactive whiteboard or regular projector, enough cameras for at least 5 or 6 groups of students, enough microphones, a scanner, and a printer in each classroom. The school web site provides enough room for each teacher about their subject so that they could upload their lesson materials. In addition, this type of school provides teachers with the necessary software to create online quizzes or exams. Moreover, parents can access to the school website to see their students’ learning progress.

In terms of pedagogical aspects, innovative practitioners operate in schools which provide regular in-service training for teachers for all new equipment in the classrooms. This in-service training is very interactive, for example a workshop format. The teachers have a meeting to share their experiences every month. In these meetings, they also do some micro teaching hours to evaluate their methods and to learn from each other. They complete a self-evaluation form regularly to recognise the progress in their teaching approach. The teachers also inform the parents about the new technologies and how, where and when their students will use them. Finally, parents provide their ideas about the students’ learning progress.

4.16.5 Key Sources


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WP5: Evaluation Handbook

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October 2011

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acknowledgements
We would like to thank all WP5 partners and iTEC National Pedagogical Co-ordinators who were able to comment on an earlier version of this document. We have tried to incorporate comments where possible.

Our thanks are also extended to Rebecca Smith, a Science Teacher at Altrincham Grammar School for Girls, who has commented on sections of this document from a teacher’s perspective and who has kindly agreed to share her own Multimedia Story on the iTEC Teachers’ Community site.

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The work presented in this document is partially supported by the European Commission’s FP7 programme – project iTEC: Innovative Technologies for an Engaging Classroom (Grant agreement Nº 257566). The content of this document is the sole responsibility of the consortium members and it does not represent the opinion of the European Commission and the Commission is not responsible for any use that might be made of information contained herein.
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1 INTRODUCTION

The purpose of this document is to provide guidance for National Pedagogical Coordinators (NPCs) on the evaluation procedures and protocols. It includes relevant information from the Evaluation Plan (D5.2). Where complex concepts are used (throughout this document) readers should refer to the agreed definitions in Appendix 1 below.

1.1 THE OBJECTIVES OF WP5

- To produce a knowledge map of current evidence of the use of innovative tools in classrooms.
- To engage with teachers to record the process of operationalising Learning Stories in classroom settings, within each project cycle.
- To establish how teachers integrate innovative technological tools within their pedagogy.
- To evaluate the impact of the Learning Stories in each cycle on:
  - teaching practices;
  - [teachers’ Learning Story specific] engagement with all stakeholders;
  - individualisation;
  - collaboration;
  - creativity;
  - expressiveness;
  - overall transformative effect and the design of the future classroom, including underlying change processes.

This document relates to the evaluation of the pilots in each cycle. The purpose of an evaluation is to identify ‘merit and shortcoming’ (Stake, 2004, p16) of an event, practice or programme.

ITEC’s working definition of impact in the Project Proposal, Part B: page 71 of 79 is as follows:

Impact is the overall achievement of an intervention on the educational system and can be described by a variety of qualitative indicators such as ‘improvements in national test’ or ‘improved learning in schools’ depending on the policy target. It is the end point of an intervention involving input, process, output and outcome. Isolating the variable that caused the impact is problematic in education.
Therefore, WP5 will consider the overall achievement and outcomes of Learning Stories on teaching and learning with particular regard to:

- what is considered to be good practice (by teachers and other stakeholders);
- what the enablers and barriers are;
- how the barriers may be overcome;
- whether the innovation is sustainable, transferable and scalable.

We are interested in **change** and **innovation** as follows:

On the pedagogical level innovations are defined in terms of novel didactic solutions reflecting theoretical shifts (e.g., from a behaviourist to a constructivist perception of the learning process) or technological changes – as in ICT implementation. Pedagogical innovations may take the form, for example, of novel instructional formats, increased delegation of responsibility and control over the learning process to the students, or alternative methods for the assessment of learning. (Mioduser et al, 2003, p26)

Judgements will need to be made about the extent of change (which can vary from replication of existing practice through the implementation of technology to radical transformation) and the temporal nature of the change. The definition of pedagogical change and innovation will vary from country to country (Kozma, 2003): ‘innovation often depends on the cultural, historical, or developmental context within which it is observed’ (p17). Therefore, as National Pedagogical Co-ordinators (NPCs) you will be asked to define innovation in the context of your own countries ensuring that the definition does not include technological change alone (i.e. the adoption of technology to replicate existing practices). This country-specific perception of innovative practice will be documented in the Knowledge Map as part of each participating country’s profile.

**Transformation** is a term commonly found in educational literature and policy rhetoric, particularly in relation to the use of technology to support teaching and learning. It means more than change alone; rather it is radical or fundamental change (Fisher, 2006). Here we are adopting the following definition that: ‘[t]ransformation is significant, systematic and sustained change’ (Caldwell, 2009, p4). That is it ‘implies a profound or fundamental change, a metamorphosis that involves some radical innovation, not just incremental innovation. The difference is important’ (Hargreaves, 2003, p1 cited in Fisher, 2006, p294). Furthermore, a significant change in a teacher’s practice must be multidimensional, including changes to resources, teaching approaches and beliefs (Fullan, 2001). Sustainability will be explored as far as possible but, due to the timescales in iTEC cycles, it may be difficult to obtain more than a teacher’s intention to continue with a particular Learning Story in the future. We will therefore consider each Learning Story which is selected for validation in WP4 with regard to its potential to lead to transformation in the classroom, as perceived by teachers and other related stakeholders. We will capture the change process and consider what needs to be in place in schools and national policies in order to take Learning Stories to scale.
The research questions are outlined below. We acknowledge that the concepts underpinning the focus of the evaluation with regard to teaching practices are complex and difficult to define precisely, particularly given that multiple interpretations may exist across national and local contexts. However, we have created, through a collaborative process, a set of working definitions (see Appendix 1: WP5 Agreed Definitions and Descriptions) which define our understanding of the more complex terms. Additionally, the actual focus of the inquiry will depend on the specific Learning Stories put forward for large-scale piloting in each cycle.

1.2 OVERVIEW OF EVALUATION

The focus of the evaluation is two-fold.

Firstly, to capture the journey of implementing the Learning Stories in classrooms focusing on: adaptation, change processes, challenges, ease of implementation.

Secondly, to evaluate the outcome of the implementation of the resulting Learning Activities in relation to meeting teaching objectives, the impact on learners and the impact on teachers’ practices.

This is to be achieved through two main sources of data collection to be conducted each cycle:

34. A survey of all teachers participating in the project at the end of the implementation of a Learning Story.
35. Three case studies of individual teachers from 2 or 3 schools.

In addition, data will be collected from the processes leading up to the Learning Story implementation (development of the Learning Stories, the development and pre-piloting of the prototypes), workshop events, national support mechanisms and, contributions and activities in the teachers’ online community.

We cannot assume that the same teachers will participate during each cycle and we need to be mindful of not overburdening very busy practitioners with data collection requirements. Therefore, it is not appropriate to adopt an experimental design (requiring data collection at more than one point or from comparison groups).
1.3 THE RESEARCH QUESTIONS

The research questions that WP5 will address are as follows:

1. What are stakeholder\(^4\) perceptions of the impact of Learning Stories on
   o Teaching practices including assessment; constructivist pedagogies: e.g. student-centred, knowledge building, self-directed, problem-based, active, peer-support; roles of teachers and learners; new learning spaces; effective uses of digital tools; and specifically:
     - Individualisation
     - Social/collaborative elements of learning
     - Creativity
     - Expressiveness
     - Engagement with a wider range of stakeholders\(^5\)
   o Teacher attitudes (motivation and engagement)
   o Learner attitudes (motivation and engagement), and learner attainment (skills, knowledge and understanding)

2. To what extent does the implementation of the Learning Story lead to any form of transformation and which Learning Stories have the maximum potential to have a transformative effect?

3. How effective are iTEC national and local support and mechanisms for local implementation (including the development of technical and pedagogical knowledge and skills)?

4. How do teachers perceive the Learning Stories in relation to quality (how easy it is for teachers to implement a Learning Story including the selection and combination of a range of people, tools, resources and services; connection to current practice; what works and what doesn’t work)?

5. What are the enablers and barriers to the process of implementation?

Clearly, these questions will be challenging to address and we are already considering how they might be revised and refocussed in the future. The questions above and evaluation criteria below will remain as stated in the Evaluation Plan for Cycle 1 and will be reviewed prior to Cycle 2. In particular, the transformative effect of Learning Stories will be challenging to measure. In some countries the selected Learning Stories for large-scale pilots may not be innovative. Teachers may already be engaged in Continuing Professional Development and reflection on their practice leading to continual change. And of course transformation and change can take time, training and practice to achieve whereas the Learning Activities may only involve one or a few lessons. Responding to Research Question 2 will require careful exploration through a wide range of data, inevitably being reliant upon stakeholders’ perceptions

\(^4\) These are the “school-based stakeholders”, i.e.: Students, Teachers, ICT Co-ordinators (where appropriate), Head Teachers. We refer to this group of stakeholders as “S-B stakeholders”

\(^5\) These are the “Learning Story-specific stakeholders” with whom a teacher may engage whilst teaching with a particular Learning Story and with whom the teacher would not usually engage. These may include, for example, parents, members of the community, local/national/international subject experts and/or professionals, students from other countries etc.. We refer to this group of stakeholders as “LS-S stakeholders”
of the potential of Learning Stories to lead to change rather than evidence of change itself. From an alternative perspective, the short timescale and tight turnaround required from teachers participating in a cycle may make implementation of Learning Stories more challenging than it might otherwise be. Time will be an important factor to take into consideration.

In Cycle 1 it is likely that it will not be possible to explore the research questions as fully as we wish. As iTEC technologies will not be available and teachers selected to participate will be using existing technologies, there will be little need in some countries for specialised support and training. However, in some countries it may not be possible to recruit ICT confident and experienced teachers so this may vary from country to country.

1.4 EVALUATION CRITERIA

The evaluation criteria below are not presented in priority order. They are numbered only for ease of access. They have been used to frame and develop the research instruments. They will be reviewed and revised as necessary after each cycle. They are presented here for information. They have already been documented in the Evaluation Plan and will not be reviewed and revised until after completion of Cycle 1. However, a number of issues and suggested additions have already been raised. These will be addressed in the next cycle.

For clarification:

- ‘Active use of the teacher community’ will be measured through observation of its use by WP5 members. The number and type of contributions will be evaluated. It is not the responsibility of the NPC to collect data on this aspect. However, it would be beneficial if NPCs could encourage teachers to visit and use the site.
- Below we use the word ‘transformation’ very broadly to include teaching and learning, but also the environment and any other aspects that relate to educational systems.
- Unfortunately we do not have the resources to survey learners. However, a group of learners will be interviewed in each case study during which they will be asked about their experiences of, opinions about and attitudes to the Learning Activities.
- Of course ‘long-term’ is difficult to define precisely and therefore difficult to measure. Due to the tight timescales concerned within each cycle we are only able to ask teachers if they might continue to use the Learning Story/Learning Activities in the future. We will explore this through teacher/head teacher/ICT co-ordinator interviews as well. We are not able to collect data beyond the lifetime of the iTEC project and therefore will not necessarily be able to confirm whether or not rhetoric becomes practice. However, where possible we will contact teachers again to see if they continued to use Learning
Stories/Learning Activities. We will be explicit about the format of the data in all reporting (largely teacher perceptions).

1. The set of training resources produced for teachers is perceived by the teachers to be supportive of their continuing professional development in relation to the technical and pedagogical skills required to integrate digital tools into their teaching practices.

2. There is evidence that the training resources are:
   a) made available to support all teachers;
   b) perceived by teachers to be useful and appropriate to their needs;
   c) easy to locate and access;
   d) easy to adapt to suit local contexts.

3. Software developed specifically for iTEC (e.g. composer, shells, registry, SDE) is perceived by S-B Stakeholders to be fit for purpose and easy to use.

4. Teachers’ technical skills and understanding of the pedagogical use of digital tools increases.

5. Communities of practice, supported by online communication and collaboration tools, are established and are:
   a) actively used by teachers (at least weekly);
   b) perceived by teachers to be easy to use and fit for purpose.

6. The Learning Stories used by teachers in the pilots are perceived to be innovative by all stakeholders, whilst remaining connected to current practice, in the context in which they are adopted (nationally, regionally, locally).

7. Learning Stories used by teachers in the pilots are successful and of good quality when they are supported by evidence that they:
   a) engage and enthuse teachers and students;
   b) are perceived to contribute effectively to teachers’ and students’ objectives and practices;
   c) have a positive impact on learner attitudes and attainment (teacher perceptions);
   d) have a positive impact on teacher attitudes to their use of technology to support teaching and learning;
   e) require relevant and appropriate use of digital tools (i.e.: the Learning Story could not be undertaken just as appropriately/efficiently without the use of the digital tools);
   f) present achievable technical challenge (i.e: they are challenging, but not too difficult to adapt/implement);
   g) are perceived by S-B stakeholders and NPCs (who will liaise with NTCs) to be technically sustainable and scalable;
   h) would be recommended by participating teachers for regional/national dissemination;

8. There is evidence that the adoption of a Learning Story will lead to a long-term change for a teacher (and possibly for the school overall) in relation to one or more of the following teaching practices:
a) New approaches to assessment procedures which are considered to be more authentic (valid, reliable and useful to teachers and students) than previous assessment practices;

b) Adoption of approaches to teaching that change the ways students learn (e.g. student-centred, knowledge building, self-directed, problem-based, active, peer-support);

c) Shifts in the roles of, and relationships between, teachers and students;

d) Creation of new learning spaces within and/or beyond the boundaries of the classroom;

e) Appropriate, innovative and effective uses of digital tools;

f) Teachers’ approaches to:

I. Individualisation

II. Social/collaborative elements of learning

III. Creativity

IV. Expressiveness

V. Engagement with a wider range of stakeholders

9. Learning Stories with the maximum potential to trigger the transformation of teaching and learning are identified.

10. Underlying change processes necessary to bring about transformation are identified.

We appreciate that some of the terminology above is open to interpretation. As referred to above, Appendix 1 below provides working definitions of many of the terms.

