

Exploring the Creative Use of Tablets in Schools



Observation
visits final
report



Author Diana Bannister MBE
University of Wolverhampton

Editors Anja Balanskat | Jim Ayre
Roger Blamire
European Schoolnet

Publisher European Schoolnet (EUN Partnership AISBL)
Rue de Trèves 61
1040 Brussels | Belgium

Picture credits Virginija Birenienė | Daniela Cuccurullo | Jan De Craemer
Antonio Gonçalves | Daniela Gruber | Ingrida Kupciuniene
Rosa Palmizio | Daniela Porro | Phil Spoors

Design and printing Hofi Studio | CZ

Published May 2015



This work is licensed under a Creative Commons Attribution-ShareAlike 3.0 Unported License: <http://creativecommons.org/licenses/by-sa/3.0/>

The work presented on this document is supported by the European Commission's Lifelong Learning Programme – project Creative Classrooms Lab (Grant agreement 2012-5124/005-001). This report fulfils a contract commitment (deliverable D4.3) to provide a “final report from observation and documentation of practice”. 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.

NB: Websites are referenced throughout this report; these were checked prior to publication. The reference to the website does not constitute an endorsement of the product or organisation.

Table of Contents

Executive Summary	4
Introduction	5
Link Observation Visits	7
CCL Project Methodology	9
Main Findings	13
1. Implementation of Devices and Connectivity	13
A. Access and Ownership	13
B. Connectivity – Reliability	16
C. Technical Support	16
2. Pedagogy	17
A. Curriculum and Timetables	17
B. Length of Lessons	18
C. Team Teaching	18
D. Content Creation – Outcome vs Output	19
E. Personalisation – How do Students Learn?	19
F. Collaboration – In The Classroom and School to School	20
G. Assessment with Tablets	21
H. Student Reflection	22
3. Resources, Applications and Content	23
A. Learning Platforms and Cloud Based Solutions	24
B. Apps	24
C. Sharing	25
D. Languages	25
E. Paperless Classrooms	25
F. E-Safety and Data Privacy	26
4. Whole School Issues	27
A. Vision and Purpose	27
B. Learning Spaces	28
C. Professional Development	28
D. Parental Involvement	31
Project Methodology – Lessons Learned	32
CCL Conclusions and Recommendations	35
Acknowledgements	38

Executive Summary

The Creative Classrooms Lab project was a policy experimentation which took place over two years from April 2013 to May 2015. It was funded by the European Commission and co-ordinated by European Schoolnet. The University of Wolverhampton were responsible for the observation and documentation of practice.

The purpose of the Creative Classrooms Lab (CCL) project was to undertake a series of tablet computer policy experimentations. Teachers within 45 classrooms were identified across eight countries to 'experiment' with tablets; this has involved them developing learning activities that can be incorporated in their classroom practice based on tablet policy scenarios scoped by CCL policy project partners and lead teachers.

The project involved nine Ministries of Education (MoE) or Responsible Organisations and throughout this report, these are referred to as policy project partners. This included representatives from **AUSTRIA, BELGIUM (FLANDERS), BELGIUM (WALLONIA), CZECH REPUBLIC, ITALY, LITHUANIA, PORTUGAL, SLOVENIA** and **UNITED KINGDOM**.

The final report builds on the interim report from year one and identifies main findings under key themes. Each of these have been explored further within the main findings. The key themes are:

- Implementation of Devices and Connectivity;
- Pedagogy;
- Resources, Applications and Content; and
- Whole School Issues.

The report also addresses the key lessons learned from the project methodology.

The **Link Observation Visits** have provided a valuable insight into practice within the classrooms and in addition have given policy project partners and CCL project teachers the opportunity to ask questions and discuss specific challenges at a national level.



The aim of the Link Observation Visits was to capture the real use of the tablets by allowing a researcher to observe lessons and document practice. Each Link Observation Visit has included at least:

- Two full lesson observations within each country with the CCL project teachers
- Interviews with the CCL teachers and school leaders.

The report concludes with a **series of recommendations** for policy-makers, school leaders and teachers with regards to the implementation of tablets and 1:1 devices in schools. The report is presented with **11 case studies** that show how policy scenarios were implemented in practice: <http://bit.ly/CCL-casestudies>. A **blog of the Link Observation Visits** is also available at <http://creative.eun.org/observation>.



Introduction

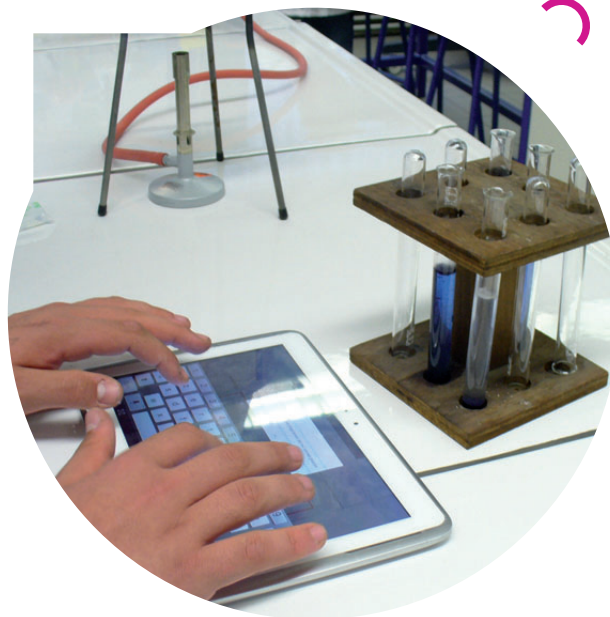
This report is based on the findings from the Link Observation Visits undertaken within work package 4 (WP4), Observation and Documentation of Practice of the Creative Classrooms Lab project (CCL), led by Diana Bannister, University of Wolverhampton, UK. The report documents the main findings from both phases of Link Observation Visits to the CCL partner countries. It describes the methodologies used to collate evidence and analyses the key themes. Each Link Observation Visit includes lesson observations in at least two CCL project schools using tablets; interviews with the teachers and summarises the discussion about the project scenario process.

The purpose of the Creative Classrooms Lab (CCL) project was to undertake a series of tablet computer policy experimentations, at the core of which pedagogical scenarios and learning activities were designed and implemented to support innovative approaches to teaching and learning with tablets in and outside school.

In order to address concrete policy concerns related to the integration of tablets in schools and to support capacity building in this area, the main project partners were Ministries of Education or organisations working closely with MoE on the integration of ICT in schools in each country. These are referred to as policy project partners in this report and are those who ran the experimentation and coordinated the pilot schools in each country. The other two project partners were European Schoolnet, the project coordinator and the University of Wolverhampton responsible for the link observation visits, webinars and documentation of practice.

Forty-five teachers were identified by nine policy project partners from Austria, Belgium (Flanders) and Belgium (Wallonia), Czech Republic, Italy, Lithuania, Portugal, Slovenia and the United Kingdom. Within this group, each project partner also identified a lead teacher to assist with coordination and undertake work at national level. These lead teachers also worked with the policy-makers to design the CCL teaching and learning scenarios and provided ongoing support for other teachers involved in the project.

It is important to note that there was some variation in both the number of devices available in each classroom pilot, the level of wireless connectivity and the length of time the students had access to the equipment. Some students had ownership of the technology 24/7, whilst others only had access to it at school during designated



lesson times. Most of the teachers had only been using tablets with students for a short time before the beginning of the project. In just two cases, the schools had been using tablets for almost four years. The majority of teachers in the project used iPads and Android devices and a few teachers used Windows devices. Two thirds of the teachers within the project had access to an interactive whiteboard or an interactive projector. The partners were encouraged to identify five teachers with a particular focus on secondary schools and the teaching of STEM (Science, Technology, Engineering and Mathematics) subjects. However, as all schools participating in the project had to provide their own technology, connectivity and infrastructure, there was a certain degree of flexibility in terms of the age range of students and curriculum focus. Around two thirds of the teachers involved in the project

used tablets in mathematics, science and technology classes and the remaining teachers used tablets in language, or geography or history classes. In some cases, the policy project partner supported the schools to access tablets at the beginning of the project in conjunction with commercial suppliers. Ultimately, the key requirement was that the project teachers were able to implement the scenarios within the timelines of the project.

The project also included working with Associate Partners, which meant that several schools within the project were provided with access to specific equipment or licenses for software/apps. In the second year of the project, five schools trialled the use of IRIS Connect technology to capture their practice using tablets and uploaded the recordings to an online platform. This enabled recording of real lessons and remote observation of classroom practice and allowed CCL project teachers to give each other feedback.

The report captures the considerable differences concerning the implementation of technologies that exist not only between the different countries, but also within the countries at a national level. At present, across the different countries represented within the CCL Project

there are no current examples of large scale strategic implementations of tablet technology. However, there are examples of other large scale ICT implementations including PCs, laptops, netbooks, interactive whiteboards and other technologies such as visualisers. Currently, there are various levels of implementation of tablets, varying degrees of use and varied access to content. Much of the 'innovation' is being led by individual schools. Furthermore, there are significant differences in terms of types of professional development available with regard to the use of ICT and in some countries there is very little evidence of training to use tablets specifically.

The report concludes with a series of recommendations for policy-makers, school leaders and teachers with regards to the implementation of tablets and 1:1 devices in schools. Above all, it is necessary to recognise the need for stakeholders to work together to ensure that any implementation programme considers the long-term changes that are necessary as access to tablet devices continues to become commonplace.



Link Observation Visits

The purpose of the Link Observation Visits was to allow a researcher to observe lessons involving the use of tablets and to discuss how the teaching and learning scenarios involving tablets had been implemented. The observation visits included interviews and discussions with headteachers, senior management teams and school leaders as well as other teachers and support staff who are involved with the implementation of technology in school.

In the first year of the project, Link Observation Visits were undertaken in four countries: UK, Slovenia, Belgium Flanders and Austria involving ten lesson observations. In the second year of the project, Link Observation Visits were undertaken in Lithuania, Belgium Wallonia, Italy, Portugal and Czech Republic involving twelve observations. Throughout the course of the project, 22 formal lesson observations were undertaken with teachers involved in the CCL project. However, some school visits also included the opportunity to observe other teachers, though in some cases this was only for a part of the lesson. These additional eleven observations have been taken into consideration to inform the evidence of current practice of using tablets in schools.

The Link Observation Visit Handbook¹ was offered as a guide to the project and whilst the policy project partners were encouraged to follow this, it was accepted that there may be slight variations in how these guidelines were followed because of the organisation of pilots within each country and the timing of the Link Observation Visit.

Purpose of the Observation Visit

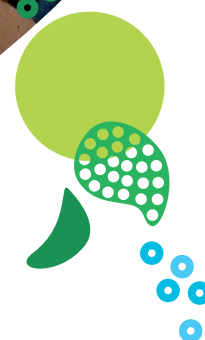
The main purpose of the Link Observation Visit in each participating country was to observe and document the classroom practice to record the ways in which the teacher uses the tablets with the students. This has then been analysed as a common independent insight into the use of tablets, but also to collate practice from across the nine partners to inform future thinking. In the Link Observation Handbook, the purpose of the visit is defined as follows:

- To look at classroom practice with the use of the tablets
- To observe the implementation of the learning stories developed from the policy scenarios
- To look at practice in at least two of the CCL classrooms (this will depend upon the location of the schools)
- To help define exemplary practice for the project
- To consolidate leading examples
- To interview practitioners
- To share European practice at a national level
- To provide the teachers with the opportunity to share practice (opportunity for optional National Focus Group).

The aim of the Link Observation Visit is to capture the “real use” of the tablets. Each Link Observation Visit has included at least:

- Two full lesson observations within each country with the CCL project teachers
- Interviews with the CCL teachers

¹ <http://creative.eun.org/about>



Lesson Observation Record

A lesson observation record² was developed for both cycles of scenarios. This was used to capture the main details within the lesson and to ensure consistency for the CCL project teachers and observer.

