

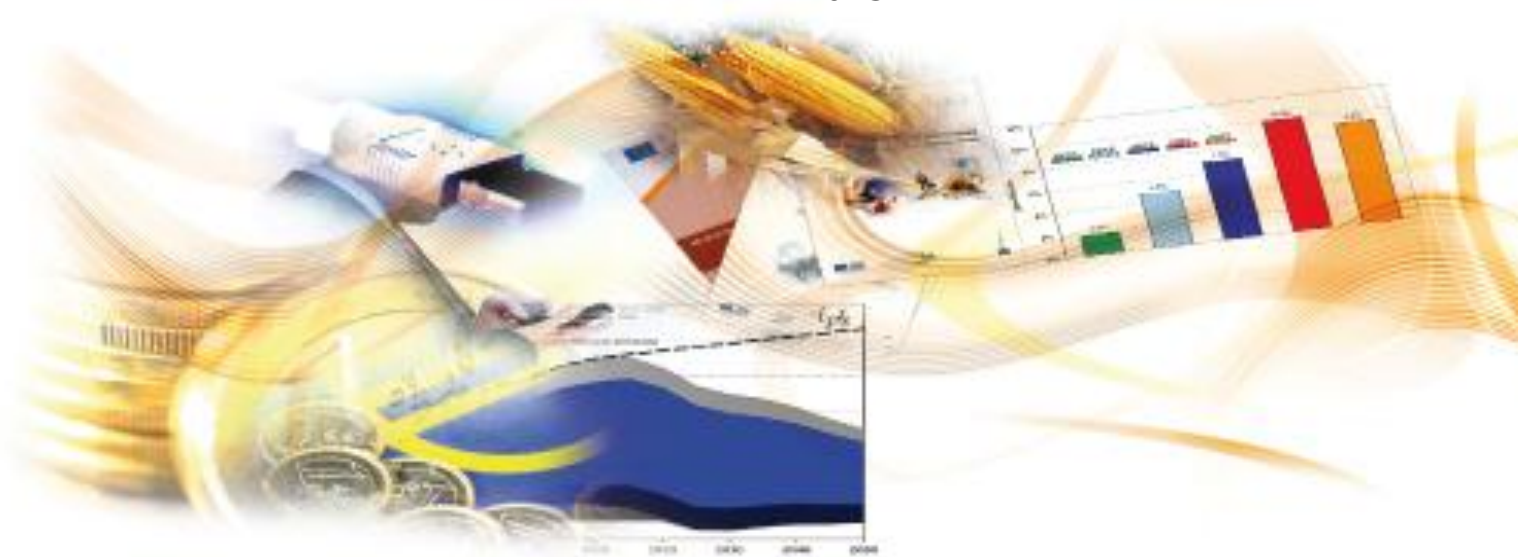
JRC SCIENTIFIC AND POLICY REPORTS

Overview and Analysis of 1:1 Learning Initiatives in Europe

Authors: Anja Balanskat, Diana Bannister,
Benjamin Hertz, Ester Sigillò, Riina Vuorikari

Editors: Stefania Bocconi, Anja Balanskat,
Panagiotis Kampylis, Yves Punie

2013



Report EUR 26004 EN

European Commission
Joint Research Centre
Institute for Prospective Technological Studies

Contact information

Address: Edificio Expo. c/ Inca Garcilaso, 3. E-41092 Seville (Spain)
E-mail: jrc-ipts-secretariat@ec.europa.eu
Tel.: +34 954488318
Fax: +34 954488300

<http://ipts.jrc.ec.europa.eu>
<http://www.jrc.ec.europa.eu>

This publication is a Scientific and Policy Report by the Joint Research Centre of the European Commission.

Legal Notice

Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use which might be made of this publication.

Europe Direct is a service to help you find answers to your questions about the European Union
Freephone number (*): 00 800 6 7 8 9 10 11

(* Certain mobile telephone operators do not allow access to 00 800 numbers or these calls may be billed.

A great deal of additional information on the European Union is available on the Internet.
It can be accessed through the Europa server <http://europa.eu/>.