The table that follows maps the relationship between the Research Questions, Evaluation Criteria and Research Instruments.

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<tr>
<th>Research Questions</th>
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<tr>
<td>1) What are stakeholder perceptions of the impact of Learning Stories on: a) Teaching practices</td>
<td>4) Teachers’ technical skills and understanding of the pedagogical use of digital tools increases</td>
<td>1. Teacher questionnaire (teaching practices; motivation and engagement; learning activities; attainment)</td>
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<td>6) The Learning Stories used by teachers in the pilots are perceived to be innovative by all stakeholders, whilst remaining connected to current practice</td>
<td>6. Teacher interview</td>
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<td>7) Learning Stories used by teachers in the pilots are successful and of good quality</td>
<td>7. Head-teacher interview</td>
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<td>8) There is evidence that the adoption of a Learning Story will lead to a long-term change for a</td>
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<td>9. Student group interview</td>
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<td>11. NPC interview</td>
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<td>Question</td>
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<td>2) To what extent does the implementation of the Learning Story lead to any form of transformation? Which Learning Stories have the maximum potential to have a transformative effect?</td>
<td>1. Teacher questionnaire 6. Teacher interview 8. ICT co-ordinator interview</td>
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<td>3) How effective are iTEC national and local support and mechanisms for local implementation (including the development of technical and pedagogical knowledge and skills)?</td>
<td>1. Teacher questionnaire (preparation) 6. Teacher interview 8. ICT co-ordinator interview 11. NPC interview</td>
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<td>4) How do teachers perceive the Learning Stories in relation to quality (how easy it is for teachers to implement a Learning Story including the selection and combination of a range of people, tools, resources and services; connection to current practice; what works and what doesn’t work)?</td>
<td>1. Teacher questionnaire (implementation and future use) 6. Teacher interview 8. ICT co-ordinator interview 11. NPC interview</td>
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<td>5) What are the enablers and barriers to the process of implementation?</td>
<td>Synthesised analysis of data from Criteria 1-9 1. Teacher questionnaire (future use) 6. Teacher interview 7. Head-teacher interview 11. NPC interview</td>
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</table>

Teacher: 1. Teacher questionnaire 6. Teacher interview 8. ICT co-ordinator interview
1.5 OUTLINE OF EVALUATION REQUIREMENTS (CYCLE 1)

Please note that the following outline is for guidance only and can be adapted according to local/national practices (such as school holidays in June or July).

36. June: NPCs to attend a half-day online workshop during which the evaluation approach, protocols, research instruments and all evaluation/data collection requirements will be explained. All participants will receive an Evaluation Handbook.

37. June: NPCs complete 1 side of A4 describing what innovative practice might look like in the national/regional context.

38. June-July: Identify 3 teachers from 2 or 3 case study schools who will participate fully in the evaluation.


40. June-Sept: (prior to large-scale pilots, as part of WP4): Design and deliver local face-to-face and online workshops for teachers participating in large-scale pilots (see D4.2 section 3.8, DoW task 4.5 p23). Please note that this may be provided through more informal means such as email and that the facilitation of the pilots may or may not involve technical and/or pedagogical training. This will depend on the expertise of the participating teachers and the technical requirements of the Learning Stories in each cycle.


42. Encourage all teachers to use the teachers’ community to share experiences, discuss issues and seek advice.

43. Oct-Dec: Spend one day with each case study teacher
   o Observe a lesson in which the Learning Story is being implemented, taking field notes (30-60 mins)
   o Collect any documentation relating to the lesson (lesson plan, resources)
   o Interview the teacher (20-30 mins)
   o Group interview with 6-8 students (20-30 mins)
   o Interview head teacher (20-30 mins)
   o Interview ICT co-ordinator (20-30 mins)

44. Dec-Jan: Write case study report for each case study teacher (3 sides of A4).

45. In cycles 3, 4, 5 arrange transcription of interview data and translate all data (field notes, interview data, multimedia stories, lesson plans/resources) for one case study (case study report not required in these cases).

46. Oct-Dec: On completion of the Learning Story implementation all teachers must complete an online questionnaire (alternative formats can be provided on request and a pdf version will be made available to NPCs for distribution as required) which will take no longer than 20 minutes.

47. Oct-Dec: During one cycle in the lifetime of the project a member of WP5 will visit for 2 days to observe data collection from case study schools. Dates and times will be negotiated with NPCs.
Please note that our expectation is that NPCs from Associate Partners will as a minimum:

- Ensure that participating teachers complete the online questionnaire.
- Be available to be interviewed by WP5.

Associate Partners are invited to participate fully in the case study data collection should they wish to do so.

1.6 IDENTIFYING PARTICIPANTS

1.6.1 iTEC School selection criteria

To be an iTEC school, the school should have:

- A supportive head teacher/senior management team who will commit to the project and who will provide feedback on the organisational changes that may be required by some of the iTEC Learning Stories in order to ensure their full implementation within their school.
- At least two ICT confident teachers (who could also be the head teacher or a senior manager) who are:
  - Making innovative and effective use of learning technology/technologies in a classroom (preferably a learning environment other than the school’s computer suite/ICT room).
  - Motivated to experiment with new learning technologies and innovative pedagogical approaches and who are willing volunteers and prepared to commit to the project.
  - In a permanent post in the school, in order to warrant continuity of work in the school over a sustained period.
  - Willing and committed to be involved and deeply engaged in a long term project (that could be linked with graduate studies in the field of ICT in education.) From a range of teaching subjects and school levels to ensure that a variety of subjects and levels are represented across iTEC as a whole (teachers from the same school need not be from different teaching subjects but it would be preferable if they were).
  - In an influential role such as ICT co-ordinator, lead teacher or school-based teacher trainer.
- A designated ICT co-ordinator (in primary schools this may be one of the above ICT confident teachers) willing to commit to and support the project.
- ICT technical support for the teachers involved in the project (desirable).

Based on iTEC DoW, pp21-22 of 69

Therefore, the selection strategy is purposeful and those involved will represent innovative ICT teachers, but not necessarily all teachers. This approach is considered to be essential in order to avoid drop-out or limited progress. The teachers involved need to be willing to try out new approaches and to be innovative in the classroom.
1.6.2 Selection of iTEC classrooms

For clarification we are defining "classrooms" as "classes of learners" simply because one teacher may engage with one Learning Story with more than one of his/her classes (for example 2 classes in the same year group but of differing abilities OR 2 classes in differing year groups etc.) As teachers and educationalists know, no two classes have the same "chemistry" and therefore the different "class" responses to the same Learning Story could vary (and, indeed the same classroom might be differently managed/arranged/organised for different classes of learners even if they are engaged in the same Learning Story).

The teacher implementing a Learning Story could teach all the lessons in the same "classroom" (for example a secondary science teacher might teach in the same lab all the time), but having used the same Learning Story with 2 different classes, that one teacher will contribute 2 of the 1000 "classrooms" expected to validate the Learning Stories developed in the project. Teachers will need to be aware that, if they use the same Learning Story with more than 1 class, they will need to complete a questionnaire for every class that is involved in the Learning Story pilots. For this reason, it is recommended that no teacher uses more than 2 classes for any one Learning Story.

Although a teacher may have taught several lessons to one class (related to one Learning Story), that one class of learners would only count as one 1 of the 1000; i.e. "class" does not equate to "a single lesson".

The term “classroom” will continue to be used in all iTEC documentation in order to ensure linkage with all work packages, but “classes” as described above will be assumed throughout.

The Performance and Research indicators have been used to generate the sampling strategy and selection criteria for schools and for case study schools (separate criteria). They are explained in the DoW Part B on page 20. They are important for the success of the validation and the evaluation processes.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Learning Stories taken to large scale per cycle min/max (decision taken by GA, process to be reviewed for Cycle 2)</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Minimum number of classrooms involved per cycle in large-scale testing (WP4)</td>
<td>250</td>
<td></td>
</tr>
<tr>
<td>Minimum number of countries involved in testing each Learning Story in a large-scale pilot (WP4)</td>
<td>5</td>
<td>13</td>
</tr>
</tbody>
</table>
A country must participate in at least 4 cycles.

Each country must participate in the first cycle and provide a minimum of 10 classrooms. Please note that the indicator relating to the number of classrooms involved in each cycle will not be met in the first cycle – this is an exception. For example, a MoE could involve a small number of schools (i.e. only 3-5). It is actually preferable in the first cycle to start with a small number of schools in order to try out the implementation and evaluation procedures.

Our assumption is that a Learning Story may be piloted in more than one cycle, possibly with some form of further refinement or additional development. If so, then it would be desirable to pilot a Learning Story for a second time with schools which piloted it the first time and also new schools which have no prior experience of the Learning Story.

New classrooms can be introduced to the project during any cycle.

1.6.3 Meeting the required numbers of classrooms (classes)

- Over the course of iTEC each country will provide data from an agreed number of classes as negotiated with the WP4 leader on a case-by-case basis (typically around 80). However, the same teachers (and, indeed, the same classes) could be involved in more than one cycle in order to achieve this. And the same teacher could provide data for more than one class.
- We do not expect any one country, over the life of the project, to collect data from more than the agreed number of classes. MoEs may wish to identify several teachers from within a single school, though no teacher should engage with the Learning Story with more than two classes (see Section 4, paragraph 2)
- It will be acceptable for a country to involve more than the agreed number of classes if they wish to do so.
- Each country needs to identify at least 40 classes for at least one cycle (which we suggest should be in cycles 3, 4 or 5).
- The selection of Learning Stories to be implemented in each cycle will need to be negotiated with the leader of WP4 as we need to ensure that at least 5 countries pilot each available Learning Story during each cycle. In the cycle when a country offers 40 classrooms it would be preferable for those classrooms to pilot the same Learning Story in order to be able to conduct quantitative analysis on a country-by-country basis as well as aggregate responses across the whole project.

The following is an example of what one country’s involvement might look like:
A country agrees to provide 80 classrooms
5 classrooms participate in the first cycle
15 classrooms participate in the second cycle
40 classrooms participate in the third cycle
This country does not participate in the fourth cycle
20 classrooms participate in the fifth cycle

1.6.4 Case study selection criteria for each country participating in a single cycle

Case studies are likely to include Learning Story implementations which will be judged as being ‘successful’ to varying degrees. In each cycle, each participating country’s NPC should identify 2-3 case study schools PRIOR to engaging in the pilot. This is necessary in order for teachers to fully document the process of implementing the Learning Story. 3 case studies are required from each participating country in each cycle and NPCs will need to identify 3 case study teachers from their selected case study schools. The same case study schools (and teachers) could be used in every cycle if preferred, but this is not a specific requirement. There will inevitably be greater demands on case study teachers (see 4.3.1 below) and NPCs should consider possible incentives for these teachers. In addition, these teachers will be acknowledged in all applicable evaluation reports unless they request otherwise.

What is a case study teacher’s required commitment?

It is worth noting here, that the time a teacher uses to engage with a Learning Story in each cycle could be highly variable as teachers understandably will want to make use of the Learning Stories in their own particular ways (e.g.: one teacher may wish to use the Learning Story to create one Learning Activity to be undertaken during one lesson, whilst another teacher may wish to use the same Learning Story to develop a series of Learning Activities to be undertaken over a series of lessons). Any variation in engagement with the Learning Stories is acceptable for the purpose of case study evaluation (as long as the Learning Story engagement falls within the specified piloting period). However, it is the responsibility of the NPCs to discuss issues related to time allocation with the selected teachers and their Head Teachers/school managers.

In order to show the extra commitment a case study teacher needs to make, the requirements for all iTEC teachers are listed below and requirements that are additional for fully engaged case study teachers are highlighted in bold.

All teachers new to the project will first be introduced to iTEC and then will engage in the following:

1. Training (if appropriate) and introduction to the Learning Story.
2. Planning one or a series of Learning Activities to teach (including resource preparation).
3. Teach one or a series of lessons using the Learning Activities.
4. Be observed whilst teaching one of the Learning Activity lessons.
5. Be interviewed after observed lesson (approx 20-30 minutes).
6. Arrange for a group of 6-8 students (from the observed lesson) to be interviewed by the lesson observer as soon after the lesson as possible (approx 15 minutes to select students and to book interview room).
7. Communicate/network (throughout the above activities) with other teachers involved in Learning Story implementation.
8. Write a multimedia story in diary/journal style (see guidance notes below) about their holistic experience of the Learning Story (approx. 2/3 hours over the Learning Story implementation period).
9. Complete the online questionnaire as soon as their Learning Story pilot has been completed.

The 2-3 schools selected as case study schools from which the 3 case study teachers will be chosen must:

- Be representative of the range of schools involved in iTEC nationally (i.e. according to proportions of primary and secondary schools) in the cycle.
- Be representative of all schools in the country (as far as possible given the school selection criteria) with no more than one classroom from a school that is considered to be highly innovative (i.e. atypical) in terms of the use of technology to support teaching and learning.
- Have access to the appropriate technology to support the Learning Story implementation (the technology available may or may not meet the requirements for the Learning Story; in the latter case the Learning Story may be partially implemented or alternative tools may be adopted).

The teachers involved must represent a range of teaching subjects including at least one from Science, Technology, or Mathematics (subject to the requirements of the Learning Stories put forward for large-scale piloting). In addition, where primary school teachers are involved they could focus on one or more of these subject areas when implementing the Learning Story.