Interviews

Interviews were conducted with a lead representative from each policy project partner at the beginning and end of the project. The findings from the beginning of the

project were recorded within the interim report (D4.2). The purpose of the second interview was to document the current use of tablets at the end of the project and to understand if/how the methodologies in the project had supported developments. Prior to the interview, each partner was given a framework to outline the key areas that would be covered. The interviews were conducted as a discussion via Skype or telephone and each interview lasted approximately one hour. Whilst all interviewees had the same framework and same key questions, some additional discussion was dependent on individual responses. The findings from the interviews have been analysed and captured within the different sections of the report.

² <http://creative.eun.org>

CCL Project Methodology

A. SCENARIO PROCESS

POLICY-MAKER SCENARIOS – At the start of the scenario development process, CCL partners worked together to develop policy-maker scenarios based on a methodology developed in the iTEC project³ where future classroom scenarios provide a vision for innovation and advanced pedagogical practice. They outline the educational challenges and priorities to be addressed during the national pilots and a first set of teaching and learning activities for teachers. The policy-maker scenarios served as a reference framework for the learning stories (or pedagogical scenarios) to be developed in a second phase during a pedagogical scenario development workshop.

LEARNING STORIES (OR PEDAGOGICAL SCENARIOS) inform teaching and learning practices during the pilot. They are example narratives that present

how a collection of learning activities could be performed with students. During two pedagogical scenario development workshops lead teachers and policy project partners co-developed the learning stories. Special attention was given that learning stories reflect key ideas of the policy project partner's scenarios and respond to educational challenges to be addressed supported by the use of tablets.

LEARNING ACTIVITIES are the detailed descriptions of novel teaching and learning in classrooms within the learning story. They suggest ways of expanding teaching practices with practical steps, motivational benefits and tips on technology. They can be selected, combined and adapted to personal learning contexts. The seven core activities in each learning story are: **Dream, Explore, Map, Make, Ask, Remake** and **Show**.

CCL SCENARIOS 2013



CCL SCENARIOS 2014



The project developed two sets of pedagogical scenarios/learning stories that were implemented by CCL teachers with their target class during the project, each set of scenarios in one school term. The first set of scenarios were tested from November 2013 to April 2014, the second set of scenarios were implemented from October 2014 to January 2015.

The Link Observation Visits investigated how the CCL learning stories/pedagogical scenarios were implemented by the teachers during the pilots.⁴

B. Lead Teachers

Each policy partner organisation appointed a lead teacher in their country or region (nine in total), which formed part of a **practitioner focus group** for the pedagogical scenario development. Each lead teacher contributed to development of the two sets of pedagogical scenarios during the pedagogical scenario development workshop. Lead teachers also helped to lead the coordination of the pilots involving the other four participating teachers in their country. With the support of the policy project partner and European Schoolnet, they encouraged teachers in the project to develop and share learning activities based on the project pedagogical scenarios/learning stories.

C. Support at National Level

The CCL policy partner organisations supported the pilots on a national level in line with national/regional priorities for ICT in education by:

- selecting CCL teachers/schools/classrooms according to criteria agreed by project partners;
- setting up national training workshops, kick off meetings, online webinars and focus groups for teachers prior to the pilot implementation (providing translations of scenarios, methodologies for implementation);
- providing teachers with support and guidance throughout the project;
- supporting the Peer Exchange workshops organised at European level.

D. Webinars

During the project, the University of Wolverhampton provided six webinars for all 45 CCL project teachers in order to provide ongoing online support. All of the webinars were delivered using the Cisco WebEx platform and held during the early evening just after most school's teaching hours. After each webinar, the teachers were encouraged to write their own online reflective blog. This information is publicly available via the CCL project website within the teachers' community of practice⁵. This means that anyone can access the information that the teachers have written and has led to other non-CCL project teachers using the blog templates to support their own professional development.

E. Working with Associate Partners

Over the course of the project seven industry partners in the European Schoolnet Future Classroom Lab became CCL Associate Partners (this activity was not funded) and offered free hardware to a limited number of CCL schools and software/content licenses to all of the CCL schools. They included:

- Adobe (Adobe Captivate and Presenter software)
- Corinth (Corinth Classroom app and content)
- IRIS Connect (IRIS Connect video-based continuing professional development platform)
- NEC (NEC DisplayNote content sharing app and NEC interactive displays)
- Promethean (Promethean ClassFlow teaching and learning platform)
- Samsung (upgrading of schools with Samsung tablets to Samsung Smart School solution)
- SMART Technologies (SMART amp collaborative learning platform)

⁴ For further details on the scenario development process see: Report on phase 1 scenario development Report on phase 2 scenario development: <http://creative.eun.org/about>. Full access to policy-maker scenarios and learning stories: <http://creative.eun.org/scenarios>

⁵ <http://creative.eun.org/teachers-blog>

As well as supplying technology, CCL Associate Partners also proposed specific tablet scenarios.

The decision on whether to trial the hardware/software was up to CCL policy project partners and teachers in the pilots and, in total, around 20 schools participated.

In one of the observations in Belgium Flanders, the teacher had received a display screen from NEC and a license key for NEC DisplayNote. At the time of the observation, the teacher was beginning to explore the potential of the hardware and software. In a science lesson, the teacher took photos of the students during an experiment and was able to send these to the students immediately. The teacher annotated the photograph and encouraged the students to add in their own additional comments. The photograph was saved on Dropbox and this meant that the students could add this into their own work.

Four of the observations included classrooms in Austria, Italy, Lithuania and Portugal that had been equipped with the Samsung Smart School Solution. This enabled the teachers to distribute different activities to individual students in the class and to undertake formative assessment with short quizzes and provide instant feedback to the students. In Portugal, one teacher in the school observed was trialling the use of Promethean's ClassFlow. This allowed the teacher to assign work to students at their tablet in a live learning activity. The students were then able to interact with the materials.

F. Remote Observation

In the initial plan for the CCL project, the partners identified that part of the experimentation would involve exploring the opportunities for a small group of the CCL teachers to record their practice using tablets and to observe each other and provide feedback. This approach to classroom observation provides teachers with the opportunity to collaborate and share real practice across larger professional communities. In 2012, IRIS Connect⁶ was identified as the only cloud-based, online platform and mobile video system at that time which would allow teachers to easily record their teaching and share lessons with others in a virtual space that is private and secure. The technology enables the teacher to analyse, reflect on and add time-stamped comments to their own lessons and



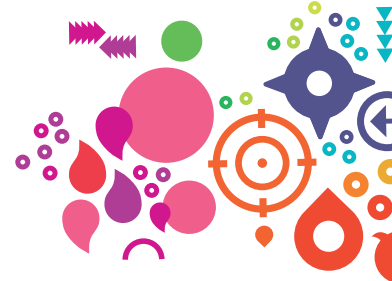
can then choose who to share it with. A remote observer is then able to offer their reflections or suggestions to improve or enhance the teaching and learning.

As part of the project, five CCL project teachers from different countries (Belgium Flanders, Czech Republic, Italy, Lithuania and Slovenia) were equipped with a Discovery Kit from IRIS Connect. Each teacher was given initial training and access to technical support from the company to use the technology. Alongside this, the teachers attended bespoke webinars during the second year of the project to share their progress and evaluate the use of the equipment.

The teachers were allowed to record lessons in their native language, but they were encouraged to teach in English to allow colleagues from other countries to benefit from being able to share their practice. It was acknowledged that one of the differences between remote observation and face to face observation is that the observer cannot move around the room to gain further insight into the activities of the students. However, during the course of the experimentation, the teachers found effective ways to overcome this by providing additional notes in English to their reflections.

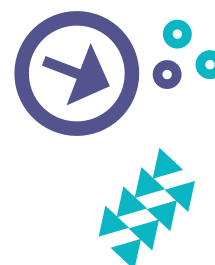
The CCL project teachers said that it was very easy to record lessons and recognised that it was helpful to get feedback on their teaching. Initially, a minority of students reacted to the presence of the technology, but soon ignored it.

Simona Granfol, CCL project lead teacher, Slovenia: *Going forward – I am getting to where I want, I am in a better position to include other teachers. Now whilst testing IRIS Connect, I would like to use this to reflect with other teachers. Already after watching myself, I have made ten points about what I have to change in my lessons.*



Three different modes of using the IRIS Connect equipment have been identified:

Mode	Description	Advantages	Disadvantages
1 Showcase	The camera captures the outputs that the students have created.	• The teacher may feel more confident using the equipment. • The teacher can identify particular students to have a specific role in the lesson. • The teacher can review the outputs, ensuring that nothing is missed.	This does not give the opportunity for the remote observer to see the teaching and learning.
2 Demonstration	The camera is on and the teacher uses the opportunity to demonstrate a particular software/ technology/ teaching strategy with the students.	• This is an effective way to show other teachers either the entire lesson or a specific part of the lesson. • This is helpful when the teachers want to see/share a particular technology, teaching strategy or approach to classroom organisation being used.	• The teacher may focus too much on either the technology or the students and “act” to the camera. • The students may be more aware of the presence of the camera. • It may be necessary to “script” the content of the lesson to ensure that all the points are covered for observers and some of the spontaneity will be lost.
3 Reflective	The camera is on in the background and the teacher records the lesson for personal use or shares reflections.	• The teacher can record whole lessons or parts of lessons and choose whether to upload them to a private or shared space for review and analysis. • The teacher is able to share real practice and can consider how to improve or enhance teaching and learning. • The teacher is able to agree with an observer prior to the lesson on the aspects for focus and discussion. • The teacher can seek feedback and advice from colleagues that is evidence-based, personalised and contextualised.	• The teacher may be more aware of using the technology and this may lead to unusual practice. • Some students will be more aware of the technology.





Main Findings

The main findings emerged from the Link Observation Visits, through a combination of the direct observation of lessons, the interviews with the CCL teachers, discussions within the national focus groups and analysis of the teachers' blogs. Alongside this, each of the policy project partners has participated in an interview at the beginning and the end of the project. The data from this has been collated and analysed then grouped under the following themes:

- 1 Implementation of Devices and Connectivity;
- 2 Pedagogy;
- 3 Resources, Applications and Content;
- 4 Whole School Issues.

1

Implementation of Devices and Connectivity

A. Access and Ownership

Across the CCL project, the students have had varied levels of access and 'ownership' of their tablets. It is essential to consider 'ownership' not just in whether the device has been purchased exclusively for the student, but the extent to which the student is able to customize and personalise the device. This should include consideration about whether the student has the ability to download apps and make decisions about when to use the tablet.

Most CCL schools have implemented a single type of device. This is largely to avoid apparent network problems and compatibility between devices. There is little evidence from the CCL schools of tablet implementations with mixed economies of tablets in use.

Teachers and students were observed using several different kinds of tablets or devices including iPads, Samsung 7" Galaxy Tab, Samsung 10" within Samsung Smart School solution, Prestigio 7" tablets, Magalhães hybrid devices (Portugal), Acer netbooks and other brands of netbooks not specified. The maximum time that tablets have been in any school is four years, but in many cases,

schools have only had their tablets since the beginning of the CCL project or just before. The focus has therefore been largely with only one or two groups of students for each teacher.

Schools have become more autonomous in their decisions to purchase tablets because unlike many other technologies they can afford to buy them in small numbers. This means that there is all too often an ad hoc approach and dependency on a few teachers within individual classrooms without consideration for what changes might be necessary across the school.