JRC81903

EUR 26004 EN

ISBN 978-92-79-30548-1 (pdf)

ISSN 1831-9424 (online)

doi:10.2791/20333

Luxembourg: Publications Office of the European Union, 2013

© European Union, 2013

Reproduction is authorised provided the source is acknowledged.

Printed in Spain

Preface

The Europe 2020 strategy acknowledges that a fundamental transformation of education and training is needed to address the new skills and competences that will be required if Europe is to remain competitive, overcome the current economic crisis and grasp new opportunities. Innovating in education and training is a key priority in several flagship initiatives of the Europe 2020 strategy, in particular the Agenda for New Skills and Jobs, Youth on the Move, the Digital Agenda, and the Innovation Union Agenda. Accordingly, one of the five targets for measuring the success of the Europe 2020 strategy is the modernization of European Education and Training systems with the goals of reducing early school leaving and increasing tertiary education attainment.

Policy makers and educational stakeholders recognise the contribution of ICT to achieving these targets, and more broadly, the role of ICT as a key enabler of innovation and creativity in Education and Training (E&T) and for learning in general. It is however also highlighted that the full potential of ICT is not being realised in formal education settings.

Within this framework, JRC-IPTS¹ commissioned European Schoolnet (EUN) to conduct the study 'Overview and analysis of 1:1 learning initiatives for Education and Training in Europe' (*1to1Learning*). The aim of the study was to provide an overview of recent 1:1 learning initiatives in primary and secondary education across European countries as well as to identify major bottlenecks and barriers to their innovative implementation in schools. The study is part of the broader JRC-IPTS research agenda on modernisation of Education and Training systems in Europe. In particular, it provides input to the study that JRC-IPTS carries out on behalf DG Education and Culture on mainstreaming systemic ICT-enabled innovation for learning (Up-scaling Creative Classrooms in Europe - SCALE CCR).

This final report presents the results of *1to1Learning* study discussing the implementation strategies of current 1:1 initiatives and concluding on policy options for mainstreaming 1:1 initiatives that focus on the notion of 1:1 learning rather than 1:1 devices and successfully promote technological, pedagogical and organizational innovation in E&T across Europe.

Yves Punie
Project leader ICT for Learning and Inclusion

¹ The Institute for Prospective Technological Studies (JRC-IPTS) is one of the seven institutes that form part of the European Commission's Joint Research Centre.

Acknowledgements

European Schoolnet (EUN) would like to thank the EC Joint Research Centre, Institute for Prospective Technological Studies (JRC-IPTS) for the opportunity to carry out a study on 1:1 learning initiatives in Europe, which forms part of EUN's strategic work in this area. The authors especially would like to thank Yves Punie, Stefania Bocconi and Panagiotis Kampylis from IPTS for their ongoing support throughout the drafting of the report.

The report would not have been possible without the contributions from Ministries of Education which are members of European Schoolnet and its related organisations responsible for the implementation of ICT, which provided reliable input on the 1:1 initiatives during the information gathering phase of the project. Especially, Jale Akbas (Turkey), Roman Baranovič (Slovakia), Barbara Brečko (Slovenia), Christian Gertsch (Switzerland), Barbora Grecnerova (Czech Republic), Peter Karlberg and Martin Tallvid (Sweden), Eugenijus Kurilovas and Vainas Brazdeikis (Lithuania), Merab Labadze (Georgia), José Victor Pedroso and Teresa Pombo (Portugal), Christos Roushias (Cyprus), Reinhold Hawle and Christian Schrack (Austria), Nathalie Terrades (France), Leonardo Tosi (Italy).

The authors are especially grateful for the invaluable insights and opinions of 10 experts who are involved in 1:1 initiatives in Europe and worldwide. These insights were gained during interviews with Roberto Carneiro, Bruce Dixon, Reinhold Hawle, Erich Herber, Andrea Karpati, John Kershaw, Bette Manchester, Augustín Muñoz Núñez, Dave Whyley and Oscar Valiente.

Moreover, the discussions during the validation workshop have proven to be extremely useful for the drafting of the overall report and the authors would like to thank the workshop participants for their feedback and in particular for the specific interventions as provided by Pilar Antolín (Ministry of Education, Spain), Conor Galvin (University College Dublin, Ireland), Fengchun Miao (UNESCO, France) and Alice E. Owen (Irving Independent School District, U.S.A).