1.7 FOCUS OF EVALUATION OF LARGE-SCALE PILOTS

The main focus of the evaluation is presented in the diagram below. However, data relating to the following preparatory events/processes (carried out by WP2/WP3/WP4) will be collected in order to provide a context for the evaluation:

- 20 educational scenarios proposed
- Scenarios transformed to Learning Stories
• Pre-pilots of Learning Stories
• 2-3 Learning Stories selected for large-scale pilots

### 1.8 RESEARCH INSTRUMENTS AND PROTOCOLS REQUIRED

<table>
<thead>
<tr>
<th>Research Instrument</th>
<th>When?</th>
<th>Who?</th>
<th>How?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Teacher questionnaire</td>
<td>Immediately following completion of Learning Story implementation</td>
<td>All participating teachers complete independently. NPC monitors completion rate</td>
<td>Online, paper-based version (PDF) available as necessary</td>
</tr>
<tr>
<td>2) NPC Pro-forma to</td>
<td>June 2011</td>
<td>NPC completes in first</td>
<td>Electronic form will be</td>
</tr>
<tr>
<td>Task</td>
<td>Description</td>
<td>Cycle</td>
<td>Notes</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>1) Define local innovative practice (for inclusion in Knowledge Map)</td>
<td>cycle only</td>
<td>emailed to all NPCs</td>
<td></td>
</tr>
<tr>
<td>3) Multimedia Story: guidance and exemplar</td>
<td>From beginning to completion of Learning Story implementation</td>
<td>Case study teachers only</td>
<td>Online Diary blog or Journal repository, via the Teacher Community site</td>
</tr>
<tr>
<td>4) Lesson observation guidance</td>
<td>Towards the end of the case study teachers’ implementation of Learning Stories</td>
<td>NPC to observe all case study teachers for one lesson in a Cycle</td>
<td>Field notes; can be digitally recorded if desired (personal choice)</td>
</tr>
<tr>
<td>5) Documentation</td>
<td>Collected during case study visits or electronically immediately after visit</td>
<td>NPC to request/collct relevant documentation including lesson plans/lesson evaluations etc</td>
<td>Paper and electronic documentation as available</td>
</tr>
<tr>
<td>6) Teacher interview schedule</td>
<td>Immediately after observed lesson</td>
<td>NPC to interview case study teacher</td>
<td>Audio recorded; field notes</td>
</tr>
<tr>
<td>7) Student group interview schedule</td>
<td>Immediately after observed lesson</td>
<td>NPC to interview student group</td>
<td>Audio recorded; field notes</td>
</tr>
<tr>
<td>8) Headteacher interview schedule</td>
<td>During case study visit</td>
<td>NPC to interview head teacher</td>
<td>Audio recorded; field notes</td>
</tr>
<tr>
<td>9) ICT co-ordinator interview schedule</td>
<td>During case study visit</td>
<td>NPC to interview ICT co-ordinator</td>
<td>Audio recorded; field notes</td>
</tr>
<tr>
<td>10) Case study report pro-forma</td>
<td>As soon as possible after completion of case study visit</td>
<td>NPC to produce based on observation, interviews and documentation</td>
<td>Electronic form to be submitted to WP5</td>
</tr>
<tr>
<td>11) NPC interview</td>
<td>Towards the end of each cycle</td>
<td>WP5 leaders to interview NPC</td>
<td>Via telephone or face-to-face if visiting country; audio recorded; field notes</td>
</tr>
</tbody>
</table>

**Note:** Research Instruments 4) -10) are to support the writing of the NPC case study reports (see below).
2 RESEARCH INSTRUMENTS AND PROTOCOLS

Please note that, although these instruments will be used in each cycle, the questions asked will be reviewed at the end of each cycle and may change as the project progresses. Therefore, the instruments that are included in this document are specific only to Cycle One.

2.1 TEACHER QUESTIONNAIRE

At the end of each Learning Story implementation, all participating iTEC teachers including those from Associate Partner countries are required to complete the online questionnaire/survey. It will take no longer than 20 minutes for teachers to complete. This will be verified by piloting the questionnaire prior to Cycle 1.

The online survey will collect quantitative data to capture perceptions from all participating teachers in relation to:

48. the impact of the technology/Learning Story/Learning Activities on:
   o teaching practices and attitudes
   o learner attitude and attainment
   o individualisation
   o social/collaborative elements of learning
   o creativity
   o expressiveness
   o engagement with stakeholders
49. the overall transformative effect of the technology/Learning Story/Learning Activities
50. classroom design
51. national approach to project introduction and implementation
52. local support for the project; technical and professional
53. what works and what doesn't work
54. barriers/enablers
55. good practice
56. overall perceptions of the project, Learning Story and technology

Most questions will be statements which teachers will need to indicate their level of agreement with:

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly Agree

Where appropriate a ‘not applicable’ option will also be offered.
The questionnaire will be presented online via the Teacher Community using Survey Monkey. Teachers will be able to save and return to their survey at a later time as long as they use the same computer and do not delete cookies on that computer. Filtering will be used if appropriate. Basic information about individual teachers and the classes of learners involved will already have been collected via WP4 – the online registration system once available.

The last section of the questionnaire will be formed of open ended questions requiring brief responses. We will ask teachers to respond in English if possible but teachers may respond to these questions in their own language. We will then translate the responses ourselves drawing on local expertise/native language speakers where possible and using online translation tools otherwise. There is no requirement for NPCs to arrange translation of open responses.

NPCs are responsible for ensuring that all participating teachers complete the online questionnaire. Teachers should be encouraged to complete the questionnaire as soon as possible after completing the implementation of the Learning Story. A mechanism will be implemented which will ensure that non-responders can be identified and follow-up requests for completion can be made. This information will be shared with NPCs as appropriate.

The questions below will be presented within Survey Monkey on separate pages to minimise information overload. It will be piloted with at least 5 teachers from at least 3 countries. The final version will be available by the end of September 2011.

NPCs will need to arrange for the questionnaire to be translated if required.

It is organised into 3 sections:

- Preparation: training and support provision, use of teacher community
- Implementation: digital tools, teaching practices, individualisation, collaboration, creativity, expressiveness/engagement, learner attitudes, teacher attitudes, attainment
- Future use: changes, issues, benefits, potential, intended future use, dissemination
# 2.1.1 Preparation

How many training session/workshops (run by your National Co-ordinator or ICT co-ordinator) did you attend in preparation for the implementation of the Learning Story?

___ out of ___

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>In preparation for implementing the Learning Story…</th>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>the training sessions/workshops/resources provided appropriate technical skills to support the implementation of the Learning Story.</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>2</td>
<td>the training sessions/workshops/resources introduced me to new pedagogical approaches.</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>the training sessions/workshops/resources introduced me to new ways to use technology to support teaching and learning.</td>
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<tr>
<td></td>
<td>the training resources were easy to locate.</td>
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<tr>
<td></td>
<td>with no help, I was able to adapt the Learning Story to suit my particular needs.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>In relation to the online teachers’ community…</th>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>I have been an active and regular user, visiting the community at least once a week.</td>
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<td></td>
<td>I have found it easy to use.</td>
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<tr>
<td></td>
<td>participating has been useful for discovering new ways to use technology to support teaching and learning.</td>
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<td></td>
</tr>
</tbody>
</table>
### 2.1.2 Implementation

**Digital tools**

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>The digital tools I used when implementing the Learning Story …</th>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>were ones I had not used before.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>7e</td>
<td>were essential for the Learning Story implementation.</td>
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</tr>
<tr>
<td>7f</td>
<td>could be replaced by other digital tools.</td>
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<tr>
<td></td>
<td>were easy to use.</td>
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<tr>
<td></td>
<td>could be replaced with non-digital resources.</td>
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<tr>
<td></td>
<td>were powerful tools for supporting teaching and learning.</td>
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</tr>
</tbody>
</table>

**Teaching practices**

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>The implementation of the Learning Story enabled me to…</th>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 a</td>
<td>include content not previously introduced.</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>8 b</td>
<td>incorporate approaches to teaching that facilitate different approaches to learning.</td>
<td></td>
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</tr>
<tr>
<td>8 c</td>
<td>assess students in a new way.</td>
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<tr>
<td>8 d</td>
<td>create opportunities to learn beyond the boundaries of the classroom.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>explore different teacher and student roles and relationships.</td>
<td></td>
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</tr>
</tbody>
</table>
# Individualisation

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>The implementation of the Learning Story enabled me to adopt teaching strategies to …</th>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 c</td>
<td>meet the individual learning needs of my students.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 b</td>
<td>track each student’s progress.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 f I</td>
<td>support students to work independently according to their interests and abilities.</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

# Collaboration

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>The implementation of the Learning Story resulted in my students…</th>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 f II</td>
<td>having increased opportunities for collaborative activity.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>developing new skills for collaborative work.</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>using digital tools to support collaborative activities.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

# Creativity

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>The implementation of the Learning Story enabled…</th>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 f III</td>
<td>creative activities to take place.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>students to develop their creativity.</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>me to develop my creativity as a teacher.</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
Expressiveness and engagement with the wider community

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>The implementation of the Learning Story enabled my students to…</th>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 c</td>
<td>express their ideas in new ways using digital tools.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>8 f IV</td>
<td>communicate in new ways with each other.</td>
<td></td>
<td></td>
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<tr>
<td>8 f V</td>
<td>communicate with me in new ways.</td>
<td></td>
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<tr>
<td></td>
<td>communicate in new ways with the wider community (e.g. other teachers, parents, experts).</td>
<td></td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

Learner attitudes: motivation and engagement

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>The implementation of the Learning Story …</th>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>7a</td>
<td>actively involved students in tasks.</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>7c</td>
<td>led to students being immersed in their work (so that they did not notice time passing, for example).</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>has had a positive impact on student attitudes to learning.</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Teacher attitudes: motivation and engagement

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>Because of my experience of the implementation of the Learning Story …</th>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>7a</td>
<td>I will use technology more often in the future.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>7d</td>
<td>I feel that the investment required was worthwhile.</td>
<td></td>
<td></td>
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<tr>
<td>8e</td>
<td>I think that students learned new concepts which would be difficult to teach otherwise.</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>I have become more enthusiastic about my job.</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>I feel that the Learning Story presents exciting opportunities to do things differently in the classroom.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Professional development

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>The implementation of the Learning Story has led to improvements in …</th>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>my skills in the use of digital tools.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>4</td>
<td>my knowledge of the pedagogical use of ICT.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 b</td>
<td>my understanding about the potential of integrating ICT in my teaching practice.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 e</td>
<td>my understanding about the ways that students can learn.</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Student attainment

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>The implementation of the Learning Story has led to improvements in …</th>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 c</td>
<td>my students’ levels of attainment (as indicated by my assessment data).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.1.3 Future use

If I used the same Learning Story again, I would: . . .

The real benefit of the Learning Story is: . . .

If I used the same Learning Story again, I would not: . . .

The main problem with the Learning Story is: . . .

I think that this Learning Story has the potential for innovative practice in the classroom in the future: Yes – Definitely, Yes – Probably, No.

Explain why or why not: . . .

I intend to use the Learning Story again in the future: Yes - Definitely, Yes - Probably, No
I would recommend that this Learning Story should be made widely available to other teachers. Yes – Definitely, Yes – Probably, No

Explain why or why not: . . .
2.2 PRO-FORMA TO DEFINE LOCAL INNOVATIVE PRACTICE

This is required to provide a baseline of what constitutes innovative practice in each country. NPCs will be asked to provide some contextual information about what constitutes innovative practice with regards to teaching, learning, and technology. This will happen in the first cycle only.

A question for NPCs: What is Innovative Practice in your Country?

In relation to the use of ICTs and learning technologies, "innovative practice" reveals itself in many different ways across our iTEC partner countries. Therefore, in order to capture each country's baseline expectation of "innovative practice" (that includes the use of ICTs/learning technologies), NPCs are required to provide WP5 with up to 1 side of A4 describing what they might expect to see in classrooms where teachers are engaged in "innovative pedagogy" and their learners are engaged in "innovative learning".

This information will be included in each country's section of the Knowledge Map and will provide an important "local baseline" for WP5's evaluation of the pilots.

The two questions NPCs will address, in no more than 150 words each are:

- If you were asked to nominate innovative practitioners who are making exemplary uses of ICT in your country, how would you describe them (what pedagogical aspects and technical aspects do you consider to be innovative)?

- What would be the 3 main criteria you would use to judge whether or not classroom practices with ICT could be considered to be innovative?

In addition NPCs will be asked to select the Learning Stories from Cycle 1 which they consider are the most innovative, taking into account the local context.

The pro-forma will be an electronic document that will be circulated separately.
2.3 GUIDANCE FOR THE COLLECTION OF CASE STUDY DATA BY NATIONAL PEDAGOGICAL CO-ORDINATORS

The purpose of the case study data collection is to inform the Case Study Report (CSR).

The purpose of the CSR is to obtain as full and clear a picture as possible about the way a teacher is implementing the Learning Stories.

2.3.1 Guidance for the Case Study Teacher’s iTEC Multimedia Story

In order to help support case study teachers in their writing of multimedia stories, guidance is presented below as a set of questions and answers. Key points within the sections are highlighted in bold type.

Because this section provides information for case study teachers, these guidance notes are also produced as a separate document located on the Teachers’ Community site (see: “Guidance for Case Study Teacher’s iTEC Multimedia Story”)

2.3.1.1 What is a multimedia story?

There are many definitions of “multimedia story”, but for the purposes of this project, our definition of an iTEC Multimedia Story (this is quite a lengthy name, so we’ll refer to it as an iMmS) is as follows:

- it is essentially a story written in simple straightforward language\(^6\) about a teacher’s and his/her students’ experiences of implementing an ITEC Learning Story.
- it is a text-based journal or diary style narrative that is augmented\(^7\) by a selection of any of the following media items:
  - still photographs
  - video clips
  - audio
  - graphics
  - hyperlinks to websites
  - possibly other documents

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\(^6\) It is preferable for your iMmS to be written in English for sharing purposes, but if this is difficult, then it can be written in your own language. Remember, though, that it can be more widely shared if written in English.

\(^7\) Media items should support/add to the written narrative.
WP5: Task 5.3

(such as hand-outs, lesson plans, work-sheets etc)

- possibly diagrams
  (showing, for example the class’s seating arrangements, an outdoor learning area or a plan of the school);

- it does not have to include all of the multimedia examples referred to above;
- it does not have to include large amounts of written content.