Teachers have tried various ways to ensure that the school can make maximum use of the devices; for example, some schools have bought one or two class sets of 25-30 devices and timetabled the access across as many students as possible. Whilst this seemingly allows more students to access the technology, it can create problems as a result of students having as little as one hour per fortnight to use the devices. It is important to understand that it takes time for the students to learn how to use the device and very limited access such as this also restricts the time to develop project work and produce outputs using the tablets. This can be problematic for teachers, particularly where they are trying to deliver a rigid curriculum and feel

that they cannot afford time to experiment with the tablets. In Lithuania, one of the CCL project teachers was only able to give the students one hour per week to use the devices. In addition, the students had to “log-in” to the devices and “log-out” and this usually has to be done in break times before and after the lesson. Some students were not familiar with using tablet devices outside this time and therefore it took longer for them to complete tasks or use certain tools or applications. Several teachers in different countries have commented that it cannot be assumed that students will know how to use the tablet intuitively. Teachers do need to devote some lesson time to show the students how to use certain applications, or make alternative arrangements to do this. In one classroom in Slovenia, the teacher showed six students how to use an app, whilst the rest of the class did a ‘warm-up’ question and it was then their responsibility to show all the other students in their group how to use the app.

Valerie Thompson, e-Learning Foundation, UK said: *“the assumption that children are digital natives is not true and children do need time to know how things work.” Teachers, therefore, have to deal with the fact that their students are not always familiar with the technologies or the expectations of doing this kind of work.*

Petra Boháčková, CCL Project Lead Teacher, Czech Republic commented: *“One of the biggest challenges is organising access to the iPads. The student numbers at the school are growing significantly and this means that the access to the devices is distributed across the students. The school would benefit from access to more devices, but this creates problems for storage too.”*

Some classes did have enough devices to allow each student access and whilst it can be beneficial for students to be able to share access in particular learning activities, it was difficult to use formative assessment and give individual student feedback using shared devices.

There are several examples where the purchase of the tablet was made by parents either in agreement within the school or of their own accord. For example, in one of the schools in Austria, parents were mainly buying the devices for the students. In the UK, there were examples of parental contribution schemes; parents made payments each month and the student will own the device after three years.

In some schools, for example, in Belgium Flanders, Belgium Wallonia, Czech Republic, Italy and Portugal, the devices were bought by the school, but assigned to an identified group of students for a defined period. There are advantages to this; it is easier for the teacher to prepare learning materials knowing that the students have access to tablets. This is supported even further when the student is able to take the device home. This is because the student can begin to make their own decisions about when and how the tablet is used. It can

mean that the student is allowed to download apps and change the settings on the device to customize features. Significantly, the student can have web-based accounts on the app which are “open” and not restricted by log-in details or additional passwords each time.

Furthermore, some schools had tablet classes and non-tablet classes. However this created a clear digital divide and whether this was by choice of the student or determined by the school, the consequence is that some students are excluded from access to technology which may impact upon their achievements.

The evidence suggests that ideally, students should be allowed to take the devices home and this will ensure that the teacher is able to plan for the use of the technology outside lesson time. Whilst this is still somewhat dependent on students having access to the internet at home; it enables the teacher and student to consider how the technology can enhance learning opportunities. Schools need to be aware of students that may not have internet access at home and provide alternative solutions through access after school-hours or in the library.

The observation visits highlighted the significance of giving teachers access to a device. There were some classrooms where all the students had access to a device, but the teacher was writing the task on a chalkboard. It is fundamental to ensure that the teacher has access to a device and it is recommended that this is the same device as the students. This helps the teacher to be able to prepare lesson materials and model activities during the lesson.

The interviews with the policy project partners revealed that at a national level, there are no current examples of large-scale tablet implementations. However, there are examples of teaching and learning projects or “digital” projects which have enabled schools to access funding or undertake research and there is evidence to suggest that some schools will use this as a route to implement tablets. One of the biggest challenges at a regional and national level is to capture the practice that is happening in classrooms with regard to the implementation of tablets. The policy project partners realised that they do not have the complete data about what tablets schools have access to and who is providing the equipment.

For example, in Belgium Wallonia, there is a national project called École Numerique, (the digital school project) that is now in its third phase. The first two phases involved 100 schools and these schools are now moving forward with their own project. The third phase will run until June 2016, involving 200 new schools and these schools will shortly be equipped with technologies, including 100 primary schools, 60 mainstream secondary schools, 40 higher level secondary and Special Educational Needs Schools including some Adult Education (16+) non-compulsory schools. 160 of these projects involve tablets.



The school defines their own project, and is given some resources to achieve this goal. e.g. 24 tablets and one whiteboard or maybe 3 whiteboards, depending upon what materials the schools need. Regional advisers will provide support for the schools and there will also be two phases of data collection. Alongside this project, many of the schools in Belgium Wallonia have also bought their own tablets.

In Lithuania there will be a national project over the next 12 months equipping 200 classrooms with approximately 30 tablets paid for by the Ministry of Education. In addition, there has been the appointment of 20 consultant teachers and initial teacher training lecturers to provide pedagogical support and training.



Eugenijus Kurilovas, CITE, Lithuania: *"The training and experience of the CCL project teachers will be very useful and inform these current developments and future work. I think we did the first step only; we got teachers acquainted with tablets, we showed them examples, gave them advice and now we need to share their ideas."*

In Italy, national projects on the digital school provided funding for Classroom 2.0 and Schools 2.0 programmes. There is no single project on 1:1 computing and schools decide autonomously whether or not to buy particular resources. There is no national policy for the implementation of tablets. Currently, there is no further funding at a national level, but there may be funding available to schools at a regional level. Italy has a pilot project with Samsung involving 25 schools in trialling the use of the company's SMART School solution. Samsung has launched a new call together with the Ministry which potentially will involve up to a further 70 schools.



As a national ICT in education agency, INDIRE is promoting what they have learnt from their participation in both the ITEC and CCL projects and they will use this within their newly identified Avant Garde Schools. 22 schools are promoters of the Avant Garde movement⁷ and promoting the ideas. They have signed a manifesto and schools can enrol if they are interested in joining the programme. At present, 140 have enrolled to test one or more of the innovation ideas.

At the same time, INDIRE is funding another open call, so that they can collect a number of ideas to test and discuss within an online community. The promoters will be the schools themselves. One of the important things is that the school is interested in developing a whole school approach to using ICT.

In the Czech Republic, the National Strategy for Digital Education until 2020 was approved in November 2014. There is a Ministry of Education funded project, "Call 51" which includes equipping teachers with tablets. This runs until June/July 2015. It is not for teachers in the Prague region – but for other teachers across the Czech Republic.

In Portugal, a recent national conference in January 2015 highlighted over 11 tablet projects at a national level.

On January 31st 2015, the Ministry of Education in Portugal (DGE) had a national conference "Tablets in Education" which attracted almost 300 delegates from different municipalities across Portugal.

Fernando Franco, DGE commented:

"This was a real combined effort of DGE, the Universities and the schools. Because of the conference, we have a lot of questions about tablets. We have made meetings with the lead teachers in the competence centres. They want regional conferences now and DGE will go to these, and make a plan to support them." DGE has nine competence centres for ICT in the country across Portugal and employs teachers in Universities who engage in partnership work. They have a goal and a role to support teachers and schools who have an interest in ICT. However, the conference has highlighted that there is a need for tablet specific support and professional development.

Bernhard Racz from Austria indicated that the CCL project has provided an opportunity to test the different kinds of devices available. Two of the schools have used iPads, whilst two others have used Microsoft RT tablets and one school has been equipped with the Samsung Smart School solution. The Ministry has been able to undertake research and make recommendations to schools who are considering the purchase of devices. In brief, the recommendations suggested:

- 7" tablets are too small for general use in the classroom
- 10" tablets are fine for most subjects and everyday regular use

⁷ Educational Avant-garde: <http://avanguardieeducative.indire.it/>
Manifesto of Educational Avant-garde: <http://avanguardieeducative.indire.it/wp-content/uploads/2014/10/Manifesto-AE.pdf>



- Smartphones are ok for access to research and where some responses are required
- 12" tablets are required for drawing applications

In a number of countries, it is felt that the concept of **Bring Your Own Device** is something that could be explored further in future projects. Headteacher and Director **Julia Tainha, Portugal recognises:** *"BYOD is a problem because not all students have a tablet/mobile/laptop device, some would bring them, but some wouldn't."*

B. Connectivity – Reliability

The observation visits have shown that teachers are battling with access to reliable wireless connectivity. In some cases, the wireless access was limited to a single classroom or small area of the school where technology

teachers were based or where a particular teacher worked. This is limiting as it can mean that the students cannot be mobile with the devices and are restricted by timetabled access to learning spaces. There was concern that, if the access is unreliable in schools that have only 25-30 devices, this would mean that there needs to be substantial investment for the wireless to be stable when more students have access to devices. In schools that have more devices there has been an initial investment and an ongoing commitment to providing reliable connectivity (UK, Austria, and Czech Republic).

Teachers are aware that some students do not have access to the internet at home. However, in general students were offered access to the library or time to complete homework in school. Having access at home did not impact upon any of the scenarios; it was much more challenging for teachers if there was no internet access in the classroom.

Rui Lima, CCL lead teacher, Portugal: *"During the past two years, we had lots and lots of technical problems and students were forced to cancel activities because of these problems. Sometimes I had doubts about the benefits of technology because of all the obstacles we were facing. But the truth is that I've learned so many things to solve these problems and my students have as well. Today, I feel I'm much more capable of teaching with technology and my pupils feel that technology is their ally in the learning process."*

Jan De Craemer, Ministry of Education, Belgium Flanders pointed out that the current technical specification for wireless connectivity is currently being reviewed with telecom providers. He explained that when the last technical specification was developed three to four years ago, it did not anticipate the very fast growth in the number of devices in our schools today. The current plans will now have to consider all learning spaces and wireless connectivity in social spaces, including playgrounds.

Jan De Craemer, Belgium Flanders, commented: *"I am not convinced with changing technologies into tablets. Some schools still need PCs and laptops, and schools should think about what they want to do and what they want to achieve. At the moment, schools want the technology and then they think about what to do with it."*

Two of the policy project partners raised concerns over health issues in relation to wireless access. (Italy, Lithuania) In Lithuania, the Ministry of Health has issued guidelines about 3G and radiation in the school environment.

C. Technical Support

One of the notable challenges for schools is technical support. Several of the classrooms in CCL schools had appointed one or two students to provide first line support to other students and the class teacher.

In Slovenia, one of the schools had a part time technician who supported the maintenance of the individual devices. He is also a part time teacher, so this helps to ensure that he is aware of the issues in the classroom.

However, technical support often rests with the class teacher and whilst this may work with relatively small numbers of devices, it is not appropriate to expect the teacher to be responsible for downloading apps, confirming upgrades and general maintenance of tablets.



2

Pedagogy

A. Curriculum and Timetables

The observation visits and interviews have highlighted significant evidence that teachers find it challenging to implement new ways of working whilst trying to fulfill the requirements of the curriculum at a national level. This is particularly evident with teachers who have classes in upper secondary where examination preparation dominates lesson time. It is evident amongst teachers who are less confident with using scenario development as a planning process and who find it difficult to implement new ways of working in one single classroom because they have to implement new ideas with little or no support available in school. This emphasizes the need for school leaders to be aware of how the implementation of tablets will impact upon the curriculum and the timetable.

The CCL observation visits revealed that students and teachers have varied timetabled access to tablets for learning and teaching. Ultimately, this will impact upon the implementation of the learning scenarios and the learning activities that the student is engaged in.