Anja Balanskat, European Schoolnet

Diana Bannister, University of Wolverhampton

Table of Contents

Preface.....	1
Acknowledgements.....	2
EXECUTIVE SUMMARY.....	6
1. Introduction.....	9
1.1 The Study Context.....	9
1.2 Objectives and Methodology of the study.....	9
1.2.1 Analysis of 1:1 initiatives.....	10
1.2.2 Literature Review.....	10
1.2.3 Expert interviews.....	11
1.2.4 Validation Workshop.....	11
1.3 Terms.....	11
1.4 Structure of the Report.....	12
2. Analysis of 1:1 Learning Initiatives.....	13
2.1 Overview of 1:1 Learning Initiatives in Europe.....	13
2.2 Objectives and Rationale.....	18
2.2.1 Focus on Pedagogy, Change and Innovation.....	18
2.2.2 Addressing Economic Inequalities.....	19
2.2.3 Supporting Digital Competence.....	19
2.2.4 General Expansion of ICT Provision.....	19
2.3 Scope of Initiatives.....	20
2.3.1 Education level.....	20
2.3.2 Number of students benefitting from the initiatives.....	21
2.3.3 Key Target Groups.....	22
2.4 Policy Context.....	22
2.4.1 Link to National/Regional ICT Initiatives.....	22
2.4.2 Key Initiators.....	23
2.4.3 Industry Involvement.....	23
2.5 Organisation and Implementation.....	24
2.5.1 Key Stakeholders Involved.....	24
2.5.2 Implementation Strategies and Plans for Expansion.....	26
2.6 Equipment and Financing Model.....	29
2.6.1 Type of Equipment.....	29
2.6.2 Financial Model.....	29
2.6.3 Ownership of Equipment.....	30

2.7	Support.....	32
2.7.1	Policy level support.....	32
2.7.2	School level support.....	33
2.7.3	Industry level support.....	33
2.8	Training.....	34
2.9	Evaluation.....	36
2.9.1	Organisation responsible for the evaluation.....	36
2.9.2	Methods.....	36
2.9.3	Study Focus.....	37
2.10	Impact.....	38
2.10.1	Evidence of Impact.....	38
2.10.2	Barriers and Enablers.....	41
3.	Summary of findings.....	45
3.1	Key points from the analysis of 1:1 initiatives in Europe.....	45
3.2	Key points from the literature review.....	46
3.3	Key points from the validation workshop.....	47
3.3.1	Up-scaling and the role of stakeholders.....	48
3.3.2	Sustainable finance and business models.....	48
3.3.3	Supporting students and teachers.....	48
3.3.4	The impact on informal and non-formal learning.....	48
3.3.5	Bring Your Own Device.....	49
3.3.6	The role of research and evaluation.....	49
4.	Conclusions and Recommendations.....	50
4.1	Implementation strategies and up-scaling.....	50
4.1.1	Models and practices for sustainability and up-scaling.....	50
4.1.2	Involvement and collaboration between all stakeholders.....	50
4.1.3	Sustainable finance and business models.....	50
4.2	Teaching and Learning.....	51
4.2.1	1:1 Pedagogy.....	51
4.2.2	1:1 Personal learning environments.....	51
4.2.3	Training and support.....	51
4.2.4	Research and evaluation.....	52
	References.....	53
	Annex 1: Experts Interviewed.....	56
	Annex 2: Initiatives by Country.....	58
	Austria.....	58
	Cyprus.....	64

Czech Republic.....	70
Denmark.....	75
Estonia.....	77
France.....	79
Georgia.....	88
Germany.....	90
Greece.....	92
Ireland.....	95
Italy.....	97
Lithuania.....	101
Norway.....	104
Portugal.....	106
Slovakia.....	110
Spain.....	112
Sweden.....	115
Turkey.....	117
The UK.....	119
Europe.....	132
Annex 3: Other ICT Initiatives.....	135
Czech Republic.....	136
Cyprus.....	138
Slovenia.....	149
Spain.....	153
Switzerland.....	155
The UK.....	161

EXECUTIVE SUMMARY

1:1 learning initiatives are equipping students of a given school, class or age group with portable devices (e.g. laptops, netbooks, tablets or smartphones) for learning purposes. Such initiatives exist already for quite some years (e.g. One Laptop Per Child) and increasingly, governments and other educational stakeholders in Europe and elsewhere are investing further in the wider roll-out of 1:1 devices. Major questions are arising however on the sustainability, impact, costs, renewal and mainstreaming of such initiatives, especially now when educational budgets are under pressure in Europe due to the economic climate.