**Note:** *It is essential* that Permissions are sought and granted in accordance with the country’s legal requirements before including any images of students, teachers or other persons in the iMmS.

### 2.3.1.2 What are the purposes of an iMmS?

There are two main purposes for the iMmS:

1. to capture your experiences of:
   - how you are integrating technologies into your existing pedagogy (teaching practices)
     
     *(think about:)* what you are doing with the technology in your teaching that you would not/could not have done before.
   - how your teaching practice (pedagogy) is beginning to change or is likely to change over time;
     
     *(think about:)* all aspects of the way you are implementing the iTEC Learning Story and consider what is having an impact on the way you are teaching and the way your students are learning. Then consider what is likely to have a long-term impact on your teaching and the way your students learn.
   - how the design of Professional Development is (or is not) helping you to adjust your teaching practices;
     
     *(think about:)* the training, support and development opportunities that are supporting you to use the technology and any new practices you are beginning to employ).
   - the main barriers to and enablers of changes to your practices
     
     *(think about:)* any problems/barriers that you and/or your students are experiencing/have experienced in implementing the Learning Stories and also consider what has been useful and has really helped you and/or your students to engage positively in new ways of working)

2. to share with other teachers (on the iTEC Teacher Community site) your iTEC experiences
(think about: you being able to get ideas from other teachers as well as them being able to benefit from your experiences; ie the mutual benefit of sharing your stories. All completed iMmS will be kept in a searchable iMmS Repository (see 2.3.6: “How do I share my story?”).

2.3.1.3 Who should write an iMmS?

- All case study teachers are required to write an iMmS.

- Other iTEC teachers can write an iMmS if they wish, but it should be noted that:
  a. taking on this additional work load will be the teacher’s own personal undertaking;
  b. there will be no extra time allowance to support this activity;
  c. anyone choosing to contribute their own iMmS must keep to these guidelines.

2.3.1.4 How do I structure my iMmS?

- You can choose to structure your iMmS in one of two ways:
  1. Chronologically
  2. Thematically

  It is preferable to keep to just one of the two structures for the whole of your story.

1. You can choose to present your story chronologically covering a variety of experiences as they occur in your iTEC lessons (such as, for example: describing the most exciting/surprising/disappointing/groundbreaking aspects of a lesson with some attempts to explain the reasons behind the selected elements of the lesson).

This is very much like writing an on-going diary and therefore, this style of story is referred to as an iMmS diary.
An extract from an iMmS diary is provided below.

(See section 3.1.5 for what to include in your iMmS)

Extract from an iMmS DIARY (the embedded links are shown in brackets and are described below because they are not “live” in this extract; the information included at the end (i.e.: KEY and NOTE) do NOT appear in the iMmS:

(start of extract)  
September 25th  (ITEC Lesson 3 of 6)  
(a) “The students (1) that were talking to our remote guest “expert” (Dr X) (2) through the interactive whiteboard (3), spent too long being shy and quiet at the beginning of their virtual meeting and this meant that they didn’t have time to cover all the questions (4) they had collected from their classmates. I hadn’t considered this “time issue” and will need to alert my students to this possible problem when they have their next virtual meeting with a guest expert. However, the students actually solved the problem themselves this time by asking Dr X if they could send her the questions via email and if she could recommend any reliable websites to help them continue with their search for information . . . if I’d asked them to do this, they would have had a good moan and thought of it as a bit of an imposition, but they were so enthusiastic about setting this up themselves. (5).” (b)

Key Words/phrases/Tags: collaborative learning; student attitude/motivation; external expert. (end of extract)

KEY:  1 link through to photo of group sitting round the IWB talking to Dr X;

2 link to website about Dr X;

3 link to hand-drawn diagram showing where student groups were located in classroom and very brief notes included on diagram about what tasks they were undertaking;

4 link to document (copy of the questions);

5 link to audio clip of students’ reactions after the meeting.

NOTE:  1 This teacher always includes a link to her lesson plan at the beginning of an entry (a) and a link to her Lesson Evaluation at the end (b).

2 The entry presented above is the full entry for 25th Sept.

2. You can choose to present your story thematically presenting focused information and reflections on specific elements of teaching and learning with the Learning Story (there may be sections on, for example: “using the technology”, “some changes in my teaching/planning”, “the limitations of my classroom”, “the way I implemented the Learning Story”, “my students’ responses to the technology/to the Learning Story” etc).   Writing thematically
means that rather than writing a chronological narrative, you are choosing to navigate through various key elements of your story capturing media items and making brief notes related to your chosen themes throughout all your iTEC lessons. At the end of your Learning Story implementation, you then construct your iMmS with a separate chapter/section for each of your themes.

This is like writing a journal and therefore, this style of story is referred to as an iMmS journal.
An extract from an iMmS journal is provided below.

(See section 2.4.5 for what to include in your iMmS)

Extract from an iMmS journal (the embedded links are shown in brackets and are described below because they are not “live” in this extract; the information included at the end (ie: KEY and NOTE) would NOT appear in the iMmS:

(start of extract)  
Assessment and Individualisation (1 of 3 entries for Assessment)  
“The students are benefiting so much from our use of the Learner Response Devices (LRDs) (1) since we started using the self-paced software (2). They found it much more interesting to use the LRDs once they could answer questions at their own pace (3) and they appreciated my interventions when I could see on my laptop that they were struggling with certain questions (4). After one particular lesson (5), my students and I reviewed our use of the LRDs and our review is captured in my lesson evaluation (6). I feel as though I am actually beginning to see how I can use assessment for individualised learning.”

Key Words/phrases/Tags: assessment; individualisation; learner response devices; self-paced assessment  
(end of extract)

KEY:  
1: link through to video clip on website that shows the LRD and how it works;
2: link to website the self-paced software;
3: link to photograph showing students using the LRDs in class;
4: link to audio clip of brief discussion between teacher and student about a problem;
5: link to lesson plan;
6: link to lesson evaluation.

NOTE: The entry presented above is the first of 3 entries about Assessment.

2.3.1.5 What should I include in my multimedia story?

Before you write anything in your story, re-visit the purposes of the iMmS and let these serve as a broad guide for the content of your story whether it is presented as an iMmS diary or an iMmS journal. Refer back to these frequently when writing as they will help to keep your story focused.

➢ All diaries and journals will need:
1. a context which provides the following details:
   - The age of your students and the number in your class;
   - The subject/topic you are teaching
   - The Learning Story that you are implementing
   
   Note: This contextual information should be included at the beginning of your story whether you are writing a diary or a journal.

2. to include brief information about your iTEC experiences before you start to implement the Learning Story (e.g.: how were you introduced to your Learning Story? what training were you given? what went well?/what didn’t go so well? ... and reasons why);
   - Diary writers: include one brief pre-implementation entry
   - Journal writers: include one slide that captures your pre-implementation experiences.

3. to include entries about your implementation of the Learning Stories with your students (see below);

4. Key Words to help make the iMmS stories “searchable” and easier to share. Key Words relate to the purposes of the iMmS and teachers will select their Key Words from “drop-boxes” or will create “tags” when submitting their stories on the Teachers’ Community site.

   - Diary writers: select Key Words or create Tags every time they blog (i.e. each time they make a diary “entry”)
   - Journal writers: select Key Words or create Tags when they upload their completed journal.

   ➢ If you choose to write an iMmS diary, select the most interesting points (remembering the purposes of your story) that you would like to share from each iTEC lesson and briefly tell your story deciding where you might include the media items you have captured in your lessons or whilst planning them.

   ➢ If you choose to write an iMmS journal, you will need to decide, right at the beginning of your teaching with the iTEC Learning Story, what your themes are going to be (e.g.: changes in your practice, your students’ learning, assessment, individualisation, collaborative learning, learning space/s, involvement of others beyond the classroom etc). Keeping the main iMmS’ purposes in mind, you will need to choose 3/4 themes (preferably 3).

   ➢ Whichever style you choose, it will be helpful to include links to lesson plans and evaluations where you feel these will support your story or even tell a large part of the story for you and this will help to save you some time by avoiding too much narrative! Another way of including lesson evaluation may be, for example, an extract from an audio recording of your students reviewing a lesson. This is not only a demonstration of interesting practice, but (with their permissions of
course!) a clip of the recording would also be a rich source of feedback/information that you can include in your story.

- Whichever style you choose, you will need to remember:
  - to plan for capturing/recording the media items (photographs, audio/visual recordings, graphics, screenshots etc) throughout your iTec lessons;
  - to collect any pieces of student work that you would like to share in your iMmS.
  - to make sure you know how to use your recording equipment and check that the equipment works (e.g.: think batteries!)
  - to ensure you have appropriate permissions to capture and make use of photographs, audio and visual recordings

2.3.1.6 How do I share my story?

- It is advisable to use a presentation tool (eg PowerPoint, Prezzi, Penzu: www.penzu.com, LDS journal: www.ldsjournal.com, loggel: www.loggel.com) for Journal writing and to write your Diary as a Blog:
  - Presentation tool and Journal writing:
    - You can tell your story and embed all your media items in the slides (eg 2/3 slides for each theme/chapter of your journal) and of course you can use the “Notes” facility if you need to explain some of the story in a little more detail.
    - A completed Journal should not have more than 12 slides (plus notes).
    - You will be required to provide your Key Words/Tags before uploading your iMmS
    - Instructions about selecting your key words and uploading your Journal will be provided on the Teachers’ Community site.
  - Blogs and Diary writing:
    - You can start your Blog in the dedicated iMmS area of the Teachers’ Community.
    - You will find all the instructions about starting your Blog and how to upload your media items in this area.
    - You will be required to provide your Key Words for each entry you make on the Blog (i.e. each diary entry).
    - Instructions about selecting your key words will be found on the Blogging area of the Teachers’ Community site.

- All iMmS will be kept in a dedicated area on the Teacher Community website. All iTec teachers and project partners will have access to this area and there will be instructions about how to search the iMmS.

- Please note that Tutorials about how to upload and share your Diary blog or your Journal presentation can be found on the Teachers’ Community site (available from mid-July).
2.3.1.7 *What about time and effort involved in writing the iMmS?*

- You should start your iMmS as soon as you become involved in iTEC and some of your story should refer to your introduction to the project and the Learning Story.

- Your iMmS should be completed when the Learning Story implementation ends.

- Remember that media such as photographs, video clips, text, diagrams and voice (as appropriate and depending on local availability of suitable technologies) can capture processes, practice and interesting situations in ways which are not as time-consuming as writing narrative.

- You do not need to spend time making iMmS into polished pieces – rather they will be collections of media and **brief narrative reflections** that document your experiences (either in diary or journal style) of the different stages of the implementation process.

- We estimate that completing an iMmS might involve 2-3 hours work over a four month period (for example, spending 15-20 minutes at regular intervals documenting the process [for diary and journal writing] in the fastest possible way and in the style that is most appropriate for you, then perhaps 30 minutes when the Learning Story is actually implemented in the classroom).

- The ways you spread and allocate your time is entirely your choice, but try not to exceed 3 hours in total.

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*Please remember that the guidelines above are just that: guidelines. The most important things to remember are that you have a story . . . it is a story worth telling and others will benefit from reading it. Good luck with your iTEC multimedia story!*
2.3.2 Guidance on the NPC Visit to the Case Study Teacher

2.3.2.1 Introduction

Work Package 5 acknowledges that, in partnership with us, National Pedagogical Co-ordinators (NPCs) play a vital role in the collection of qualitative data from case study teachers (CSTs) and school-based (S-B) stakeholders in their countries.

This section provides guidance for all NPCs in order to aim for a consistent approach to the data collection activities across the iTEC partner countries.

Because consistency across the countries is highly desirable, it is important that the data collection protocols described in this document are, within the bounds of local political and cultural contexts, adhered to where possible.

- This section of the document is presented as a set of guidance notes (addressed to the NPC), questions (that an NPC might ask) and answers that explain the data collection protocols.

- In each Cycle, when you visit each of your three case study teachers, you will be carrying out the following activities:
  - one observation of one iTEC lesson being taught by the case study teacher;
  - four interviews:
    - the case study teacher whose lesson you observed
    - a small group of students who participated in the observed lesson
    - the Head Teacher (HT)
    - the ICT Co-ordinator (ICTC)
  - Collection of case study teacher’s documentation

- The field notes, recordings and documents you collect from the above activities provide all the information you need to help you write each of the required Case Study Reports (CSRs). You will be provided with a CSR pro forma to help you structure your report (to be provided separately).

2.3.2.2 What do I need to do before my visit to the Case Study Teacher?

- 2/3 weeks before your intended visit to your case study teacher and his/her school, communicate (letter, email or phone call) with the Head Teacher⁸:
  - seek permission to carry out the iTEC Evaluation activities;

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⁸ It is assumed that the Head Teacher will be required to give permission for iTEC activities to take place in your schools, but if this is not the case and the you (NPC) are working directly with the case study teacher/s, then this letter will need to be sent to the case study teacher.
explain that the purpose of your visit is research focused and that you are not there in any way to assess the school, the case study teacher, or any other S-B stakeholder;

suggest a date for your visit. You will need a whole day if there is only one case study teacher at the school; two days if there is more than one in a school (see Notes 3-5 below).

• request that a schedule (see Notes 1-2 below) be prepared and rooms allocated to accommodate:

  ▪ observation of the case study teacher’s iTEC lesson (preferably the whole lesson);
  ▪ four interviews (each 20/30 minutes) with:
    - the observed case study teacher;
    - a group of students from the observed lesson;
    - the school-based ICT Co-ordinator (if there is one who is involved in iTEC);
    - the Head Teacher.