One headteacher said: *"Sometimes when we work with the tablets it can be disorganised and we think that the students are easily distracted. As a school we have found it important to consider whether the students should have access to the devices all day."*

In Portugal, one teacher shared that it had been a challenge to implement the scenarios whilst trying to fulfil the requirements of the curriculum and prepare the students for testing. The teacher had decided to restrict the implementation of the scenario to three existing units of work. This helped the teacher to focus specifically on the use of tablets for certain topics, and reassured parents who were concerned that students may lose valuable time preparing for examinations. Antonio Gonçalves, CCL project teacher Portugal used Padlet as a project board for the students to be able to show their progress. This was because it was a public digital space encouraging the students to be open about their learning progress. It also revealed which students had been involved in certain tasks on a day to day basis.



Equally, other schools have discussed how the use of tablets has helped the teachers to achieve transparency across the curriculum. At Penwortham Priory Academy in the UK, the use of tablets by the whole year group opened up the issue of needing to see evidence of students' digital work, related to different aspects of the curriculum. The school adopted the use of 'Showbie' which enables the students to keep a digital portfolio of their work. This means that teachers can see the work being done by students in different subjects. The student is also able to access all his or her digital work in one place.

In CCL schools in Austria, Slovenia and Lithuania, schools "collapsed the curriculum" on certain days to work on the scenarios as part of project days. However, this was challenging for the teachers and the students because it meant that students did not have sufficient time to think about or develop their ideas. Some teachers felt that the students saw the tablet as just for "project" work and did not embed the use of the technology into their everyday work.

Across the CCL project, teachers have said that the scenario development process has enabled them to plan with other colleagues collaboratively across the different curriculum areas. This has been viewed as successful because it has allowed them to discuss ideas. It has enabled the teachers to see the learning activities and tasks that students are engaged in; consider the level the



student is working at; and make valuable comparisons between subjects about the consistency of the level of challenge.

B. Length of Lessons

The length of the lessons in most of the secondary classrooms observed as part of the project was between 45 and 60 minutes. This has created challenges for teachers using tablets with students. It was particularly problematic where the devices did not belong to the student and time was lost distributing the tablets, accessing applications appropriately and putting the devices away. It can also be a problem when students have to move to a particular room or area of the school to access the technology or WIFI connection. Both phases of the observations showed that, where lessons are 90 minutes or “double lessons”, students have more time to develop their ideas. This means the teacher can focus the tasks to allow time for planning, creating new materials with the students and advanced discussion. Teachers felt that they need more flexibility within the timetable.

In Italy, Daniela Cuccurullo found that the longer lesson time when using the tablets allowed the teacher time to explore how the students have extended their learning between lessons. The objective of the first scenario cycle in Italy was to implement the flipped vlassroom approach and in the second year of the project Daniela continued to encourage the students to undertake some learning at home prior to the lesson. The teacher is able to begin the lesson collating ideas in a collaborative digital space whilst

the students contribute their ideas using the tablets. This informs the next stage of the lesson where the students collaborate to develop new resources. Whilst the students could do this over a series of lessons, the focused time allowed them to go into more detail and consolidate their prior learning. It means that the teacher has time to offer support and check understanding of individual progress, rather than having 45 minutes to merely deliver often complex content.

Sandrine Geuquet, the CCL project lead teacher from Belgium Wallonia found it effective to give the students smaller timed tasks. *“Initially, I gave them ten minutes to do a series of shorter tasks to assess just how much the students can achieve within a focused time. I also have to encourage the students to ask for help.”*

C. Team Teaching

There was evidence from the observation visits and interviews with teachers that some schools found it beneficial to arrange ‘team-teaching’ as part of the implementation of tablets. In Austria, two teachers delivered a Physics lesson enabling one of the teachers to demonstrate the measurement of force in Newtons using science equipment, whilst the other teacher showed how to predict what might happen using a drawing on the Samsung large display screen at the front of the classroom. In this lesson, all of the students had to record their findings on a digital worksheet that had been sent to their individual device. Having two teachers in the room meant that students had additional support and they could explore the use of equipment as well as the digital tasks.

In Portugal, one school working with primary-aged students has used the scenario on liberating learners to combine two classes. This has meant that teachers can join two smaller classes together. Students all had their own device, but worked in groups of three on a project and both teachers provided support.

At Penwortham Priory Academy in the UK, the CCL project teacher, Lisa Cowell found it beneficial to work with the learning support assistant who provided information about the individual learning needs of the students.

In Belgium Flanders, CCL project teacher, Jan Thoelen was given additional time as part of his role to work with teachers in lesson time to support the use of ICT and this included the use of tablets. One teacher demonstrated something new in a staff meeting and then Jan created a schedule of support for other teachers.



D. Content Creation – Outcome vs Output

In both the first and second phases of observations, there was substantial evidence of teachers directing the content and workflow of the lessons. For example, “go to xx app, use xx search engine, find xx images and make a presentation”. This was partly because the teacher wanted to give the students a task and control the direction of the learning. This can be a particular challenge where the teacher is less confident with the technology. It is something that is minimized as the teacher becomes more familiar with the scenario development process and as the teacher engages the students in tasks that enable them to produce different outputs. For example, the students may be asked to produce a presentation, a poster, a video or a game. This means that students can use various applications and make their own decisions.

In several countries across the project, particularly where teachers had not implemented the CCL project scenario, there was evidence to show that students can appear “busy” on the tablet spending substantial time in the lesson “searching for information” or “researching”. However, valuable teaching time can be lost if the students simply “copy and paste” or spend time making presentations rather than learning how to analyse, validate and evaluate within learning activities. It can mean that whilst the teacher “monitors” that the students are working, there is little or no evidence to suggest how the activity has challenged them.

In Belgium Flanders, Philip Everaerts developed his scenario on Content Creation into an iBook. There were smaller tasks at each stage. This meant that the students could work through different tasks at each stage of the scenario and the students could work in rotating groups. This helped the teacher to organise the access to the

physical resources and helped the students to make effective use of their time.

In the lesson observation of the UK scenario on personalisation, the teacher invited each student group to present their video whilst the other students reviewed the content. During the interview, the teacher emphasised the importance of the smaller outputs in earlier phases of the scenario. For example, it was made clear to the students that developing a quality video may involve lessons on producing storyboards, text analysis, research into the background context for the video, mind mapping, all of which would be outputs in their own right. This is particularly important as the teacher builds up a portfolio of evidence for the students as individual learners.

E. Personalisation – How do Students Learn?

There have been several discussions in the project around how can we encourage independent learning and, in a similar way, there were some teachers who wanted their students to be more self-organising and to take more decisions. Teachers involved in the scenarios on personalisation and liberating learners said that it has helped them to know more about their students by giving them opportunities to explore how the students learn.

In the Liberating Learners scenario, Lithuania and Portugal used the questionnaire called VARK (Visual, Aural, Read/write and Kinaesthetic)⁸ which is free to use for educational purposes. The teachers used the findings from the questionnaire to organise the groups for collaborative work, trying to identify students with different learning styles to work together.

8 Based on Fleming, N. (2006). Teaching and Learning Styles. VARK. 2nd ed. Christchurch, NZ. <http://vark-learn.com/the-vark-questionnaire/>





In UK, the teachers used e-Pace⁹ with the students.

Phil Spoors, Cramlington Learning Village and CCL lead teacher, UK: *"The use of ePace was an integral part of the Liberating Learners scenario for the UK. ePace was used to evaluate the strengths and weaknesses of our students in a range of skills and abilities essential for learning. We realised that if we are going to help students develop into more independent learners we first needed to know their starting point. The test itself was very revealing and helped teachers, students and of course parents understand why some learning came easy to that particular student whilst other learning was challenging. Once we had been through the scenario and had worked to build up learning dispositions, strategies and confidence in being more independent we tested the students again to see if there were any changes. The main importance of the results was to highlight where particular students were strong and weak so that activities and material to develop their independence could be tailored to their individual needs and negotiated with them."*

Lisa Cowell, CCL project teacher UK said: *"the school has recognised the importance of students taking an active role, not a passive role in their learning with the tablets."*

In Italy, students in one class were given the freedom to choose what output they will produce. In an English lesson combined with Science about different forms of energy, students could decide whether to present their new knowledge as a wiki, a Popplet, a Glogster or develop an app.

F. Collaboration – in the Classroom and School to School

Both phases of observations revealed that students can find it challenging to work collaboratively. In Slovenia, the teacher asked the students to work together on a task in a mathematics lesson. However students were not familiar with doing this and, although placed in groups of four, they still worked on their own. Teachers found that it can be useful to ask the students to share a device and this meant that they had to communicate with one another.

Teachers found it effective to give the students roles within the lesson; for example, in a mathematics lesson in Italy, the teacher assigned one student to be the photographer, one to be the constructor, and two to be the reporters. The constructor had to make a 3D shape from straws, whilst the reporters noted the resources used, took the measurements, wrote the instructions and the photographer captured each stage of the process. This was then collated by all the students into a final piece of work for a presentation.

In a science lesson in Lithuania, the focus was for the teachers to encourage the students to be independent; however, the students needed to collaborate because

whilst some students were more confident with the task of producing a video, others were more confident with the science knowledge. It was important for the teacher to group the students according to their knowledge and skills. In the second scenario cycle in Portugal, the teachers used the VARK questionnaire to reveal more information about how the students learn. The teachers then used this information to inform their decisions about grouping the students for collaborative activities. Rui Lima, CCL lead teacher in Portugal said: *"Using the VARK questionnaire made me implement more diversity in my approach to students learning."* The school has now implemented the whole curriculum through project based learning with students involved in different types of activities. Rui believes that *"students are more focused on learning and making decisions about their learning."*

Simona Granfol, CCL Lead Teacher, Slovenia said: *"The scenario process has helped me to understand their learning strategies and realise that just because they use digital media, teachers must not assume that students have the necessary skills. Not everything is intuitive."*

In the Czech Republic, students discussed that it can be challenging to complete a collaborative task because "you have to communicate with people after the lesson who you do not normally work with." Students are able to use the tablets or their own mobile devices to make decisions about learning and complete projects together outside lesson time.

The CCL project teacher **Martina Baseggio Czech Republic said:** *"The scenario on collaboration has enabled me to learn more about students who feel more confident to emerge and shine within collaborative tasks."*

In Austria, the teacher in a science lesson gave the students time to undertake the task on tablets collaboratively, but also provided access to the physical resources. This gave the students time to validate and test out their ideas.

The teacher felt that some of the students found it easier to complete the experiment using the physical resources when they had been given the opportunity to work with the tablets first.

In Belgium Wallonia and Portugal, the teachers gave the students timed tasks to make sure that the students knew how long they had to complete the work. This encouraged the students to divide the tasks and take responsibility for their learning activities. Pedro Correia commented: *"I have now realised as a teacher that I need to explain things from different perspectives. I cannot explain things from the front of the class. I have to 'turn it over' to the students."*

In Slovenia, mathematics teacher Andreja Pečovnik Mencinger said: *"the whole project was a challenge; before the project we were only used to using ICT now and then with one hour in the computer room. Using tablets in the classroom is quite different."*

In the scenario on school to school collaboration, teachers highlighted the challenge in establishing appropriate ongoing links with other schools. Two schools in Belgium Wallonia found it difficult to set up external links because of time available and chose to work with each other. Two teachers in Belgium Flanders and Czech Republic established their links during the peer exchange meeting as part of the project. However, the lead teacher in the Czech Republic used eTwinning to establish a link with another school not involved in the project. In Slovenia and Czech Republic, the teachers discussed not just the importance of student collaboration, but staff collaboration too. Teachers recognised the benefit of finding opportunities to plan scenarios on collaboration and school to school collaboration. One school in the Czech Republic collaborated with a local university. The university students prepared some materials to teach the lower secondary students how to build and program robots.



Teachers used apps like Socrative or Kahoot to implement formative assessment for students. Whilst these are not considered difficult to administer, teachers do need to give some time to learning how to make best use of the applications and preparing the questions for students.