The study 'Overview and analysis of 1:1 learning initiatives for Education and Training in Europe' (1:1Learning) was carried out by European Schoolnet (EUN) on behalf of the Institute for Prospective Technological Studies (JRC-IPTS). It aimed to provide an overview and analysis of 1:1 initiatives in Europe, synthesising research findings on 1:1 learning in primary and secondary schools, identifying factors for successful implementation of 1:1 initiatives, and presenting policy options that successfully promote technological, pedagogical and organisational innovation in Education and Training (E&T).

The 1:1Learning study is based on desk research (analysis of country reports on 1:1 initiatives and a literature review), in-depth expert interviews, and stakeholder consultation in a validation workshop. The overall analysis presented in this report only includes recent European 1:1 initiatives at local, regional or national level that are launched within an educational framework, have significant scale and/or impact, and are "true" 1:1 initiatives according to the definition provided in this study which is "equipping *all* students of a given school, class or age group, with a portable computer device".

In particular, the report presents **31 recent 1:1 initiatives** that involve approximately 47,000 schools and **17,500,000 students** in **primary and/or secondary education** across **19 European countries**. The main beneficiaries of these 1:1 initiatives are the students and teachers, who received laptops and netbooks in most cases, and in some cases, tablets. Only a small number of projects provided students with smartphones. Likewise, most of the initiatives provided additional equipment to schools, such as interactive whiteboards or video projectors, or WiFi access.

In general, more than half of the initiatives are linked to a national or a regional ICT strategy in education. Thus, **national and/or regional authorities are often the main initiators**, especially those on a larger-scale, and are also often involved in the implementation process. Only a few initiatives are initiated solely by industry. More often, industry plays a role during implementation as part of a public-private partnership to equip schools with the devices but is less involved in providing training and ongoing support.

Three main approaches to implementation are identified: top down, bottom up or a combination of both. The majority of initiatives are top-down or a mix of top-down and bottom-up. A few initiatives relied solely on a bottom-up process, reflecting the degree of active involvement by the schools themselves in the process. In only one third of the initiatives, head teachers, school or ICT coordinators play an active role in the implementation process. Parents are mentioned to an even lesser extent as actors in the implementation process.

There are also **three mainstreaming models**. Firstly, there are large-scale, nationwide initiatives that are from the very beginning part of a mainstreaming programme in which the equipment is gradually provided to schools in the whole country. Secondly, existing pilot projects are scaled up and more devices are given to more students in the same school at different education levels and/or to other schools in other regions in a second phase of the project. Thirdly, new co-existing 1:1 initiatives emerge, which are not necessarily complementary and not part of a coordinated mainstreaming approach.

Financing models are threefold as well, as identified by the analysis of the 31 recent 1:1 learning initiatives: full financing (e.g. by the state or local authority); co-financing involving the state, local authorities and other stakeholders such as parents; and finally, the free provision of

equipment by industry. With a fall in the market price of portable computer devices, a co-funding model -where parents and/or schools take responsibility- offers a more promising long-term prospective and possibility to make 1:1 a sustainable programme.

In most of the initiatives, students own the device for their activities in and out of school. In other cases, the equipment is owned by the schools, and in a few initiatives the Ministry of Education owns the devices and lends them to schools.

The analysed 1:1 initiatives generally pursue **several objectives**. Almost all the initiatives refer to the idea that a 1:1 learning model would lead to pedagogical change and innovation, by providing ubiquitous access to ICT to school students, the actors involved in the 1:1 initiatives expect new classroom and learning dynamics to emerge. Another key focus of the initiatives is to address economic inequalities by improving students' access to ICT and promoting e-inclusion on a more general level. A smaller number of initiatives, around one third, aim to improve students' ICT skills and motivation, or to expand ICT provision in schools by further reducing computer-per-student ratios. Various initiatives have as a primary objective the use of devices both at school and at home while very few identified overall improved learning outcomes as a rationale for the project. Objectives related to improved communication between students, teachers and parents or relating to administration issues are part of only five initiatives.