(Include/attach copies of the interview questions in your communication)

Notes for your attention
1: The schedule needs to be sent to you at least one week before your visit in case you need to suggest any changes.
2: Your schedule will need to include:
   - times/locations for your observation and your interviews;
   - time (on arrival preferably, but may be spread throughout your day) for introductions to S-B stakeholders (though, of course, you may already know them) and for “settling into the school” for the day (ie knowing where to find the classroom, the interview rooms, where to have lunch etc);
   - include a little time in the CST’s classroom before the observed lesson takes place, so that you can set up any recording equipment you may be using and you can work out (with the CST) the best place to locate yourself for observing the lesson (see Observation Guidance below).
3: The teacher and student interviews need to take place as a “suite of activities” (ie undertaken together with the interviews being carried out as soon as possible after the lesson observation).
4: The Head Teacher and ICT Co-ordinator interviews can be fitted in around the “suite of activities”.
5: Where the case study teacher is also the ICT Co-ordinator, then this person will be required to undertake two interviews (or extra time can be added to the end of the “teacher” interview). Also note, that if time does not permit the teacher with a dual role to undertake two interviews, the “teacher” interview must take precedence.

• explain whether or not you are intending to video record or take photographs of teachers and/or students in the lesson you will be observing (see Note 6 below) as permissions for these need to be agreed before your visit.

Note for your attention
6: You are not required to video record or take photographs of the lesson, but you may choose to do either (or both) of these for the purposes of recall when you are writing your Case Study Report.

➢ 2/3 weeks before your visit, write a similar letter to the CST or copy him/her into the Head Teacher’s letter⁹ (being guided by whichever is most appropriate and acceptable in your country; also see Footnote 6 above) that includes everything in the Head Teacher’s letter as well as informing the CST that:

- as part of your data collection requirement, you will need to collect, on the day of your visit, all iTEC lesson plans, evaluations and resources that have been completed prior to the lesson you will be observing (i.e. for previous, related lessons).
- 2/3 days before your visit, you will need to have a copy of the lesson plan for the lesson you will be observing. It is difficult to read this whilst you are beginning your observation. However, if sight of this before your visit proves to be impossible, then at least try to read through the aims and the objectives of the lesson before the lesson starts.
- you will be contacting the CST and/or school again 2/3 days before your visit to ensure that everything is in place for your visit.

➢ 1/2 weeks before your visit:
   - read through and familiarise yourself with the interview questions;
   - decide on how you will capture your observations of the iTEC lesson:
     - Video recording
       - This is not a requirement, but you might choose to seek permissions so that you have a visual prompt when you are writing your Case study Report;
       - It would also be beneficial for dissemination purposes to have video recordings or photographs from at least 2-3 lessons over the course of the iTEC project;
       - You may want to use a tripod; this can help to leave you free to make additional notes.
       - You may want to walk around with the camera, but remember to be the observer rather than an intruder!
       - Even though you may decide to record the lesson, it is advisable to make some notes and to use the areas included on the Observation Note Sheet¹⁰ (see Appendix 2) to guide both your recording and your note-taking.

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⁹ It does not matter if you write separate letters or a combined letter as long as the HT and the CST are clear about the requirements and the activities that need to be scheduled.

¹⁰ As part of your preparation for observing and interviewing, you will need to check the definitions in the Evaluation Plan for: individualisation; collaboration; creativity; expressiveness.
- Make a copy of the Observation Note Sheet to take with you on your visit.

- **Field Notes**
  - you may chose to use the Observation Note Sheet or simply use the areas included on the sheet to make your own notes.
  - Make a copy of the Observation Note Sheet to take with you on your visit.

- Decide what equipment you will need to take with you for the lesson observation and the interviews. Think:
  - note book (and a copy of the Observation Note Sheet)
  - pens
  - camera
  - digital video recorder
  - digital audio recorder (for the interviews)
  - tripod
  - batteries/leads/chargers/extension lead/memory stick

(always make sure you are familiar with a piece of equipment if it is something you have newly acquired for the activity).

- **2/3 days before** your visit, contact the teacher in order to:
  - provide assurances to the teacher that your role in his/her classroom is that of **observer and not assessor**;

  - if you have not already received it, request a copy of the lesson plan for the lesson you will be observing; you will need to read it before your visit;

  - check that:
    - everything has been organised for your visit (permissions, schedule, rooms etc);
    - everyone being interviewed has been informed;
    - there are no changes to your schedule (if there are, you will need to request a copy of the new schedule);
    - that you both know your time of arrival;
    - that you know what to do on arrival at the school;
    - that documentation (lesson plans and evaluations related to lessons already taught whilst implementing this Learning Story) will be available

2.3.2.3 **What do I need to do during my visit to the Case Study Teacher?**

- There should be no need to arrive early as your schedule should include time for introductions to S-B stakeholders (though, of course, you may already know them) and for “settling into the school” for the day.
Make sure you keep to the arranged schedule and avoid any time slippage.

Your scheduled activities will include one CST lesson observation followed by the CST interview and the student interview; the ICTC and the HT interviews will fit around this “suite of activities”.

Remember to collect all relevant documentation before you leave.

### 2.3.2.3.1 Lesson Observation Guidance

The purpose of the Lesson Observation is to provide an opportunity for the NPC to share real-time experience of the way teachers and students are making use of and responding to the iTEC Learning Stories and the learning technologies.

The observation of the lesson provides the NPC with a context for the Teacher and Student Interviews that follow the observed lesson.

**Before a lesson starts, you will need to:**
- check with the teacher how s/he prefers you to observe. Some will like to “place” you where it feels best for them whilst others will be happy for you to move around the class. However, it is up to you to ensure that you are observing the lesson in a way which is not intrusive;
- provide further assurances, if necessary, to the teacher being observed that you are focused on collecting data for research and that you are not there in any kind of judgemental capacity. Remember that even the most confident teachers can feel nervous when being observed and trying something new;
- decide (if you have agreed with the teacher that you will record the lesson) where it is best to place your video recorder and/or tripod (think batteries and/or sockets . . . you may need an extension lead!);
- check that permissions are in place for all the children in the class if you are recording.

**During the lesson, you will need make notes (even if you are recording the lesson, it is helpful to make brief notes) that focus on the following questions:**
- How is the teacher addressing: 
  - Individualisation;
  - collaboration;
  - creativity;
  - expressiveness;
- How is the teacher integrating innovative technological tools within their pedagogy?
- What is innovative about the way the teacher is teaching?
- How are the students responding to the Learning Activities?
• Is the classroom setting appropriate for implementing this Learning Story? How?
• Is there teacher/student engagement with others beyond the classroom? Who? How?

➤ An Observation Note Sheet is offered as a recording tool (see Appendix 2). Use of this is optional.

2.3.2.3.2 Interview Guidance (General)

➤ The guidance offered to NPCs in this section applies to all the interviews (Teacher, Student Group, ICTC, HT).

➤ Information specific to particular interviews can be found at the beginning of the relevant interview schedule below.

➤ Remember that ‘Learning Story’ refers to the more concrete examples derived from the educational scenarios and provided by WP3.

➤ Remember that ‘Learning Activity’ is the implementation of a Learning Story by a teacher. The implementation may well include a series of Learning Activities rather than a single Learning Activity.

➤ When conducting any of the interviews, please note the following:

• Depending on national/local policies you may need to obtain interviewees informed consent to participate in the evaluation. Exemplar consent forms can be provided by WP5 on request.

• The interview should take no more than 30 minutes.

• Ensure that the interview finishes on time, but try to avoid “clock watching” as this can be very off-putting for those being interviewed.

• To help with the writing of their Case Study Report (CSR), NPCs should audio record their interviews (check that you have consent).

• Field notes:
  - these are useful aide memoires even if the interview is recorded, but field notes are essential if the interview is not recorded (ie if consent to record is not given).
  - there are many ways to record field notes, but basically, they should be key points recorded against the question being asked.
  - if the NPC is relying on field notes and does not have any interview recording, it is important to write fuller notes as soon after the interview as possible; the longer the time gap, the less information is retrieved. It is also important to make a careful note during the interview of verbatim
quotations which seem to be very important. That is, to record exactly what someone says and make sure that the field notes clearly indicate that this is a quotation.

- Those being interviewed need to be assured of confidentiality and need to be put at their ease. Because there is a lot to cover, it would be helpful if casual/friendly chat/discussion takes place before the time allocated to the interview.

- Try to keep to the specified questions, but let them be a guide rather than a script.

- Sometimes you will need to ‘probe’ for more detail. To do this, you will use phrases/questions such as:
  - “Can you give me a little more information about that?”
  - “Can you think of an example to illustrate the point you are making?”
  - “Can you provide me with a little more detail?”

- You may find that a particular question may not be applicable in a particular interview or has already been covered within a response to a previous question. It is all right to miss out those questions that do not apply.

- Sometimes it is possible to combine questions (see for example questions 3.7.2.4 and 3.7.2.4 in the Teacher’s Interview).

### 2.3.2.3.3 Document Collection

- Documents that are created to support the implementation of the Learning Stories will be collected by the NPC and used to support and inform the writing of their CSR. These might include:
  - Lesson Plans
  - Lesson Evaluations
  - Resources that have been used by the teacher or the students

### 2.3.2.4 What do I need to do after my visit to the Case Study Teacher?

- Let WP5 know that your visit has taken place and that you are ready to make arrangements for your on-line interview (see NPC Interview below).

**WP5 contact details:**
Maureen Haldane: m.j.haldane@mmu.ac.uk;
Cathy Lewin: c.lewin@mmu.ac.uk
Write your Case Study Report (in English) as soon after your visit as possible and send to WP5.

An electronic CSR pro forma will be provided for you separately to this document.

In Cycles 3, 4 and 5 you will be required to select one Case Study and all the data collected will for that case study needs to be transcribed and translated before sending to WP5. Dates for submission of each Cycle will be negotiated.

2.3.3 Teacher Interview: Guidance and Schedule

- The teacher to be interviewed is the teacher who was observed.

- The teacher interviews take place as soon after the observed lesson as possible.

- To help with the writing of their Case Study Report (CSR), NPCs should audio record their interviews (where consent is given).

- The interview questions focus on the impact of the technology/Learning Story on teaching practices, learner attitude and attainment, engagement with stakeholders, individualisation, social/collaborative elements of learning, creativity, expressiveness, the overall transformative effect and implications for the design of the future classroom. Refer back to these and use them to help focus and contextualise your questioning.

- Remember that it is all right to miss out those questions that do not apply and that sometimes it is possible to combine questions (e.g: 3.7.2.4 and 5).

- You may wish to ask about specific things that you saw in the lesson and these should be accounted for in the timing of your interview.

- Try to make sure you spend approx 0.25% of your time on the first 3 questions and approximately 0.75% of your time on the ‘Learning Story’ questions.

- See also 3.2.3.2 above for more general interview guidance.

2.3.3.1 Training

1. How did the training help you overall? (e.g.: the training resources/support materials that were used)
2. With hindsight, what else could have been included in the training?
3. What kinds of activities have you undertaken in the iTEC Teacher Community? How has the Teacher Community helped you to change your practice? Can you give us an example?

2.3.3.2 Learning Stories

4. How does the lesson I have just observed fit with the implementation of the Learning Story overall? (One of a series of lessons? A single lesson?)
5. Have you needed to make any changes to the Learning Story? What changes have you made (so far)? Why?
6. How successful has the Learning Story been (to date)? In what ways? Why? What factors have contributed to the success (so far)?
7. How, if at all, has your involvement changed your pedagogical approach? (Think about: roles, assessment, individualisation, collaboration, creativity, expressiveness/communication, engagement with a wider range of stakeholders)
8. Have there been any other changes or unexpected outcomes as a result of your involvement in the project?
9. What challenges have you faced (so far) in implementing the Learning Story? Were there any challenges in relation to the organisation of the school or the design of the classroom? How did you overcome the challenges?
10. What kind of support have you received in this process? From whom? How was this helpful? What additional support might have been beneficial?
11. How has the Learning Story fitted the needs of the curriculum? In what ways, if any, has your planning changed in order to accommodate the Learning Story?
12. In your professional judgement, has the Learning Story implementation impacted on student attainment, motivation and engagement? If yes, how? Can you give an example?

2.3.4 Head Teacher Interview: Guidance and Schedule

- The interviews with Head Teachers should be audio recorded (where consent is given).
- These interviews will capture qualitative data on the change management process and will facilitate the generation of lessons learned and key success factors in implementing the Learning Stories.
- Be conscious of the time element in these questions i.e. Q7 the HT might be encouraged to consider future implications.
- See also 3.2.3.2 above for more general interview guidance.
2.3.4.1 Learning Stories

1. How does the Learning Story fit with the school vision/strategy/pedagogical and/or curriculum planning? Will your experience lead to any changes in the future?
2. How does the Learning Story fit with the current school culture and practices? What changes have occurred through the implementation of Learning Stories?
3. To what extent does the Learning Story meet the curriculum needs?
4. What challenges have you faced/are you facing in resourcing the technical requirements for the Learning Story? How have you overcome/are you overcoming these challenges?
5. Is the implementation of the Learning Story impacting on teaching practices? If yes, how? Can you give an example?
6. Is the implementation of the Learning Story impacting on teacher attitude? If yes, how? Can you give an example?
7. In your professional judgement, has the Learning Story implementation impacted on student attainment, motivation and engagement? If yes, how? Can you give an example?
8. Would you support the continued use of the Learning Story in your school? What will you put in place to ensure that this happens? What impact would this have in terms of your management and leadership of the school? Are there any external factors affecting the continuing use of the Learning Story in your school?

2.3.5 ICT Co-ordinator Interview: Guidance and Schedule

- The ICTC interview should be audio recorded (where consent is given).
- These interviews will capture qualitative data on the change management process and will facilitate the generation of lessons learned and key success factors in implementing the Learning Stories.
- Some ICTCs will play a more active role in supporting teaching and learning in their schools than others and therefore for some, certain questions will be inappropriate. It is all right to leave such questions unanswered.
- See also 3.2.3.2 above for more general interview guidance.

2.3.5.1 Training

1. What do you think about the technical training?
2. What do you think about the pedagogical training?
3. How did the training help your teachers overall?
4. With hindsight what else should have been included in the training?
5. What additional training and/or support did you offer your teachers? What worked well? What would you do differently next time?