However, the benefit is that the teacher can maintain evidence of progress and use the data for teacher assessment but also to share with the students. As these types of applications are intended to inform individual assessment, it is necessary for students to have access to an individual device. This can be particularly effective at the beginning of the lesson to enable the teacher to recap or revisit information. It can also be useful at the end of the lesson when the teacher is gathering evidence of student understanding.

G. Assessment with Tablets

Both phases of observations showed that teachers can find it complex to assess the work of the students using tablets. Teachers are familiar with students handing in their individual work to be marked and returning it to them. This means the move to tablets can initially reduce paper based outcomes. Some schools were particularly concerned with how to evidence the student work on tablets for parents, but also to ensure that the students themselves had revision materials. The teachers had to make considerable changes to ensure that they are not just marking an end product, but providing evidence of students' progress.

In Italy, the teacher demonstrated the use of paper based assessment and had chosen to do this only at the end of the activity with the students. This is because the students could not take their device home and the teacher wanted to be sure that the student had the criteria. However, this meant that students were unable to capture their reflections along the way about their progress. This emphasises the need to have smaller learning activities and tasks requiring ongoing feedback. Students may not always be fully involved in the final product, but it is crucial that their input and progress in activities is known.



However, there are examples of teachers asking students to develop their own criteria for assessment (Slovenia, Italy and Austria). In Italy, one teacher used Rubistar which allows students to write the criteria into a digital application.

In Belgium Wallonia, Sandrine Geuquet, the CCL lead teacher commented: *“Recent assessments have shown that the students using tablets are not afraid to speak; they are more active and more reflective, they have become more cooperative.”*

Phil Spoors, Cramlington Learning Village UK said: *“The tablets combined with our class blog allow us to very quickly and easily collect photos of student work electronically and provide feedback virtually. They don’t need to wait for the next lesson to get their feedback and can begin to work on it straight away.”*

H. Student Reflection

One other critical aspect of the scenario implementation is student reflection. In the first phase of observations, this was achieved in various ways. At Skinner’s Kent Academy, UK, Craig Bull encouraged students to review each other’s work,

suggesting improvements but also encouraging them to acknowledge student roles. In a lesson where students presented videos they had created, they were encouraged to consider the script, the filming and the acting. The teacher tried to maintain the link to the school curriculum as students were asked to mark work according to national curriculum levels.

In Belgium Flanders, Philip Everaerts began the lesson with a briefing to see where they were up to. The students then put their work on the school virtual learning environment, to show their progress. This was useful as it enabled everyone to have evidence of any reflections; it also gave the teacher a basis for further classroom discussion.

In Lithuania, one observation showed students using Yammer to document their reflections on certain apps.

Following the first phase of observations and the webinars, teachers identified that they needed to give students more direct opportunities for reflection. Most teachers chose to do this informally. Throughout the observations, it became apparent that teachers did not necessarily keep evidence of the student reflection.

Rui Lima, CCL lead teacher, Portugal: *“If you want to make a difference, don’t just give your students tablets... give your students challenges.”*

3

Resources, Applications and Content

Throughout the observation visits, interviews with policy project partners and feedback from the teachers via their blogs, there is substantial reference to the resources, applications and content that teachers have available to them when using tablets with students. The issues have been grouped under six headings, including general use of apps, sharing resources, curriculum linked resources, and language barriers with resources. There is notable evidence of teachers attempting to consider the notion of paperless classrooms. Finally, this section highlights the discussion that has arisen with regard to e-safety and data privacy when using tablets.

At a basic level, schools in several of the countries observed are opting for digital versions of school textbooks, but these are not always interactive or challenging for students and simply lead to the teacher instructing the students from the front with everyone following the same exercise in a didactic way. It can be financially expensive with schools having to negotiate with educational publishers. In some countries, teachers are trying to take ownership of the materials and creating the digital materials themselves, but this is dependent upon the teacher's technical and digital skills. This requires understanding of how the use of tablets can transform how the student learns. For example, the digital materials need to encourage the student to be creators and take an active role in their learning (Belgium Flanders, Italy, Slovenia), rather than just consumers of information.

Antonio Gonçalves, CCL project teacher, Portugal believes that tablets allow a wider scope and access to rich content. They are a resource creator and have enriched the IT skill levels of the students. Students have found using the tablets quite demanding in daily and continuous work. **Antonio says:** *"the students actually prefer the traditional mode of working because working with tablets means that you have to 'work' in every lesson. You cannot just use the textbook and 'swat-up' for the exam. Traditional is more convenient."*

In Portugal, DGE is working on specific content for teachers using tablets within the Edulabs project where there are 1,000 students and 120 teachers across different subject disciplines. Fernando Franco, DGE discussed that there are also two educational publishers working on Digital Manuals/textbooks that have made resources. These publishers are working with Edulabs project to convert/adapt content of the curriculum to digital content. These two publishers have also made specific additional content for tablets covering the entire curriculum.

Jan De Craemer from Belgium, Flanders said that schools can struggle to negotiate directly with educational publishers to have digital versions of their textbooks. This is because it can be expensive and in some cases the digital versions are not available. Edutap is a Flemish research project looking at ICT and digital learning content on tablets. Research was initiated and commissioned by educational publishers who wanted to see how to move from paper based methods to digital content.

In Belgium Flanders, this is evidenced with two teachers who have created their own iBooks to enable them to deliver their content to the students. The student had a digital workbook with different types of tasks. In Italy, this has idea has grown into a fully-fledged business; one school has developed a project called Book in Progress¹⁰ where all subjects across the curriculum have become iBooks created by teachers for use by other teachers. There are also examples of iBooks created by students.

Edutap is co-funded by the Flemish government. Jan de Craemer described how schools are using apps, free apps mostly or commercial apps. Some schools are creating their own materials – a "digitisation of their work."

Italy had a monitoring activity carried out by OECD looking at the national digital school. The Review of the Italian Strategy for Digital Schools is published¹¹. As a result of the review, recommendations were provided stating that: There should be a national repository of digital content and this should include localised existing content.

Elena Mosa from INDIRE explained that at national level teachers wanted a repository of resources that have been approved, reviewed and quality controlled. Teachers are encouraged to produce their own content and to make it available to the national repository – but as yet the repository is not in place. This also creates issues for publishers because the materials would not be quality assured and some teachers would have issues with intellectual property rights. **Elena Mosa commented:** *"Teachers are not familiar with sharing and this is new territory." In Italy, there is a new law on textbooks; schools can decide whether or not to have schoolbooks. They can have digital/paper/both – and this is an ongoing process.*

Paolo Soldani, CCL project teacher in Italy said: *"I am quite convinced that technology can help teachers to work in a creative and gratifying way, liberating teachers from school books where the texts are often boring or uninspiring."*

¹⁰ www.bookingprogress.org/

¹¹ <http://www.oecd.org/edu/ceri/Innovation%20Strategy%20Working%20Paper%2090.pdf>

In Lithuania there is a national repository of free content for schools that includes learning objects. There are active teacher groups for ICT in the classroom and teachers share, comment on and rate resources. There are a number of tablet applications made available by CCL teachers on the Lithuanian national ICT centre website; although teachers have commented that there are fewer resources available for android devices. The level and use of resources differs according to the schools. Schools have also made use of web based environments such as Padlet and Edmodo. Eventually, students will have their own devices and this will enable them to implement personalisation fully.

In Slovenia, there is a national project to develop e-textbooks and some are already finished and are being evaluated by the schools – for example in Mathematics and Science. However, this is not yet in place across all subject areas.

In the Czech Republic, there are active teachers who blog on the resources available to teachers. There are also resources on the web portal RVP – an educational portal. Czesch Skole is also an important portal. DZS help teachers with tools and webinars 10 weeks in each semester, and some of these look at appropriate ICT tools in teaching and learning.

A. Learning Platforms and Cloud Based Solutions

Some schools had not implemented a standard, common learning platform across the school and therefore students were often expected to use several different learning platforms. This can be problematic for teachers giving students feedback on their work. Access to a consistent learning platform may be helpful to schools implementing tablets because there is a single place for lesson content to be made available. Schools are recognising the importance of exploring cloud-based solutions to support teaching and learning.

In Slovenia, the CCL lead teacher said the schools are offered support and teachers are encouraged to put their content on the Virtual Learning Environment (VLE). During the lesson observation, the teacher was able to demonstrate how materials used in other phases of the scenario were readily available for the student to access to support their continued learning. Students could make their own decisions about what they produce, but they were required to save their work to Google Drive. This meant the teacher could check on their progress at any point. The students also had a specific task for each lesson, and not just each phase of the scenario.

In the UK, Penwortham Priory Academy used a single app across the school to store the students' work in a digital portfolio.

B. Apps

Throughout the CCL project, teachers have been keen to increase their knowledge and awareness of apps. However, discussions during the observation visits and the webinars highlighted that teachers need to refine the numbers of apps for their own use and student use in the development of learning activities. Following the first phase of observation visits, teachers were encouraged to define the apps to be used within the scenarios. Some of the CCL project teachers restricted the apps that the students were able to use for the task; whilst this helped the teacher to be more informed about the features of the apps; it forced the students to produce particular outputs in a certain format. Teachers had realised during the first cycle of scenarios, that there needs to be a semi-structured approach; this means that teachers may want to define a number of apps that the students can use, but equally encourage the students to make choices and decisions. During the planning of the second scenario cycle, teachers were asked to identify some apps that could be used, but were also encouraged to allow the students to make independent decisions. The second phase of visits has reiterated teacher comments that students should be able to identify other apps/tools that will support their learning.

Teachers highlighted that it would be useful to have access to resources that are curriculum-linked. Teachers can spend a long time trying to locate the most appropriate subject specific resources. Teachers in the CCL project expressed the importance of giving students a restricted list of apps to begin with so that students do not spend unnecessary time searching for appropriate apps. However, as both teachers and students grow in confidence, the students may prefer to make their own decisions about which apps they choose and the types of end products that they create.

Staff in schools should be reassured that training will be available for an identified number of apps and students will be aware of the list known and used by staff. It means that where the devices belong to the school, students will need to seek permission if they require access to additional apps. This encourages consistency between staff and ensures that the teachers have considered the most appropriate apps to use as part of the scenario implementation. Some schools also expressed a concern at the cost of apps and chose to install only free apps whereas others used web based environments such as Padlet and Edmodo.



D. Languages

At a national level schools have access to a range of digital content; however teachers can find it a challenge because the content is not always available in other languages apart from English. This can exclude teaching staff and also creates problems when teachers are trying to deliver subject specific content in the home language.

Simona Granfol, CCL lead teacher in Slovenia said: “As teachers we still don’t have that much material in Slovene language; most of the really good teachers are involved in developing their own resources for the lessons.” She believes that this is perhaps easier for those who teach languages as they can perhaps readily request help from teachers in other countries.

Rui Lima, CCL lead teacher, Portugal commented: “It’s very difficult to find good apps in Portuguese. Fortunately we have a digital platform with a large number of resources for learning. However, I found that pupils are more interested when they listen to their teacher, so I started recording my voice and creating my own videos.”

Valerie Thompson, e-learning Foundation, UK said: “One of the challenges for schools is that there is not enough guidance available about volume licensing and this can create problems when schools want to distribute the app across a number of devices.” She also noted that teachers were making use of the Educational App Store.¹²

At a national level, Belgium Flanders has written guidelines for Primary and Secondary level about the implementation of apps. These are available in e-pub format¹³.

Phil Spoors, Cramlington Learning Village UK outlined the **importance of staff and students having training to gain regular use of tools that can become embedded in every day practice**. For example, a virtual planner, tools for communication, a dictionary or thesaurus and other generic resources can help staff and students to use the tablets continually. All staff have planned the use of tablets into their schemes of work and lesson plans.