Policy support is provided as part of national 1:1 initiatives and includes providing guidance to students and parents, logistics support, and teachers training. There are a variety of **support strategies at school level**: most of the initiatives appoint a school coordinator to support other teachers. Alternatively, schools organise workshops, seminars and training with the help of external experts. Industry level support is marginal in the initiatives analysed, and suppliers primarily provide technical support to schools via standard helpdesks.

The findings from this analysis indicated that various actors organise different types of **teachers training**, ranging from self-organised training sessions by the schools, external training provided by local and/or national administrative authorities, specialised centres or universities, or by the technology companies that equipped the schools.

Most of the initiatives have just been evaluated or are about to be evaluated. Overall, evaluation reports from 1:1 initiatives provide **evidence of impact** on motivation; student centred learning; teaching and learning practices; learning outcomes; and parents' attitudes. For instance, almost all the evaluation reports refer to **students being more motivated when using the given devices**. According to some of the reports the motivation could be maintained longer term when devices were regularly used; when students were able to work and do exercises independently with learning software giving them immediate feedback; when students had the possibility of carrying out research on the Internet, presenting the results of their work, and exchanging more easily with other students.

RECOMMENDATIONS

Based on the evidence of the analysis of 1:1 initiatives, the literature review, insights from the experts' interviews and the validation exercise with experts in the workshop, the following recommendations emerged:

Implementation strategies and up-scaling

- Change must be systemic and underpinned by pedagogical values.
- A flexible framework should be created which contains objectives, guidelines and tools for system-wide transfer of innovation and incremental change of pedagogical practice.
- Pedagogy that supports 1:1 learning needs to be "cultivated" or developed and incentives for teachers to "buy in" should be established. Up-scaling needs to be based on evidence and is dependent on individual and social practices, regardless of technology.

Involvement and collaboration between all stakeholders

- A variety of stakeholders should be involved in the implementation of 1:1 education programmes, such as commercial suppliers, local sponsors and the community, parents and head teachers. Exchanges between these stakeholders should be increased to encourage wider collaboration in this area.

Sustainable finance and business models

- Sustainable planning for investment requires a model that has both cost and value dimensions. Policy makers should consider long-term investment.
- Co-financing models in the provision of devices offer a more promising long-term prospect and the possibility to make 1:1 an ongoing programme.

1:1 pedagogy

- Pedagogical learning scenarios should outline how portable computer devices can be used to support a plethora of learning strategies.
- Assessment should be formative and also take into account new competencies that could be acquired by learning with technology.
- A knowledge base on informal learning spaces could include the development of new scenarios that expand outside classroom teaching such as activity-based learning, project-based learning and study visits.

1:1 personal learning environments

- Students should own their devices as this helps them take responsibility for the device and is essential for the creation of personal mobile learning environments that span formal, informal and non-formal learning settings.
- Bring Your Own Device (BYOD) requires a consideration of the school infrastructure, a minimum standard for software, equity issues and the use of the devices for assessment.

Training and support

- Effective training and support mechanisms include early familiarisation with the equipment, ongoing school-based support and training, blended learning and peer-learning among teachers. Staff access to equipment can encourage dialogue and opportunities to share practice. 1:1 programmes should be integrated within an overall learning plan.
- Training should focus on helping teachers integrate technology into their instruction.

Research and evaluation

- Evaluation should be designed from the very beginning of the 1:1 initiative with a designated institution or individual taking responsibility.
- Access to national evaluation results should be more commonly shared.
- Research should explore new impact areas such as evidence of effective implementation strategies, learning practices or possible long-term impacts of 1:1 initiatives on lifelong learning.
- Research should be more qualitative, formative, and competence- and outcome-based.
- Research should involve teachers in action-based research and also observations in real classroom settings.