2.3.5.2 Learning Stories

6. How did the Learning Story fit with the school ICT strategy/plans?
7. Did you need make any changes in the Learning Story? What changes did you make? Why?
8. How successful was the Learning Story? Why? What factors contributed to the success?
9. What challenges did you face in resourcing the technical requirements for the Learning Story? How did you overcome these challenges?
10. What other challenges did you face and how were they overcome?
11. Has the Learning Story implementation impacted on teaching practices? If yes, how? Can you give an example?
12. Has the Learning Story implementation impacted on teacher attitude? If yes, how? Can you give an example?
13. In your professional judgement, has the Learning Story implementation impacted on student attainment, motivation and engagement? If yes, how? Can you give an example?
14. How innovative was the Learning Story in relation to current practices at your school?
15. Will your involvement lead to any changes in your future planning?

2.3.6 Student Group Interview: Guidance and Schedule

- Interviews with a small group of students (6-8) selected by the teacher should be audio recorded. Assure them of confidentiality.

- Consent will have been obtained as appropriate and in line with national/school protocols.

- It is preferable to interview the students without their teacher, but check that this is in line with national/school protocols.

- Spend a few minutes introducing yourself and decide how you will remember and record their names (small name cards might be helpful).

- Remind the students to talk one at a time otherwise it will be difficult to make sense of the audio recording.

- When writing the case study report it will be necessary to identify the gender of students if you present verbatim comments so you will need to ensure that you can put the names of students to the contributions made during the interview.

- Use the interview questions to allow short focused discussions to take place.
Try to encourage all students to contribute.

See also 3.2.3.2 above for more general interview guidance.

2.3.6.1 Learning Stories

1. What are the differences and similarities between the lesson I have just observed and any related previous lessons and the kinds of activities you usually engage in at your school?
2. What do you think about technologies used in these lessons? How do they compare with the technologies you use outside school?
3. How did you learn how to use the use these technologies? Were there any difficulties at all?
4. What have been the main challenges for you in these lessons? Have there been any particular challenges in relation to how you were learning? If so, how did you overcome these challenges?
5. How did you feel in these lessons? What did you like most? Why? What, if at all, did you not like? Why? Would you like to do more learning in this way? Why/why not?

2.3.7 Pro-forma for Case Study Report

This will be provided as a separate electronic pro forma. All reports must be in English. There will be two sections. In the first section you will be asked to provide short responses to a number of questions, ensuring that the same information is provided by all NPCs. In the second section you will be asked to write a short narrative, using all data collected. There will be some sub-headings to provide structure for you. We do not expect the narrative sections of the case study report to be any longer than 3 sides of A4. However, it is perfectly acceptable for you to write a report which is longer. Sometimes it is easier to write as much as necessary and not to worry about the length.

Key pointers

- Listen again to any audio recordings and make more detailed notes about the interviews. We do not feel it is necessary to transcribe interview data (it will take at least 5 hours per hour of audio recording to do this) except for the cases in cycles 2-5 for which you will send the data to WP5 rather than provide a case study report. However by listening back you will be able to capture further key points which you may have missed during
the actual interview and to record verbatim quotations which you feel are important and that you may use in the CSR.

- Read through your field notes and all the other documentation provided by the teacher. You may wish to make further notes during this process.
- Use verbatim quotations (what the interviewee actually said, in their own words) to illustrate key points. In this way the narrative is presented in the stakeholders own words. Verbatim quotations should be presented in quotation marks, with the source of the quotation identified clearly (ie student, CST, HT etc).
- Be careful to distinguish between what actually happened (in the observation, from the interviewees responses) and what the stakeholders would have liked to have happened or might try in the future.
- Any claims made such as assertions about impact on learning should be evidenced by giving a justification or clear example of how the impact manifested itself (ie support for the claim being made). Using more than one source of data (your own observation, what the students said etc) will help to justify the teacher’s claims.
2.3.8 National Pedagogical Co-ordinator Interview Schedule

- WP5 will carry out online interviews with all NPCs (including Associate Partner NPCs) during the fourth month of each large-scale pilot cycle.
- Interviews will last for approximately one hour.
- The questions to be asked of NPCs, presented below, are organised in 2 columns. This is to show that, although WP4 will be asking the questions in the left-hand column, WP5 also needs to have the responses to these questions. NPCs will only be asked these questions once as WP4 and WP5 will liaise in order to share NPCs’ answers.
- NPCs will probably like to prepare for their interview by reading through the questions and making notes prior to the interview event.
- WP5 will liaise with NPCs to arrange the interview date and the format of the interview (eg: Flash Meeting, WebEx etc).
<table>
<thead>
<tr>
<th>WP4 NPC Questions</th>
<th>WP5 NPC Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A) Selection</strong></td>
<td></td>
</tr>
<tr>
<td>1. Learning Stories</td>
<td>e. Reflecting on the Learning Story selection process:</td>
</tr>
<tr>
<td>a. How did you choose the Learning Stories for your country?</td>
<td>i. Which aspects of the Learning Story selection process were successful?</td>
</tr>
<tr>
<td>b. How many Learning Stories did you choose for Cycle One?</td>
<td>ii. What challenges, if any, did you face in the Learning Story selection process?</td>
</tr>
<tr>
<td>c. To what extent did you allow teachers and/or students to help with this initial selection of Learning Stories and how were they involved in the process?</td>
<td>iii. How could the Learning Story selection process have been improved?</td>
</tr>
<tr>
<td>d. If there needed to be any “localisation” of your chosen Learning Stories, please briefly describe:</td>
<td>iv. Is there anything you would definitely do again and why?</td>
</tr>
<tr>
<td>i. why there was a need to “localise”;</td>
<td>v. Is there anything you would definitely not do again and why?</td>
</tr>
<tr>
<td>ii. the “localisation” process;</td>
<td>vi. Main lessons learned?</td>
</tr>
<tr>
<td>iii. the support you received to help you “localise”;</td>
<td></td>
</tr>
<tr>
<td>iv. who provided the support to help you “localise”.</td>
<td></td>
</tr>
<tr>
<td>2. Schools, iTEC Co-ordinators, Teachers and classes</td>
<td>f. (Repeat e. above in the context of “localisation” if appropriate)</td>
</tr>
<tr>
<td>a. How many iTEC teachers and schools have taken part in Cycle One?</td>
<td>d. Reflecting on the process for selecting schools, iTEC Co-ordinators, teachers, classes and case study teachers:</td>
</tr>
<tr>
<td>b. How did you select the following (and who was involved in selecting them):</td>
<td>i. Which aspects of the selection process were successful?</td>
</tr>
<tr>
<td>i. iTEC schools?</td>
<td>ii. What challenges, if any, did you face in the selection process?</td>
</tr>
<tr>
<td>ii. school-based iTEC coordinators?</td>
<td>iii. How could the process for selecting schools, iTEC Co-ordinators, teachers, classes and case study teachers be improved?</td>
</tr>
<tr>
<td>iii. iTEC teachers?</td>
<td>iv. Is there anything you would definitely do again in Cycle Two and why?</td>
</tr>
<tr>
<td>iv. classes?</td>
<td>v. Is there anything you would definitely not do again in Cycle Two and why?</td>
</tr>
<tr>
<td>c. How did you select your case study teachers?</td>
<td>vi. Main lesson learned?</td>
</tr>
<tr>
<td><strong>B) Preparation and Training</strong></td>
<td></td>
</tr>
<tr>
<td>1. iTEC Teachers and other Stakeholders</td>
<td>c. Reflecting on the process for preparing and training iTEC teachers, case study teachers and their school-based iTEC colleagues and any other stakeholders:</td>
</tr>
<tr>
<td>a. How were your iTEC teachers prepared and trained in order to help them understand:</td>
<td></td>
</tr>
<tr>
<td>i. the iTEC project (including its aims, objectives and structure) and</td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>b.</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>i. Their role within it? ii. the Learning Stories (including the purpose and intended function of them) and their relationship with them? iii. the technology required for the Learning Story with which they would be working? iv. their online community and support facilities.</td>
<td>i. Which aspects of the preparation and training process were successful? ii. What challenges, if any, did you face in the preparation and training process? i. What, if any, were the main enablers? ii. How could the process for preparation and training be improved? iii. Is there anything you would definitely do again and why? iv. Is there anything you would definitely not do again and why? v. Main lessons learned?</td>
</tr>
</tbody>
</table>

**C) The Learning Stories and teachers in action**

1. **iTEC Schools and Teachers (20mins)**
   a. What systems/processes have you set in place to manage the project and to communicate with your iTEC schools and teachers in order to acquire feedback from them whilst iTEC?
<table>
<thead>
<tr>
<th>Teachers are engaged in an iTEC Cycle?</th>
<th>What challenges, if any, have you faced in the management of the iTEC project in your country?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Which aspects of the Learning Story implementation in your country have been successful?</td>
</tr>
<tr>
<td></td>
<td>What challenges, if any, have your teachers faced in the Learning Story implementation?</td>
</tr>
<tr>
<td></td>
<td>What, if any, have been the main enablers overall?</td>
</tr>
<tr>
<td></td>
<td>What/Where/How could key improvements be made?</td>
</tr>
<tr>
<td></td>
<td>Is there anything you would definitely do again in Cycle Two and why?</td>
</tr>
<tr>
<td></td>
<td>Is there anything you would definitely not do again in Cycle Two and why?</td>
</tr>
<tr>
<td></td>
<td>Main lessons learned?</td>
</tr>
</tbody>
</table>
APPENDIX 1: WP5: AGREED DEFINITIONS AND DESCRIPTIONS

WP5 is required

“to evaluate the impact of the Learning Stories in each cycle on: teaching practices; engagement with all stakeholders; individualisation; collaboration; creativity; expressiveness; overall transformative effect and the design of the future classroom, including underlying change processes.”

In order to ensure that all partners have a shared and common understanding of these elements, we asked iTEC partners to contribute to our thinking around the terms and phrases presented below. We have discussed all the contributions and considered authoritative sources provided by partners as well as others that we have identified ourselves.

The descriptions and definitions below are working definitions for WP5. They will serve to guide and inform our evaluation and we would like to thank all those who so kindly made such valuable contributions to our thinking.

<table>
<thead>
<tr>
<th>Term/Phrase</th>
<th>Working Definition</th>
<th>Sources/References</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) “teaching practices”</td>
<td>The processes, procedures, strategies and methodologies used by a teacher when planning lessons, teaching students and reviewing/evaluating.</td>
<td></td>
</tr>
</tbody>
</table>
2) “stakeholders”

There are two groups of “stakeholders” that we refer to in our Research Questions (see: section 2.1). We differentiate the two groups in the following way:

1. “What are stakeholder perceptions of the impact of Learning Stories on . . . “

These are “School-based stakeholders”, ie: Students, Teachers, ICT Co-ordinators (where appropriate), Head Teachers.

We refer to this group of stakeholders as “S-B stakeholders”.

2. “Teaching practices including . . . Engagement with a wider range of stakeholders”

These are “Learning Story-specific stakeholders” with whom a teacher may engage whilst teaching with a particular Learning Story and with whom the teacher would not usually engage. These may include, for example, parents, members of the community, local/national/international subject experts and/or professionals, students from other countries etc.

We refer to this group of stakeholders as “LS-S stakeholders”.

3) “individualisation”

We are aware that individualisation and personalisation are concepts which are defined in various ways. In some cases, they are used interchangeably. We have adopted “individualisation” as it was originally specified in the call documentation (rather than “personalisation”). However, where personalisation is used specifically (for example, in literature

referred to in the Knowledge Map) we will use it rather than "individualisation".

"Individualisation" requires intentional teacher consideration of and provision for the learning needs of individuals within a group or class of students. It is not about letting students work and/or learn alone.

"Individualisation" includes elements of "personalisation" in that it . . .

"has an emphasis on:

- identifying what individuals already know, what they need to do to improve and how best they can do so.
- . . . developing effective teaching and learning skills through a range of whole class, group and individual teaching, improving learning and ICT strategies so as to best transmit knowledge, to instil key learning skills and to accommodate different paces of learning." (DfES, 2007)

"Personalisation" was introduced into educational policy by the New Labour Government in the UK in 2004, influencing its use in a European setting (OECD, 2006) and Australia. However, it has been conceptualised and interpreted in different ways both in academic and government literatures (Campbell et al, 2007). Miliband (2006) identified five components of personalised learning: using assessment for learning (ensuring children understand how they are doing and how they can improve), providing teaching and learning strategies that build on individual needs, enhancing curriculum choice, facilitating a radical approach to school organisation, and greater
In the EACEA P9 Eurydice report (2011, p96), the two terms are defined differently as:

**Personalised learning**: Pupils learn in ways that are relevant to their own background, experiences, and interests. They can choose the topics they will learn about, the tools or strategies they will use, and the types of work products they will create.

**Individualised student-centred learning**: Teachers make it possible for individual pupils to work at their own pace, or they adjust instruction based on individual pupils' skill levels and learning needs.

4) “collaboration”

“Collaboration” is the way individuals work together in order to achieve a goal and Michinov and Michinov (2009:43) suggest that “(collaborative) learning is a result of interaction or transaction between students.”


See also:


5) “creativity”

“Creativity” expresses an open-minded way of approaching a task or a challenge in order to come up with new or unconventional solutions to a given task. “Creativity” begins with imaginative activity and the National Advisory Committee on Creative and Cultural Education (NACCCE) suggests that “creativity” is:

“Imaginative activity fashioned so as to produce outcomes that are both original and of value.” (1999:30)

6) “Expressiveness”

“Expressiveness” is a basic ability to transform and communicate clearly, thoughts and ideas through language (spoken, written and non-verbal communications [facial expression/body language or NVCs]). “Expressiveness” can also be evidenced through the languages of music, art and movement.
### 7) “21st Century Skills”

“21st century skills” implies the skills and habits of mind that allow people to participate actively in society using all forms of media available. They are required as individuals need to think and reflect critically on what is happening around them and to develop creative solutions that serve personal and social needs.