C. Sharing

Across the project, several teachers highlighted that they are not familiar with sharing their resources with other teachers or planning collaboratively. This has been a challenge for the teachers throughout the CCL project. However, teachers have said that it has been beneficial to learn from teachers across different disciplines as they can consider the different types of activities that the student may engage in across the subjects. This can help teachers to know more about their students (Slovenia, Austria, Belgium Wallonia).

In her blog identifying challenges, **Petra Boháčková CCL lead teacher Czech Republic says:** “It takes time to explore different apps, to try them out. It is useful to be a member of a community that can help. But a lot of teachers are afraid of social networks.” Petra recommends that it can be useful for teachers to recognise that social networks can help them build their knowledge.

E. Paperless Classrooms

Across both phases of observation visits, there is still much evidence of paper worksheets for students even though the research is being done on the tablet. Whilst it is readily understood that the student will probably work with a range of paper based and digital tools, some teachers were only using the tablet device as a research tool, and recording findings on paper or in an exercise book. At present students express that they feel secure with paper based notes so that they have something to refer to. Schools find this challenging because parents want to see evidence of written work. It is seemingly easier for parents to understand marked books, and some have commented that if students are just creating videos, this does not evidence their learning, suggesting that these types of creative activities are “for pleasure.” Going forward, it will be essential to consider how the student is able to collate digital information and paper based information. In Belgium Flanders, in a science lesson, the teacher asked the students to undertake a science experiment and record the findings in digital form. The students took photographs of different phases of the experiment, made digital notes before collating it and sending it back to the teacher via email.

Sandrine Geuquet, CCL lead teacher, Belgium Wallonia discussed: “The teacher believes that the students work best when they have a blend of digital

¹² www.educationalappstore.com/

¹³ www.appsakee.be/docs/51659/

and paper based activities, 'because this gives them variation'. Some of the students still prefer to have access to the tasks on paper."

F. E-Safety and Data Privacy

All of the policy project partners have acknowledged that e-Safety is a challenge. **Jan De Craemer, Belgium Flanders commented** "there are a lot of challenges with regard to e-safety including both technical and pedagogical challenges."

The technical aspects will involve the school being aware of the filtering and firewalls and access to inappropriate material; whilst the pedagogical issues

include schools taking responsibility for students being safe. Several partners in the project discussed the benefits of encouraging schools to adopt the European Schoolnet's eSafety Label¹⁴ (Belgium Flanders, Czech Republic, Portugal).

Portugal has a dedicated team of three teachers who are working on e-safety. Seguranet¹⁵ have had national meetings aiming to get every school to engage with internet safety. Fernando Franco says: "Students need principles about e-safety. A major goal is to teach all the school and not just those who have requested help."

Valerie Thompson said that Childnet international¹⁶ have provided some excellent materials for schools. "There is no excuse not to keep children safe online."

Eugenijus Kurilovas, Lithuania says: "Tablets are personal devices and it is not good when students share one device and it is not good if they have to share applications/log-ins. The devices currently belong to classrooms not students and this is problematic. Classroom devices are not personal devices and this creates problems."

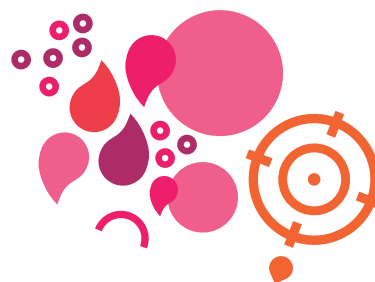
This highlights the challenges faced by schools trying to share devices, but expecting students to take responsibility for data privacy.



¹⁴ www.esafetylabel.eu

¹⁵ www.seguranet.pt

¹⁶ www.childnet.com





4

Whole School Issues



Environment (VLE), impact upon numbers of staff involved and training required. Wireless networks have been upgraded by schools, particularly where the technology has been implemented for more than two years.

The observation visits and interviews have revealed that there are a number of issues that sometimes only emerge after schools have invested in tablets, yet should be part of the ongoing school development planning and review processes. Schools should begin to identify the main challenges that will affect them if there is a growth in the access to 1:1 technologies in school. At Cramlington Learning Village, UK, Phil Spoor, Assistant Head (e-learning) takes responsibility for the implementation of tablets and deals with a wide range of issues in relation to infrastructure, finance, resources, curriculum, assessment, parental liaison and insurance claims. This illustrates the breadth and depth of knowledge that is required by staff in school.

A. Vision and Purpose

This project focused on the use of tablets in 45 classrooms; however, some of the areas discussed during the observation visits reveal that there are fundamental whole school issues that need to be considered by schools implementing tablets. At the heart of this is the need to understand that pedagogical change takes time, needs leadership and requires strategic planning; for many of the CCL teachers, whole school issues were not at the forefront of their agenda at the beginning of the project. The CCL project has enabled the teachers to take first steps and raised awareness of the challenges as schools begin to increase the availability of tablets. It has also allowed the more experienced schools to explore how to scale up best practice from one classroom across the school, but some of these issues also need to be addressed at a national or regional level by the school in partnership with the policy project partner to understand the issues that may arise if and when the use of tablets and 1:1 technology grows. Some of these issues have been raised in other places throughout this report, for example: access and connectivity, changes to the curriculum and assessment, but there are important decisions to be made about learning and teaching environments, professional development and parental involvement. Some of the observations show that decisions need to be made at school level about the implementation; for example, Influence choice of management system, Virtual Learning

In some schools within the CCL project, there is a clear vision for the implementation of technologies in school and for the development of learning and teaching. However, other schools have introduced the tablet as the “latest device”, in one classroom or with several groups of students, but have no clear plan for how additional devices would be implemented. The data from the interviews with school leaders suggests several reasons for the implementation of tablets, but there are very few CCL schools which are currently clearly working towards one device per student. Schools have not necessarily thought about the strategy for the implementation of 1:1 devices because they are too dependent on funding and projects to determine whole school development.

Former Headteacher, Jim Hourigan at Penwortham Priory Academy, UK states: “The school has to provide what is already out in society.”

Lisa Cowell, CCL project teacher and now deputy headteacher said: “We didn’t realise how big the process of implementing tablets was and the impact that it would have on the pedagogy.”

This emphasises the challenge for schools; at first it can seem as straight forward as buying a few devices, but there is a need to consider much larger issues about learning and teaching involving ICT.

In Portugal, one of the teachers suggested the need for continued inquiry to support the implementation of tablets. The teacher has developed an inquiry to understand how

the tablets are used and this will inform further use and implementation of tablets in school.

Valerie Thompson, e-learning foundation, UK: *"In schools – it is all about leadership. It needs to be in the school development plan. Schools should define how they use pupil premium. You need to know your parents. We need to see the school's commitment to general access is something that they take seriously. Students need universal, ubiquitous resources for learning in school and at home too."*

Schools need to plan implementation research and development programmes that allow for the review of how tablets will be used. This means that schools should be encouraged to pilot the use of technologies in their own setting with more than one practitioner. This will enable the school to consider some of the larger changes that may be necessary; for example, is the wireless connectivity strong enough and reliable? How do teachers share resources? How do students access the technologies beyond the school day? What kinds of outputs will students produce? How do we assess student work? Realistically, such pilots should be part of the developments within a whole school learning and teaching strategy.

instructional video using the app "Explain Everything" and by working in smaller groups the students are able to take photos and make voice recordings without interrupting other students.

In Austria, Belgium Flanders, Italy and UK, students were encouraged to move as part of the learning activity; in some cases this was to form new groups, though in other cases the movement enabled the students to work as individuals on different tasks. Several CCL teachers explored the use of the devices outside the classroom. In the Czech Republic, the students worked outside the classroom to make videos to test how far their paper aeroplanes travelled.

B. Learning Spaces

The observations have revealed that the implementation of tablets has led to some teachers giving consideration to the learning environments in school. However, in some classrooms, students are still working in rows; they have access to devices but the teacher remains at the front of the classroom instructing the students within their learning.

Teachers have used the work of the CCL project to try new ideas. It is evident from the observation visits that this has led to the change of practice in one classroom, but there is much work to be done for change to occur across the rest of the school. In Portugal, one school developed a "Learning Lab"; this is a large vibrant space equipped with different technologies including PCs, an interactive whiteboard, an interactive table, a games console and all the students have access to an individual device. This means that the students are able to make their own decisions about which devices they will use for their learning.

In Belgium Flanders, the teacher benefits from working in a large space where the students start off in a horseshoe shape and then move seats to create content at smaller tables that enable them to collaborate easily. In a lesson on content creation, the students have to prepare an

At Penwortham Priory Academy in UK, **Lisa Cowell described how the school had recently opened a new building for teaching humanities:** *"Some of the learning spaces have been made bigger to accommodate students using tablets and working more collaboratively."*

Phil Spoors, UK said: *"Traditional classrooms are not always set up in a way which encourages best use of mobile devices. We had to make sure that our pedagogy, learning spaces and IT provision was all effective and in place before deciding to go mobile."*

In Belgium Wallonia, one of the CCL project teachers **Ludovic Roche acknowledged the mobility of the tablet:** *"The tablet is the backpack of the student; we can teach the student outside the class and this is the added value."*

C. Professional Development

One of the topics that raised significant discussion with teachers and the interviews with policy project partners is that of professional development. First and foremost, it is paramount that the teacher has access to a device and the teachers in the CCL project suggest that this needs to be used as a personal device (Czech Republic, UK). Teachers need to be able to 'own' the device and customise it. This allows the teacher the opportunity



to consider some of the challenges that the student may face. It also means that they have time to explore and have fun, learning as they go. These processes of familiarisation helps teachers who are less confident with the technology overcome some of the barriers.

Professional development is a challenge at a national level because teachers know that they need ongoing technical and pedagogical support. Commercial suppliers are delivering training, but this is largely technical and does not readily address the pedagogical implementation of tablets.

Across all of the partners there are still very few examples of professional development at either a national or regional level to support the implementation of tablets within learning and teaching. Teachers are able to access training from commercial suppliers, but this is largely limited to short single introductory sessions. Some teachers have been involved with pilot projects organized by commercial suppliers such as Samsung (related to its Smart School, solution), but at present these are time limited and focus mainly on technical support, rather than pedagogical development.

Secondly, teachers have raised the importance of having the opportunity to talk and exchange with others. This does not need to be formal, but where the school can provide some structure to this process, it helps to ensure that all teachers are expected to participate and encourages everyone to contribute.

In the Czech Republic, CCL project teacher Daniel Tochacek discussed how teachers have “open space” once a month in his school. This is a meeting where teachers can bring ideas to discuss certain topics. One teacher is responsible for taking notes and circulating this to staff after the meeting. At present, there are a growing number of courses addressing the implementation of tablets. In some cases, these have focussed on a particular subject or age group, i.e. implementing tablets in secondary school, implementing tablets in chemistry. Primarily, many of the courses at a regional level are in fact focussed on brands of tablet, e.g. 10 ways to use your iPad in Mathematics Lessons; Using Android devices in Science.

Whilst these courses provide access to experiences for teachers, the problem is that they are largely short lived, and one off and disconnected from the teacher’s context. The teacher can return to the classroom with ideas to implement and new apps to try, but there is often no additional expectation to do anything further.



There is no long term plan. This means that the teacher may find it more complex to start to undertake some of the bigger changes that may be necessary to make across the whole school. For example, a teacher will soon realise that there is a need for the student to have somewhere to keep their own digital portfolio of work, unless this is discussed at school level, this could mean that students have different ways of working with various teachers.

Teachers need pedagogical and technical professional development. Throughout the CCL project, teachers have been encouraged to engage with the research project so that they have their own focus area. The webinars throughout the project have enabled the teachers to take time to reflect on their practice and they have then been given the task of completing a blog to share their practice. The writing in the blog has informed practice within the project.