1. Introduction

1.1 The Study Context

The introduction and implementation of ICT in schools over the last ten years has generally taken place in three stages. First, computers were introduced in separate computer labs and used to teach ICT as a subject or for other subject-related purposes. Following this, computers were increasingly rolled out in classrooms and in other parts of the school (e.g. libraries, computer corners) to ensure their integrated use and to reduce computer-pupil ratios considerably. In a third stage -with emerging technologies such as handheld devices and netbooks being lighter, smaller and more affordable- ICT integration focuses on further widening access to ICT and using these tools to modernise classrooms and education systems (Balanskat & Garoia, 2010)².

In recent years, 1:1 computing initiatives have been on the education agenda and many European countries have increasingly started to invest further in modernising education and classroom resources by exploiting low cost devices. The wider focus of 1:1 initiatives, which were analysed by EUN (Balanskat & Garoia, 2010) is to tackle digital divides, involve more actors in the education process, give ubiquitous access to learning resources inside and outside school and to promote more personalised learning approaches as well as collaborative approaches using netbooks between teachers and students.

Also at international level initiatives which seek to address 1:1 computing continue to grow (Bebell & O'Dwyer, 2010; Penuel, 2006; Salerno & Vonhof, 2011). This is largely because of the worldwide demand for access to individual devices and this has led to projects and initiatives exploring how such devices can be utilised effectively in education.

While there are many European 1:1 initiatives and pilots under way or finalised (small and large-scale) major questions arise about the sustainability, mainstreaming and up-scaling of those initiatives. A stated objective of these initiatives is that they can bring about systemic innovation to education systems. The majority of the identified initiatives (31 in total) in this report are scientifically guided or evaluated, but a coherent and critical overview and analysis of the outcomes of those national evaluations as well the research methods used is still missing.

1.2 Objectives and Methodology of the study

The study 'Overview and analysis of 1:1 learning initiatives for Education and Training in Europe' has been carried out by EUN on behalf of the EC Joint Research Centre, Institute for Prospective Technological Studies (JRC-IPTS) from December 2011 to December 2012. The study had the following objectives:

1. To provide an overview of 1:1 initiatives in Europe, including a description and classification, indicating scope, timing, objectives, target groups and participants, funding, support, evaluation, outcomes and impacts, etc.;
2. To synthesise research findings on 1:1 learning in primary and secondary schools, drawing on a wide variety and range of publications available, including scientific papers, books and reports, evaluation reports, online information and any other reliable information, including expert knowledge or press articles. This synthesis will focus on assessing the impact of 1:1 computing on teaching and learning patterns and organisational practice with a view to elucidating how innovation is fostered (or hindered) in technology-rich learning settings;
3. To identify factors for a successful implementation of 1:1 learning in primary and secondary education and provide evidence on how small-scale programmes and initiatives can successfully be scaled-up and mainstreamed;

² The 3 phases of the integration of ICT in schools were identified by analysing EUN's country reports on ICT in education, updated every second year with Ministries of Education since 2001 (<http://insight.eun.org>).

4. To discuss the findings on 1:1 learning in primary and secondary education with experts and stakeholders and jointly conclude on policy options for up-scaling 1:1 learning experiences that successfully promote technological, pedagogical and organisational innovation in education and training.

In order to achieve the above mentioned objectives the findings of the study are based on desk research (analysis of country reports on 1:1 initiatives and a literature review), in depth expert interviews, and stakeholder consultation in a validation workshop.

1.2.1 Analysis of 1:1 initiatives

The analysis of 1:1 initiatives focuses on primary and secondary schools in Europe aiming to identify initiatives in all 27 Member States, including those countries where no initiatives were found. In addition to the EU 27 countries, initiatives from some other European and world regions are included that serve as a reference point to further understand key enablers and barriers in implementing 1:1 initiatives.

The analysis includes 1:1 initiatives at national, regional or local level, equipping all students of a given school, class or age group with a portable computer device. These are prime examples for studying the scalability of ICT-led innovation since almost all of these initiatives, even when implemented at regional or local level, can be significant in scale and most of them have been piloted on a smaller scale before being up-scaled, and in some cases even mainstreamed.

1:1 initiatives can have various objectives, i.e. to improve school resources or to dissolve the traditional boundaries between formal learning in school and informal learning in other settings (e.g. at home) and can include a wider range of stakeholders (e.g. community, industry, universities).