Digital and media literacies feature predominantly in educators’ notions of what skills are required for life in the 21st Century. (See: “Digital Literacy” below)


(Accessed 10.2.11)

### 8) “Digital literacy”

“Digital literacy” is the ability to locate, organize, understand, analyse and evaluate information using digital technology. It involves a working knowledge of current technology and an understanding of how it can be used.

Digital Literacy involves skills that are seen to go beyond functional practices which enable ICTs simply to be used. Instead, “digital literacy” demonstrates the ability to enable: “critical, creative, discerning and safe practices when engaging with digital technologies in all areas of life” (Hague & Payton, 2010, p. 19)

According to Jenkins et al (2006:4), the new skills include:

**Play**: the capacity to experiment with one’s surroundings as a form of problem-solving

**Performance**: the ability to adopt alternative identities for the purpose of improvisation and discovery

**Simulation**: the ability to interpret and construct dynamic


See also:

http://ec.europa.eu/information_society/tl/edutra/skills/index_en.htm (accessed 1.2.11)


### WP5: Task 5.3

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Source</th>
<th>Access Date</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appropriation</strong></td>
<td>the ability to meaningfully sample and remix media content</td>
<td>MacArthur Foundation</td>
<td><a href="http://digitallearning.macfound.org/atf/cf/%7b7e45c7e0-a3e0-4b89-ac9c-e807e1b0ae4e%7d/jenkins_white_paper.pdf">http://digitallearning.macfound.org/atf/cf/%7b7e45c7e0-a3e0-4b89-ac9c-e807e1b0ae4e%7d/jenkins_white_paper.pdf</a></td>
</tr>
<tr>
<td><strong>Multitasking</strong></td>
<td>the ability to scan one’s environment and shift focus as needed to salient details.</td>
<td></td>
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<tr>
<td><strong>Distributed Cognition</strong></td>
<td>the ability to interact meaningfully with tools that expand mental capacities</td>
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<tr>
<td><strong>Collective Intelligence</strong></td>
<td>the ability to pool knowledge and compare notes with others toward a common goal</td>
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<tr>
<td><strong>Judgment</strong></td>
<td>the ability to evaluate the reliability and credibility of different information sources</td>
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<tr>
<td><strong>Transmedia Navigation</strong></td>
<td>the ability to follow the flow of stories and information across multiple modalities</td>
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<tr>
<td><strong>Networking</strong></td>
<td>the ability to search for, synthesize, and disseminate information</td>
<td></td>
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</tr>
<tr>
<td><strong>Negotiation</strong></td>
<td>the ability to travel across diverse communities, discerning and respecting multiple perspectives, and grasping and following alternative norms.&quot;</td>
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</tbody>
</table>

9) **“Educational Scenario”**

“A narrative description of a preferable learning context in an abstract level that does not take into account technical details or other concrete problems.”

*From D10.1, p.55*
<table>
<thead>
<tr>
<th>10) “Learning Story”</th>
<th>“A narrative description of a learning context that is more concrete than an educational scenario and is more helpful to teachers when designing their lesson plans. A learning story refers to several learning activities and is an exemplification of them working together.”</th>
<th>From D10.1, p56</th>
</tr>
</thead>
<tbody>
<tr>
<td>11) “Learning Activity”</td>
<td>“Activity identified in a Learning Story that must be carried out by one or more persons. A learning activity is larger than a task. A typical learning story will include 3-8 learning activities. A learning activity refers to the tools and resources that are needed to successfully complete it. It also includes information such as motivation, preparation instructions, and guidelines.”</td>
<td>From D10.1, p.56</td>
</tr>
<tr>
<td>12) “Innovation/change”</td>
<td>On the pedagogical level innovations are defined in terms of novel didactic solutions reflecting theoretical shifts (e.g., from a behaviourist to a constructivist perception of the learning process) or technological changes – as in ICT implementation. Pedagogical innovations may take the form, for example, of novel instructional formats, increased delegation of responsibility and control over the learning process to the students, or alternative methods for the assessment of learning. (Mioduser et al, 2003, p26) The definition of pedagogical change and innovation will vary from country to country (Kozma, 2003): ‘innovation often depends on the cultural, historical, or developmental context within which it is observed’ (p17).</td>
<td>Mioduser, D., Nachmias, R., Tubin, D. &amp; Forkosh-Baruch, A. (2003) Analysis schema for the study of domains and levels of pedagogical innovation in schools using ICT. Education and Information Technologies, 8(10), 23-36. Kozma, R.B. (Ed.) (2003) Technology, innovation and educational change: A global perspective. Eugene, OR: International Association for Technology in Education.</td>
</tr>
<tr>
<td>13) “Transformation”</td>
<td>Transformation is a term commonly found in educational literature and policy rhetoric, particularly in relation to the use of technology to support teaching and learning. It means more than change alone; rather it is radical or fundamental change (Fisher, 2006). Here we are adopting the following definition that: ‘[t]ransformation is significant, systematic and sustained change’ (Caldwell, 2009, p4). That is it ‘implies a profound or fundamental change, a metamorphosis that involves some radical innovation, not just incremental innovation. The difference is important’ (Hargreaves, 2003, p1 cited in Fisher, 2006, p294). Furthermore, a significant change in a teacher’s practice must be multidimensional including changes to resources, teaching approaches and beliefs (Fullan, 2001).</td>
<td></td>
</tr>
<tr>
<td>14) “Impact”</td>
<td>“Impact is the overall achievement of an intervention on the educational system and can be described by a variety of qualitative indicators such as ‘improvements in national test’ or ‘improved learning in schools’ depending on the policy target. It is the end point of an intervention involving input, process, output and outcome. Isolating the variable that caused the impact is problematic in education.”</td>
<td></td>
</tr>
<tr>
<td>From DoW, Part B: page 71 of 79</td>
<td>From DoW, Part B: page 71 of 79</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX 2: INSTRUMENTS FOR CASE STUDY VISIT

This appendix contains the instruments required for the case study visit, in separate sheets which will be easy to print if required:

- Teacher interview schedule
- Student group interview schedule
- Headteacher interview schedule
- ICT co-ordinator interview schedule
- Observation Note Sheet for National Pedagogical Co-ordinators (optional)
Teacher Interview Schedule

Training

1. How did the training help you overall? (eg: the training resources/support materials that were used)
2. With hindsight, what else could have been included in the training?
3. What kinds of activities have you undertaken in the iTEC Teacher Community? How has the Teacher Community helped you to change your practice? Can you give us an example?

Learning Stories

4. How does the lesson I have just observed fit with the implementation of the Learning Story overall? (One of a series of lessons? A single lesson?)
5. Have you needed to make any changes to the Learning Story? What changes have you made (so far)? Why?
6. How successful has the Learning Story been (to date)? In what ways? Why? What factors have contributed to the success (so far)?
7. How, if at all, has your involvement changed your pedagogical approach? (Think about: roles, assessment, individualisation, collaboration, creativity, expressiveness/communication, engagement with a wider range of stakeholders)
8. Have there been any other changes or unexpected outcomes as a result of your involvement in the project?
9. What challenges have you faced (so far) in implementing the Learning Story? Were there any challenges in relation to the organisation of the school or the design of the classroom? How did you overcome the challenges?
10. What kind of support have you received in this process? From whom? How was this helpful? What additional support might have been beneficial?
11. How has the Learning Story fitted the needs of the curriculum? In what ways, if any, has your planning changed in order to accommodate the Learning Story?
12. In your professional judgement, has the Learning Story implementation impacted on student attainment, motivation and engagement? If yes, how? Can you give an example?
Student Group Interview Schedule

Learning Stories

1. What are the differences and similarities between the lesson I have just observed and any related previous lessons and the kinds of activities you usually engage in at your school?

2. What do you think about technologies used in these lessons? How do they compare with the technologies that you use outside school?

3. How did you learn how to use these technologies? Were there any difficulties at all?

4. What have been the main challenges for you in these lessons? Have there been any particular challenges in relation to how you were learning? If so, how did you overcome these challenges?

5. How did you feel in these lessons? What did you like most? Why? What, if at all, did you not like? Why? Would you like to do more learning in this way? Why/why not?
Head Teacher Interview Schedule

Learning Stories

1. How does the Learning Story fit with the school vision/strategy/pedagogical and/or curriculum planning? Will your experience lead to any changes in the future?
2. How does the Learning Story fit with the current school culture and practices? What changes have occurred through the implementation of Learning Stories?
3. To what extent does the Learning Story meet the curriculum needs?
4. What challenges have you faced/are you facing in resourcing the technical requirements for the Learning Story? How have you overcome/are you overcoming these challenges?
5. Is the implementation of the Learning Story impacting on teaching practices? If yes, how? Can you give an example?
6. Is the implementation of the Learning Story impacting on teacher attitude? If yes, how? Can you give an example?
7. In your professional judgement, has the Learning Story implementation impacted on student attainment, motivation and engagement? If yes, how? Can you give an example?
8. Would you support the continued use of the Learning Story in your school? What will you put in place to ensure that this happens? What impact would this have in terms of your management and leadership of the school? Are there any external factors affecting the continuing use of the Learning Story in your school?
ICT Co-ordinator interview schedule

Training

1. What do you think about the technical training?
2. What do you think about the pedagogical training?
3. How did the training help your teachers overall?
4. With hindsight what else should have been included in the training?
5. What additional training and/or support did you offer your teachers? What worked well? What would you do differently next time?

Learning Stories

6. How did the Learning Story fit with the school ICT strategy/plans?
7. Did you need make any changes in the Learning Story? What changes did you make? Why?
8. How successful was the Learning Story? Why? What factors contributed to the success?
9. What challenges did you face in resourcing the technical requirements for the Learning Story? How did you overcome these challenges?
10. What other challenges did you face and how were they overcome?
11. Has the Learning Story implementation impacted on teaching practices? If yes, how? Can you give an example?
12. Has the Learning Story implementation impacted on teacher attitude? If yes, how? Can you give an example?
13. In your professional judgement, has the Learning Story implementation impacted on student attainment, motivation and engagement? If yes, how? Can you give an example?
14. How innovative was the Learning Story in relation to current practices at your school?
15. Will your involvement lead to any changes in your future planning?
Observation Note Sheet for National Pedagogical Co-ordinators (optional)

This observation note sheet is offered to support NPC’s observation of their case study teacher’s lesson.

NPCs may choose not to use it and to make notes of their own in their own way. However, the headings below provide the focus of the observation.

This observation sheet (or NPC’s own notes) can be used as a prompt during teacher and student interviews and it can also be used as an aide memoire when writing the Case Study Report. It is intentionally brief and straightforward for ease of use.

<p>| Date: | Learning Story: |</p>
<table>
<thead>
<tr>
<th>Number in class:</th>
<th>Subject:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age:</td>
<td>Technology:</td>
</tr>
</tbody>
</table>

How is the teacher addressing:
(check “Definitions” in the Evaluation Plan)

Individualisation:

Collaboration:

Creativity:

Expressiveness:

How is the teacher integrating innovative technological tools within their pedagogy?
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is innovative about the way the teacher is teaching?</td>
<td></td>
</tr>
<tr>
<td>How are the students responding to the learning activities?</td>
<td></td>
</tr>
<tr>
<td>Is the classroom setting/setup appropriate for implementing this Learning Story? How?</td>
<td></td>
</tr>
<tr>
<td>Is there teacher/student engagement with others beyond the classroom? Who? How?</td>
<td></td>
</tr>
</tbody>
</table>
Is there anything else you would like to note?
APPENDIX 3: CHECKLISTS FOR CYCLE EVALUATION

CHECKLIST: At beginning of Cycle

- Identify 3 teachers from 2-3 schools to participate fully in the evaluation
- Arrange translation of research instruments (these may be revised prior to each cycle; revisions will be kept to an absolute minimum)
- Introduce case study teachers to iMmS
- Make all teachers aware of iTEC Teacher Community
- Arrange case study (see below)

CHECKLIST: Prior to case study visit

2-3 weeks before

- Seek permissions (as appropriate) to visit school and arrange date of visit
- Request schedule for visit
  - Lesson observation
  - Teacher interview
  - Student group interview
  - Head teacher interview
  - ICT Co-ordinator interview
- Contact teacher and request relevant documentation (lesson plans, resources etc)

1-2 weeks before

- Familiarise yourself with the interview questions
- Decide how you will capture the data (audio record, video record etc)
- If recording (the lesson and/or student interview), you may need to check with the school about obtaining informed consent to participate from the students or their parents (in accordance with national and local policies)
- Decide what other equipment you will need

2-3 days before

- Check everything is okay with the teacher; reassure the teacher that your role is purely observational
- Remind the teacher that you require the relevant documentation if you have not already received it
- Check that the schedule for your visit is still okay and that everything required has been organised
- Inform the teacher and school of your time of arrival
- Check that consent to participate has been obtained if required for all students
CHECKLIST: During case study visit

- Keep to schedule
- Collect any documentation not received prior to visit
- Obtain informed consent from interviewees prior to each interview
- Set up for the lesson observation in negotiation with the teacher
- Observe lesson and make notes as required
- Interview teacher (after the lesson)
- Interview a group of students (after the lesson)
- Interview head teacher
- Interview ICT co-ordinator
- Collect lesson evaluation form if teacher is required to produce one as a matter of course

CHECKLIST: After case study visit

- Notify WP5 that the case study has been conducted
- Collect any missing documentation not obtained prior to or during the case study visit
- Listen to the recordings of interviews again and supplement any notes taken with more detail and verbatim quotations
- Produce case study report (in English) and send to WP5
- In Cycles 3, 4 and 5 arrange transcription and translation of all data from one of the case studies and send it to WP5
- Arrange date for NPC interview by WP5

CHECKLIST: At end of Cycle

- Ensure all participating teachers complete the online Teacher Questionnaire
- Ensure case studies all completed
- Ensure each case study teacher completes iMmS
APPENDIX 4 CASE STUDY PRO-FORMA

This pro-forma to be completed by the NPCs (adapted from Kozma (Ed.), 2003) is comprised of two sections. Section A contains a list of questions about the case study requiring checking of tick boxes. Section B is a narrative describing the case study under a number of headings (with prompts). It will be provided as a separate document (a Word form) with guidance on how to name each case study report.