In Austria, CCL teacher, Hannes Thomas is also a headteacher who emphasises the importance of regular professional development for staff in school. The local pedagogical institute provides 15 hours’ training free of charge. The headteacher says that all teachers in his school must attend three mandatory sessions. However, the headteacher has calculated that over the course of the year, the average number of hours given by the school for continuing professional development (CPD) to learn to use the iPad is in excess of 60 hours. This is because teachers know that the students have access to the technologies because their parents have bought them and they will expect to use them as part of

their learning in school. Teachers want to upskill. The headteacher provides information and training evenings for parents too.

Austria has made support available through the ENIS network of innovative schools. There are newsletters and two face to face meetings each year. Bernhard Racz commented: “the use of tablets is being normalised.” There is no explicit tablet campaign at present. The virtual pedagogical high school has provided online training for almost four years. This has been funded by the Ministry. There is face to face training available through the teacher training institutes.

In Austria, Czech Republic, Lithuania and Portugal there is evidence that CCL teachers, are now providing support for schools with tablets in their role as a European Schoolnet Future Classroom Lab ambassador.

One of the challenges for schools is that teachers do not have access to devices to use with their students regularly and therefore it can be difficult to put into practice what they have learnt.

In Belgium Wallonia, the Ministry does not give any specific training in the use of tablets, but there are training centres that provide training on mobile devices. The courses are paid for by the Ministry. Teachers have to attend for three days per year but teachers can choose which aspect of CPD, it does not have to be on tablets or ICT. Teachers in the École Numérique programme are encouraged to do ICT training.

A group of teachers in the Czech Republic organised a Summer School in 2014 and this will run again in 2015; this is a four day course with tablets - individual schools/teachers' pay for the course and the teachers have arranged workshops. There is certification for attending the course supported by a local University.

Daniel Tochacek, CCL project teacher Czech Republic believes that “Tablets are now enabling part of the change that is happening in schools.” He knows that his school is one of the first in his municipality to give tablets to teachers first rather than students. This has enabled a number of the teachers to feel confident with the devices for personal use.

In Lithuania, twenty consultant teachers and initial teacher training lecturers are now providing ICT training through the Education Development Centre, a national agency responsible for the national curriculum. This is a new initiative and some of the consultants can offer direct support for the use of tablets in the classroom.



There is additional training support available in the 60 centres across the different municipalities.

In Portugal, teachers are expected to undertake 25 hours of CPD per year. This equates to one credit and teachers need one credit per year which they can use for career progression. Some of the training is free, but teachers self-fund their training in the competence centres and University lecturers offer workshops; the plans for the courses have to be validated by an external entity this is part of the University of Minho. Teachers can deliver training that has been externally validated. Fernando Franco, DGE commented, however, that some teachers are not so interested in credits but would prefer to attend courses to gain experience and learn about new methodologies.

In the UK, Valerie Thompson, e-Learning Foundation, discussed how tablet suppliers have tried to package professional development as part of the initial sale of tablets into school. Valerie explained that she believes that this can be attractive to schools as it enables them to access ongoing support for teachers. Some teachers are attending ‘Teachmeets’; this is self-directed professional development where groups of like-minded professionals arrange to meet in a particular location to address a particular issue. These sessions are largely led by teachers, for teachers.

At Penwortham Priory Academy in the UK, the school has introduced a five minute “Show and Tell” session every Friday morning at the staff meeting. This encourages staff to share apps that they have been using and to demonstrate examples of practice from different departments. This secondary school has been able to offer support and guidance to the local primary school partners too.

At the beginning of the project, **Lisa Cowell, CCL project teacher commented:** “I feel that our biggest challenge may be changing the practices of teaching staff. They have been used to having control of technology and the use of this type of technology is meaning that students have

power to learn more independently and I think that's great! Staff need to learn to step back and become facilitators and posers of interesting and challenging questions rather than content deliverers."

Across the CCL project several schools have explored opportunities for students to support professional development for staff. This has included identifying one student per class as a trainer, but there are schools offering helpdesks run by students to solve first line technical problems. Some CCL project teachers have appointed digital leaders either in their own classroom or across the school. These are students that are able to resolve technical problems either for the teacher or other students within the lesson. Teachers have found that it can be helpful for schools to appoint students to this role, because it means that they can take responsibility and be given training. Teachers acknowledge that some colleagues find it challenging when the students "Know more than them" about the use of the tablet or the use of technology, but this has to be overcome if schools are to encourage staff who are less motivated to move forward.

Fernando Franco, DGE Portugal stated that, "policy-makers need a national policy to train teachers on the implementation of technologies and the thematic content of the pedagogical process is also important." The training and competence centres to support the schools

need to be at the forefront of future developments in Portugal. Schools have the autonomy and must propose training projects to facilitate implementation showing how they can partner with suppliers and industry. Fernando Franco stated, "Schools must adapt their reality to reflect the modern society, e.g. BYOD is a possibility and the schools policies, development plans and self-evaluation must reflect this new reality."

In Slovenia, training is provided by the National Education Institute; this is paid for either directly by the individual teacher or the school. Every month there is also an ICT hour where teachers are invited by email to participate in online seminars for free. There is a list of subject specific seminars such as "Nearpod in Chemistry lessons" or "How to use the e-textbook in a specific subject." During the interview with one of the other CCL teachers in Slovenia, the teacher emphasised that "the CCL project has enabled us to share the things we have learnt with the rest of the teachers in school."

Simona Granfol Slovenia commented: "It is also important to include this for new teachers coming to the schools to make this a practical part of initial teacher training. Most of the time new teachers do not think about these competences. I think we have to ask what is being done by the National Ministry for their new generation of teachers."

Lisa Cowell, CCL project teacher, UK:

Invest time in training your staff:

- *Buddy staff up so that advanced users support less experienced staff*
- *Enable teachers to observe each other using mobile technology*
- *Find creative ways to teach staff skills e.g. a treasure hunt using tablets and apps, speed dating where they share ideas.*
- *Having senior leadership champions who become gurus.*
- *Have students who are gurus that staff can consult.*

D. Parental Involvement

Schools realised the importance of involving parents and informing them about decisions regarding the use of tablets, even if only one class was involved.

Craig Bull, Assistant Vice-Principal at Skinner's Kent Academy, UK acknowledged that schools need to involve parents because they can give the school feedback on how the students are using tablets and how this impacts upon their learning at home. At Skinner's Kent Academy, the use of tablets is linked to teacher performance management. This means that it will form part of the teacher's lesson appraisal by the senior leadership team in school.

Valerie Thompson from the e-learning Foundation emphasised that learning happens 24/7 and "Home is a major influence, you could provide more support to that learning and respect the roles that parents can play. Digital inclusion is an issue for the student not just in school time, but also at home."

Phil Spoors UK said, "On a practical level, this means that they have the responsibility for ensuring it is charged and brought into school each day. This has worked well for us but means that parental support is essential for the scheme to work."

Project Methodology – Lessons Learned

Scenario Process

The Creative Classrooms Lab project has focused on the use of tablets in 45 classrooms across Europe. This has also involved providing teachers with a methodology that supports the implementation process and which enables them to understand how the technology alone will not change practice in the classroom.

The scenario development process used by CCL teachers was originally developed in the European Schoolnet ITEC project. CCL project lead teachers worked with policy project partners to develop the policy scenarios and learning stories.

At the second stage in each pilot phase, lead teachers worked with the other project teachers to develop learning activities for each phase of the scenario. In both cycles, teachers had approximately 4-5 months to implement the process.

Throughout the project, the teachers were asked to implement one scenario per cycle (in total, two scenarios). This has been a considerable challenge mainly because most of the teachers were unfamiliar with planning learning activities in this way and found it complex to implement the expectations of the project, whilst the school timetable continued. The first phase of observation visits showed that only four of the twelve teachers observed were using the scenario process. However, during the second phase, this had increased significantly and six out of ten teachers were implementing the use of tablets by making full use of the scenarios. The teachers suggested that this was because additional support was given to them prior to the second phase and further emphasis being placed on the implementation of the scenarios.

Planning for scenario development takes time and needs space for maximising the breadth of ideas. The policy project partners found it was easier when they knew the teachers and had worked with the schools closely. This included observation of lessons and other opportunities for face to face meetings.



Lead Teachers

The scenario development process benefitted from the identification of strong lead teachers who have had considerable experience of implementing technology in their own schools and have played a significant role in the project providing exemplary practice for teachers at a national level and in some cases, also at a European level. In most cases, the lead teachers had substantial experience of using tablets. The capacity building workshops with the CCL partners were identified as a particularly important process for the lead teachers as these enabled the seeds of the ideas to be planted. However, what was critical was then the follow up at national level and in some cases this was more successful. This is largely because some lead teachers took a 'drip-feed' approach having not only a one day national training workshop, but also other online or face to face meetings with project teachers, where the process of scenario development was unpicked, analysed and developed collaboratively. This was supported by the project partner (UK, Portugal, Belgium Flanders). In the Czech Republic, the lead teacher hosted a summer school for teachers implementing tablets.

During both peer exchange workshops, lead teachers were invited to share their practice and inspire the other teachers within the project. This included an overview of implementing the scenario process, but also a closer look at specific apps and tools. Lead teachers were encouraged to listen to their CCL colleagues and understand the kinds of support that were needed in order to share this to inform the second cycle of scenario development.

One of the issues identified was that half of the teachers did not meet face to face until after the start of the second scenario cycle. In some cases this was too late to provide the necessary support for the teachers to understand the detail of how to plan learning activities. Subsequently, there was still evidence during the second phase of observations of teachers needing further professional development and experience in this area.

Support at National Level

During the project, at least two workshops were held at a national level. The lead teacher provided ongoing support. In some countries, the teachers were able to meet more often, either face to face or in online meetings. Where this additional support was available, teachers expressed the benefits of having continual communication opportunities with the lead teacher. It is paramount in projects such as CCL that the national co-ordinator / adviser are able to provide access to appropriate pedagogical support throughout the project. This might include facilitating extra meetings and opportunities for discussion on progress. It is also important to share best practice examples from across the project. Teachers in several countries have had the opportunity to visit other CCL schools at a national level. By comparison, there is evidence to show that some countries had a limited time for development with only the national training workshop. This is something that lead teachers realised and tried to resolve in the second year of the project.

Valerie Thompson, e-Learning Foundation says: "Individual teachers need to share with other teachers, there is so much that teachers can learn from each other. In the CCL project, it was incredibly important to have our two national workshops because the teachers learnt so much from each other."

Webinars Supporting Teacher Research and Reflection

Throughout the project, the webinars have given the CCL teachers the opportunity to reflect on their practice and consider their next steps. The teachers have been able to learn from each other and understand the importance of reviewing their implementation cycle as an action research process. The teachers' blogs now provide evidence of their progress. The data from the blog inputs has been analysed and captured within the main themes outlined in this report. Further detail of individual responses is available on the project website.

The details of the first three webinars are outlined in the interim report (D.4.2), these included:

- **Webinar 1:** Project Expectations (M2)
- **Webinar 2:** Project Ideas: Early Achievement and Goals (M6)
- **Webinar 3:** Project Challenges (M10)

In the second phase of the project, the three webinars were:

- **Webinar 4: Working with others (M14):** The purpose of the fourth blog was to encourage the teachers to work together at a national level and to enable the Creative Classrooms Lab lead teacher to co-ordinate a response. Each country had to produce only one response. The lead teachers chose various tools including Thing-Link.
- **Webinar 5: Sharing Ideas (M19):** The purpose of this blog was to encourage the teachers to share their ideas about the second scenario. This enabled the teachers to consider whether or not they needed any further support.
- **Webinar 6: Teacher Conclusions and Recommendations (M22):** The purpose of the final webinar (almost two years since the beginning of the project) was for the teachers to reflect on the project and to consider the outcomes. Teachers were encouraged to revisit their previous blogs and look at what they have been able to achieve by being involved in the project.

CCL project teachers have commented that the webinars within the project have been helpful and important for encouraging them to keep on track. As these have been held regularly, it encouraged the teacher to reflect on the work of the project and enables them to exchange practice with colleagues from across Europe. The data from the blogs has been analysed along with the evidence in the main findings.





Lessons Learned

- ❶ Future Policy experimentations should include at least three scenario cycles to give the teacher adequate time to implement the ideas and become familiar with the processes.
- ❷ The opportunities for peer exchange should be increased, particularly at the beginning of a tablet project to ensure that all teachers have received adequate professional development.
- ❸ The CCL project has shown that teachers benefit from being supported by a lead teacher who is also able to provide examples and make suggestions to improve practice. At a national level, the role of the lead teacher could be continued to support the work of schools who are implementing the use of tablets within learning and teaching. This would give CCL teachers the opportunity to cascade their work to other schools. This could be supported by the current European Schoolnet Future Classroom Lab ambassadors who are working at a national level in some countries.
- ❹ All CCL teachers should be encouraged to fully engage with the scenario development process to enable them to understand the importance of analysing and changing their practice, rather than just adopting the broad theme of the scenario.

CCL Conclusions and Recommendations

This section draws together the conclusions and recommendations from the Creative Classrooms Lab Link Observation Visits, the interviews with the policy project partners and the reflections of the CCL project teachers taken from the blogs after each of the six webinars during the course of the project.

The Creative Classrooms Project has enabled 45 classrooms across eight countries to 'experiment' with tablets which has involved them in developing learning activities that can be incorporated in their classroom practice based on tablet policy scenarios developed by CCL policy project partners and lead teachers.

This has been a complex process and in most cases, teachers felt that they needed more time and opportunities to learn from others. Creative classrooms take time to develop and there is a need for considerable planning and opportunity to develop ideas collaboratively. Teachers have benefitted from ongoing support, access to professional development and freedom to experiment.

It is paramount that those leading the implementation of devices determine whether the underlying aim is the partial implementation of tablets in classrooms or the expectation that schools should be developing an ICT strategy that includes working towards incorporating a 1:1 teaching and learning approach that involves the personalised use of the devices. Fundamentally, this is not just a decision about what technologies the student has access to, but what the learning experience is like and how successful the outcomes are.

Bring your own device is already a viable option for some schools, but at the risk of excluding some students and creating visible gaps in the learning opportunities in the classroom and at home, between those who have and those who do not have access. Furthermore, it creates a challenge for teachers. It necessitates a skilled teacher who can plan appropriate activities for students without being able to assume access to specific applications or resources.

CCL policy project partners were asked to consider making recommendations for policy-makers, schools and teachers not involved in the project, but there is of course overlap in their responsibilities, and those interested in the implementation of tablets in classrooms need to understand the benefit of making bigger decisions to ensure that schools are ready when all students and teachers have personal access to a portable device for learning. The recommendations were reviewed as part of the Creative Classrooms project final capacity building workshop (March 2015) and they have been grouped under the same themes as discussed in the report:

Implementation of Devices and Connectivity

- ❶ Ensure national and local support is provided. Schools need information, advice and guidance at a regional and national level to provide ongoing support with the implementation of tablets and mobile devices in the classroom. It is helpful at a regional level, when the municipalities and regional authorities are up to date with the requirements for effective use of technologies in classrooms.
- ❷ Equip and train teachers to use tablets first. Teachers need access to tablets to ensure that they can plan activities for students and understand the implications of using the devices for learning and teaching.
- ❸ Provide wireless connectivity in all learning spaces. Tablets are mobile devices and connectivity should be stable and reliable throughout the school including in playgrounds and social spaces.

- 4 Identify a group of students who will receive the same individual devices and allow the students at least continued access throughout the school day across all their subjects. There needs to be provision to loan devices for occasional access and temporary replacement.
- 5 Students should be allowed to take devices home. The level of student access is critical to the types of outcomes that the student is able to produce.
- 6 Ensure there is ongoing technical support for the installation of new applications, upgrading of software and general maintenance of tablets.
- 7 Encourage students to use their own devices for access to learning materials. Schools should draw up policies and procedures to protect students and staff with regard to the use of personal devices.
- 6 Explore how the tablet allows the students to be mobile and to continue to learn beyond the school day.
- 7 Ensure teachers have opportunities to observe practice and to collaborate to plan for the use of individual devices within learning and teaching.

Whole School Issues

- 1 Develop a regional/national policy to train teachers on the implementation of tablets and mobile devices in education. This should involve continuing professional development for new and existing teachers. Schools should provide both formal and informal professional development opportunities for teachers to experiment, explore and share practice.
- 2 Establish a long term digital strategy and a team comprising of identified school leaders, teachers, parents, students and the school management board (Governors) who lead the implementation and support the developments across the school. Schools need a vision for the implementation of individual devices for students. This should include a clear roadmap with how the ideas will be piloted and the professional development available for teachers.
- 3 Share the strategy for the implementation of devices with all staff. Ideally, in secondary schools, this should focus on specific students, rather than solely allowing timetabled use. This is because students benefit from being able to use the device beyond lesson time and can make independent decisions about the use of technology for learning.
- 4 Review the learning spaces where tablets are being used to ensure that teachers explore the possibilities of how to change the space to suit the learning activities.
- 5 Plan implementation research and development programmes that allow for the review of how tablets will be used. This could be done with a link to a local university.



Pedagogy

- 1 Create opportunities to pilot the use of new devices with students which may involve adapting the curriculum, exploring different timetables and making changes to the learning spaces.
- 2 Share good practice between schools demonstrating the use of tablets in the classroom.
- 3 Consider longer lessons or a more flexible timetable that helps students to prepare outputs and allows time for more focussed and facilitated discussions. In secondary schools, students benefit from having 'double lessons' of around 90-100 minutes. This enables them to develop their ideas and also means that the teacher can give feedback and support more students within the lesson time. However, it is important that the lessons remain project/subject focussed and not "tablet lessons."
- 4 Learning tasks need to be differentiated and assess the progress of individual students using tablets. This should include evidence of student reflection

and enable the teacher to be able to give feedback on digital work. All students should have a digital portfolio.

Resources, Applications and Content

- ❶ Provide access at national level to learning content repositories which enable teachers, students and parents to identify resources that can be used with tablets and mobile devices. This should prioritise native language resources.
- ❷ Provide access to generic apps/tools that can be used by different subjects to enable both teachers and students to become familiar with how they work. (These are usually referred to as productivity tools.)
- ❸ Provide teaching time and support for students to develop their ICT skills. The use of the tablet is not always intuitive.
- ❹ Provide appropriate technical and pedagogical advice to students, staff and parents about e-safety. Students and parents need to understand that there is a need to take responsibility for data and protection of personal information.

Several of the policy project partners acknowledged that there is no data on the numbers of tablets in schools. Nisdi Ouadhi from the Ministry of Education, Belgium Wallonia recognised that it would be useful to know the equipment in use across the region to be able to provide support to schools. The École Numérique (Digital School project) will mean that some data is collated at a national level, but this does not stop schools buying tablets independently and this is the case across all countries. There needs to be a greater awareness of the pockets of good practice at a national level.

Valerie Thompson, e-Learning Foundation UK, acknowledged that “schools will continue to embrace the implementation of technologies in a very flawed way.”

Essentially, what this means is that regardless of what anyone does at a national level, in any country, schools will continue to make autonomous decisions. As with all technologies, the implementation of tablets is at different stages for different schools. There are few decisions being made at a national level about the expectations for schools and most purchases are made autonomously. Schools will always be different to one another; there will

always be those which are quick to start experimenting with a new technology. However, speed of adoption does not equate to better use, and neither does provision for all students. The use of tablets in the teaching and learning requires teachers to plan, understanding of where to access or how to create appropriate resources and learning activities, knowledge of individual students and the ability to assess individual student progress.

In Portugal, Headteacher **Susana Vidal stated:** “Innovation is not about technology, it is about people. As a school principal, I give teachers autonomy. We can experiment as a team; their ideas are respected, some ideas work and some don’t.”

In the coming years, tablet computers will undoubtedly impact more and more on teaching and learning, but their lifespan is limited and new technologies emerge unpredictably and often disruptively. What matters is not the technology but people, practices and professional development. As **Pavla Šabatková, Czech Republic, points out:** “5-6 years ago, it was anticipated that every student would have access to a notebook, and now it is tablets. New devices [technologies] will come and this emphasises that the most important priority is the provision of continuing professional development for teachers.”

The technologies are becoming cheaper and more accessible to students, but many schools have considerable work to do to be able to implement tablet devices for all students. Equally, the provision of tablet devices does not eliminate the need to replace and refresh desktop computers and laptops; in fact it reemphasises that schools have to consider the true implications of their purchases. It is more important than ever before for schools to know why they are using technologies for learning and teaching. Fundamentally, the underlying issue is that pedagogical change is necessary to improve learning outcomes for students. The Creative Classrooms Lab project has shown that there is still much work to be done, but there is more than a curiosity with the technologies, there is now evidence to show that teachers benefit from a methodological process to change learning and teaching alongside pedagogical support in their classrooms and the opportunity to reflect on innovation in practice.



Acknowledgements

Diana Bannister, University of Wolverhampton would like to thank all Ministry Partners and Responsible Organisations within the Creative Classrooms Lab project for their support in the Link Observation Visits and participation in the interviews.

Diana would also like to add special thanks to all those teachers who participated in lesson observations and interviews sharing their practice. In particular, the project has benefitted enormously from the input of the lead teachers in each country. Finally, it is important to recognise all the teachers and the students who have been involved in the work of the Creative Classrooms Lab project for trialling new ideas and leading the way with the implementation of tablets in education.

Ministries of Education or Responsible Partner Organisations (Policy Project Partners)

Austria	Ministry of Education and Women's Affairs	Karl Lehner Bernhard Racz
Belgium Flanders	Ministry of Education (Flemish-speaking community)	Jan De Craemer
Belgium Wallonia	Federation Wallonie Bruxelles	François Brixy Nisdi Ouadhi
Czech Republic	DZS (Centre for International Services)	Pavla Šabatková Barbora Grečnerová
Italy	INDIRE	Elena Mosa Silvia Panzavolta
Lithuania	Centre of Information Technologies in Education	Mantas Masaitis Eugenijus Kurilovas
Portugal	Ministry of Education	Fernando Franco
Slovenia	National Education Institute	Anita Poberžnik
United Kingdom	E-Learning Foundation	Valerie Thompson





Case Study Schools

Belgium Flanders	Middenschool, Ypres	Philip Everaerts
Slovenia	High School Gimnazija Jožeta Plečnika, Ljubljana	Simona Granfol
Austria	Nnö Informatik-Mittelschule Stockerau	Peter Stöckelmaier
Italy	IIT Giordani Striano, Naples	Daniela Cuccurullo
Portugal	Agrupamento De Escolas De Freixo (Freixo School Cluster)	Pedro Correia
United Kingdom	Cramlington Learning Village, Northumberland	Phil Spoors
United Kingdom	Penwortham Priory Academy, Preston	Lisa Cowell
Portugal	Colégio Monte Flor, Carnaxide Oeiras	Rui Lima
Lithuania	Vilnius Jesuit High School	Antanas Dzimidavicius
Belgium Wallonia	Athénée Royal D'ans School, Ans Near Liège	Sandrine Geuquet
Czech Republic	Zs Dr. E Beneše School	Petra Boháčková

Any references to projects or commercial suppliers in the report should not be taken as endorsements.

Exploring the Creative Use of Tablets in Schools



Observation
visits final
report



facebook.com/groups/CreativeClassroomsLab/



#CCLproject



youtube.com/user/europeanschoolnet