Section A

1) How would you characterise the leadership style of the school head teacher (tick most appropriate)?

☐ Active involvement in the innovation

☐ Supportive but not directly involved

☐ Neutral

☐ Against the innovation

2) Does the Learning Story fit with the current school policies, curriculum and plans (tick most appropriate)?

☐ Not at all

☐ To some extent

☐ Fully

3) Will the school policies and/or plans be changed in the future as a result of participating in iTEC (tick most appropriate)?

☐ Yes, definitely

☐ Yes, probably

☐ No
4) In what curriculum area did the observation of the innovation take place?

- Mathematics
- Physics
- Chemistry
- Biology/life science
- Earth science
- Language/mother tongue
- Foreign Language
- Creative Arts (music, visual art, drama)
- History
- Geography
- Civics/Citizenship
- Economics
- Vocational subjects
- Computer science/ICT/informatics
- Physical education
- Other: please specify - ________________________________

5) Does this case provide evidence of (tick all that apply)

- New assessment procedures
- Constructivist pedagogies
- Use of new learning spaces
- Effective use of digital tools
- Individualisation
- Social/Collaborative learning
6) Does this case contain an explicit statement that the pedagogical activities of the teacher have changed due to the innovation?

- Yes
- No

7) Does this case describe the impact(s) of the innovation on the teacher(s) in terms of (tick all that apply):

- Acquisition of new pedagogical skills
- Acquisition of new ICT skills
- Acquisition of collaborative skills
- Development of positive attitudes
- Negative outcomes
8) Does this case contain an explicit statement that the activities of the students have changed due to the innovation?

☐ Yes
☐ No

9) Which technologies/software were used in the implementation of the Learning Story (tick all that apply):

☐ Desktop computer
☐ Laptop/netbook computer
☐ Tablet computer
☐ Mobile phone/smart phone
☐ Handheld device
☐ Learner response system
☐ Games based learning
☐ Virtual worlds
☐ Simulation
☐ Interactive whiteboard
☐ Touch screen devices
☐ Widgets
☐ e-Portfolios
☐ Collaborative environments
☐ Online assessment
☐ Virtual classroom/learning platform/course management system
☐ Social software (blog, wiki, social networking site, social bookmarking site)

☐ Other: please specify -
10) Where do the learning activities take place (tick all that apply):

- In the classroom
- In the computer lab
- In the school library
- In the school, but not in the classroom, computer lab or school library
- Outside school buildings but in the school grounds
- Outside school during normal school hours
- Outside school outside normal school hours

11) Does this case contain an explicit statement that there has been an impact due to implementation of the Learning Story (tick all that apply)?

- Yes, on teacher motivation and engagement
- Yes, on learner motivation and engagement
- Yes, on learner attainment
- Yes, on other: please specify ________________________________

12) Does this case describe problems and/or solutions in relation to implementing the Learning Story in terms of (tick all that apply):

<table>
<thead>
<tr>
<th></th>
<th>Tick if problem is mentioned</th>
<th>Tick if solution is mentioned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resources and equipment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical support</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pedagogical support</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher-related issues</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student-related issues</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Curriculum-related issues</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Issues related to support for the innovation (from teachers, parents, administrators etc)</td>
<td></td>
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</tbody>
</table>
13) Does this case suggest that the implementation of the Learning Story will be sustained beyond the pilot cycle?

- Yes, definitely
- Yes, probably
- No

If Yes, is supportive evidence given?

- Yes
- No

14) Does this case suggest that the implementation of the Learning Story will be transferred to other classes within the school or to other schools?

- Yes, definitely
- Yes, probably
- No

If Yes, is supportive evidence given?

- Yes
- No
Part B Narrative report of case study

Please note that there will be more space for responses in the actual pro forma.

REMEMBER: Any claims made such as assertions about impact on learning should be evidenced by giving a justification or clear example of how the impact manifested itself (i.e. support for the claim being made). Using more than one source of data (your own observation, what the students said etc) will help to justify the teacher’s claims.

Describe the participants’ perceptions of the training and support offered (if applicable):

_____________________________________________________________

Provide an overview of the implementation of the Learning Story, drawing on the observation and all interviews. (How was it structured? Was it adapted and if so how? What was the role of technology? How did the students perceive the experience? How innovative was it? What was the fit with school policies/plans?):

_____________________________________________________________

What did the participants perceive were the success factors behind the implementation?

_____________________________________________________________

What were the challenges that participants faced (including students)?

_____________________________________________________________

What, if any, solutions were identified in relation to the identified challenges?

_____________________________________________________________

What was the impact on pedagogy?

_____________________________________________________________

What was the impact on other factors (teacher attitude, learners’ attitudes, learners’ attainment, other stakeholders, school policies/plans, organisational issues, the curriculum)?

_____________________________________________________________
Were there any unexpected outcomes and if so what were they?
FlashMeeting recording available: http://fm.ea-tel.eu/fm/fmm.php?pwd=b2d8ef-26330

Hosted by Maureen Haldane and Cathy Lewin (WP5/MMU/UK), the attendees were as follows:

<table>
<thead>
<tr>
<th>Name</th>
<th>Email</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viera Blahová (NPC)</td>
<td><a href="mailto:viera.blahova@minedu.sk">viera.blahova@minedu.sk</a></td>
<td>ELFA, Slovakia</td>
</tr>
<tr>
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<td>NCIE, Norway</td>
</tr>
<tr>
<td>Barbora Grecnerova (NPC)</td>
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<td>DZS, Czech Republic (Associate Partner)</td>
</tr>
<tr>
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<td>BMUKK, Austria</td>
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<td>Attila Főző (NPC)</td>
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<td>EDUC, Hungary</td>
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<tr>
<td>Gabriella Zsigovits</td>
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<td></td>
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<tr>
<td>Ildikó Csordás</td>
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</tr>
<tr>
<td>Gill Leahy (NPC)</td>
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<td>Promethean</td>
</tr>
<tr>
<td>Monica Macedo (NPC)</td>
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<td>CNDP, France</td>
</tr>
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<td>Michael Peuch</td>
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<td></td>
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<tr>
<td>(covering maternity leave)</td>
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<tr>
<td>Luk Vanlanduyt (NPC)</td>
<td><a href="mailto:lukvanlanduyt@gmail.com">lukvanlanduyt@gmail.com</a></td>
<td>EDUB, Belgium</td>
</tr>
<tr>
<td>Patricia Munoz-King</td>
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<td>EUN</td>
</tr>
<tr>
<td>Benedicte Clouet (WP4)</td>
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<td></td>
</tr>
<tr>
<td>Pasi Kurttila (NPC)</td>
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<td>Finland (Associate Partner)</td>
</tr>
<tr>
<td>Michael Boyle (NPC)</td>
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<td>SMART</td>
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<tr>
<td>Ainhoa Marcos</td>
<td><a href="mailto:AinhoaMarcos@smarttech.com">AinhoaMarcos@smarttech.com</a></td>
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<tr>
<td>Silvana Winer (NPC)</td>
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<td>MAKASH, Israel</td>
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<td>Laura Parigi (NPC)</td>
<td><a href="mailto:l.parigi@indire.it">l.parigi@indire.it</a></td>
<td>ANSAS, Italy</td>
</tr>
<tr>
<td>Andrea Benassi</td>
<td><a href="mailto:a.benassi@indire.it">a.benassi@indire.it</a></td>
<td></td>
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<tr>
<td>(covering maternity leave)</td>
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</tr>
<tr>
<td>Name</td>
<td>Email</td>
<td>Institution</td>
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<tr>
<td>-----------------------------</td>
<td>--------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Giovanni Nulli</td>
<td></td>
<td></td>
</tr>
<tr>
<td>José Moura Carvalho (NPC)</td>
<td><a href="mailto:jose.moura.carvalho@dgidc.min-edu.pt">jose.moura.carvalho@dgidc.min-edu.pt</a></td>
<td>DGIDC, Portugal</td>
</tr>
<tr>
<td>Asta Buineviciute (NPC)</td>
<td><a href="mailto:asta.buineviciute@itc.smm.lt">asta.buineviciute@itc.smm.lt</a></td>
<td>ITC, Lithuania</td>
</tr>
</tbody>
</table>
The agenda was as follows:

1. Welcome and Introductions
2. Introduction to the Evaluation Handbook  
   + questions and discussion
3. Quantitative Data Collection: The Online Survey  
   + questions and discussion
4. Qualitative Data Collection: Case Studies  
   + questions and discussion
5. Closing thoughts: open discussion

Note: During the meeting, run via Flashmeeting, participants reported that the quality of sound was problematic. To counter this, whilst Maureen was speaking Cathy summarized the main messages via the chat facility and vice versa. Participants also raised questions either after each section, speaking directly to the group, or during sections by typing questions in the chat facility.

Questions and issues raised included:

1) The timetable for events to happen in the first cycle does not fit with our national school timetables (specifically holiday periods).

   ACTION: Revise the handbook to indicate that the timetable is just a suggestion, and can be adapted to fit local constraints (completed).

2) One of the suggested technologies for producing iTEC multimedia stories is Powerpoint, largely because it is a tool which teachers are likely to be familiar with already. A question raised was whether or not NPCs could suggest alternatives such as Prezi, voicethread, videoblogs.

   ACTION: Revise the handbook to clarify that Powerpoint is just a suggestion and that alternative tools can be used if preferred. It is not the tool that is important but the content/material presented in the story (completed).

3) Monica pointed out that in France the teachers selected to participate are highly innovative and confident users of technology so no technical training will be required. She asked about the interview questions that refer specifically to technical training.
ACTION: Check the handbook to clarify this if necessary – the interview schedules are starting points and questions should only be asked if they are appropriate (completed).

4) Clarification was sought about the difference between Associate Partners and iTEC partners in terms of participation.

ACTION: Revise the handbook to clarify this. NPC interviews will be conducted with all NPCs, including associate partners, Smart and Promethean. APs will arrange for the teacher online survey to be conducted (completed).

5) Monica requested that checklists be prepared for conducting the evaluation.

ACTION: Checklists to be provided in the handbook as an appendix (completed).

6) SMART and Promethean noted that they would like to participate fully in evaluation activities.

ACTION: This was raised in the Steering Committee meeting on June 16th 2011. It has been logged as ACTION ITEC_A122 which Will Ellis is responsible for.

7) A question was raised about which research instruments need to be translated. It was pointed out later in the session that all research instruments will need to be translated – but that the English versions could be used if the teachers and NPC were comfortable with that.

8) Monica asked how to handle things if the head teacher/ICT co-ordinator/teacher happened to be the same person. It was pointed out that the questions could be adjusted accordingly – only one interview needs to take place; the NPC in this situation may need slightly longer for the interview.

9) Monica offered to pre-test the survey when it is online.

10) Jørund asked if the NPCs will be notified when the teacher completes the questionnaire. It was pointed out that the NPCs will be notified when the teacher submits a questionnaire. Country specific data analyses will be produced and shared with NPCs. NPCs are responsible for chasing up outstanding questionnaires; the list of outstanding cases will be made available to NPCs in a timely manner.

11) Monica asked for a PDF of online survey questions beforehand.

ACTION: WP5 will circulate a PDF of the survey prior to it going live.

12) Laura Parigi asked if the NPC should remain neutral when supporting teachers doing the multimedia stories. This was confirmed.

13) Monica noted that some documentation which is required for the case study (planning, resources etc) may be online (i.e. in electronic format). It is perfectly
acceptable to gather this electronically if that is easier and there are no access issues. But NPCs need to remember that WP5 may need access to online documents so they may need to be printed out if they can only be accessed via a school learning platform for example (which may have restricted access).

14) Luk asked if the interviews should be in English. The interviews can be in the local language if required (NPCs need to translate the interview schedules to ensure that the questions are phrased in the same way each time). Or they can be done in English if the participants are comfortable with this – this will save on translation costs.

15) Luk commented that in Belgium the head teacher and ICT co-ordinator will not be aware of the scenarios. He suggested that one way to stimulate discussion if they are not aware of iTEC would be to get students to give a presentation (prior to the interview) on “new technology at school: a report of what we have done”.

ACTION: Following a review of the scenario development process by WP2, WP3 and WP4, which was held in July 2011, the Learning Stories and Learning Activities will be provided to all participating head teachers.

Participants were all very positive about the meeting, despite the poor sound quality for some and the need to cover a lot of material in a short space of time. In particular, they appreciated the level of detail provided in the Evaluation Handbook.

A formal evaluation of this event was not conducted.
APPENDIX 5: MAPPING CYCLE 1 SCENARIOS AGAINST KNOWLEDGE MAP

Italicised practices/technologies did not emerge from the Knowledge Mapping exercise but are not necessarily novel. There is an assumption that provision of a learning platform supports anytime access so anytime learning is not identified separately here.

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<th>Biblio-High-Tech</th>
<th>Insightful Instruction</th>
<th>Online Repositories Rock</th>
<th>Out of School Matters</th>
<th>Personal Learning Agent</th>
<th>Repositories and Responses: Reactive Teaching</th>
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**Technologies/systems**

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**APPENDIX 6 : MAPPING CYCLE 2 SCENARIOS AGAINST KNOWLEDGE MAP**

Italicised practices/technologies did not emerge from the Knowledge Mapping exercise but are not necessarily novel. There is an assumption that provision of a learning platform supports anytime access so anytime learning is not identified separately here.

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<th>Embedding exam preparation in learning activities</th>
<th>Mathematics in a multicultural setting</th>
<th>Mentoring teachers to improve digital literacy</th>
<th>Our school, our environment: using technology to raise environmental awareness</th>
<th>Professional development in the global classroom</th>
<th>Researching online social behaviour</th>
<th>Students creating science learning resources</th>
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