The analysis sought to identify recent 1:1 initiatives (not dating back earlier than 2008), equipping numerous classrooms, students, teachers with laptops, notebooks or handhelds such as tablets. The rationale for mainly looking at recent initiatives was to inform the reader of the latest developments in an area which is constantly evolving in terms of the technologies deployed. In some cases 1:1 initiatives starting before 2008 were analysed if they were part of the main national ICT programme (e.g. *Imitative*, Norway), still ongoing (e.g. *Learning 2go project*, UK) or a well-documented pilot generating important research evidence (e.g. *Connect School Project*, Ireland or the *1000mal1000: netbooks in schoolbags*, Germany).

The analysis is based on a common template (see Annex 2) with key descriptors defined in the beginning of the project including, e.g. scope, timing, objectives, target groups, funding, support, and evaluation. It was filled in by national policy makers and researchers involved in the 1:1 initiative or via desk research.

The overall analysis presented in this report only includes those 1:1 initiatives that are launched within an educational framework, are of larger scale and are "true" 1:1 initiatives according to the definition provided in this study which is "equipping all students of a given school, class or age group, with a portable computer device". Therefore, initiatives aiming at equipping families in the first place, as well as a number of small-scale initiatives only equipping one classroom, or ICT initiatives that have a more general focus of providing mobile learning devices to students and teachers, are not included in the analysis, but are separately described in Annex 3.

1.2.2 Literature Review

The literature review focussed on evidence, outcomes and developing principles within a review of existing available literature of studies about 1:1 initiatives in primary and secondary schools. The scope of the literature review includes European studies as well as experiences collected in other countries. The focus of these studies was on discussing the impact of 1:1 initiatives on technological, organisational and pedagogical innovation, as well as assessing strategies for implementation, up-scaling and mainstreaming.

It followed a scientific approach based on a systematic review of acknowledged sources in education research and defined keywords to systematically perform searches in the main scientific education databases (e.g. EBSCO). The literature review includes scientifically reliable information and critically evaluates and balances the research findings. It not only includes research work carried out at universities but also studies and surveys by international organisations accredited in the field, as well as reports and scientific articles.

1.2.3 Expert interviews

Interviews with ten renowned international experts in the area of 1:1 learning were carried out in order to generate additional and complementary evidence on good practice and lessons learnt. The findings from the interviews were used to complement and consolidate the analysis of 1:1 initiatives and critically review research on 1:1 learning. The aim was to have insights from various stakeholders of 1:1 initiatives (policy makers, researchers, industry representatives, implementers, evaluators) each of them contributing a specific perspective. The criteria for the selection of experts included high familiarity with the topic, capacity to give further insights on specific 1:1 initiatives, knowledge of best practice examples and factors for up-scaling of 1:1 initiatives and innovation in schools. Experts had a national, European or international background.

Interviews were carried out by phone or face-to-face according to an interview protocol. The interviews (1-1.5 hours) were semi-structured and were based on a common template with a list of themes and underlying questions to be explored. The interviews were summarised and validated by the experts. Findings from the interviews were integrated in this final report to complement the analysis of 1:1 initiatives.

1.2.4 Validation Workshop

The validation workshop aimed to discuss the findings of the study on 1:1 learning and arrive at a joint conclusion on policy options for up-scaling 1:1 learning experiences that successfully promote technological, pedagogical and organisational innovation in education and training. The three half day validation exercise involved 20 subject matter experts and 10 stakeholders at EU level from key organisations in the field (e.g. OECD, UNESCO). It included presentations on the findings from the various parts of the study (analysis and literature review), presentations from selected experts on specific aspects (implementation, research, policy) of 1:1 initiatives in Europe and internationally and interactive group sessions, where key questions around 1:1 initiatives were debated by participants. Results of the group discussions were presented during the workshop and participants concluded on a number of policy recommendations to be integrated in the final report.

1.3 Terms

1:1 computing: 1:1 indicates the ratio of items to users, i.e. one netbook per learner. It refers to the current trend of low-cost computer devices ranging from mobiles and handhelds to laptops or netbooks, which have gained ground in educational settings. Typically the device is connected to the Internet and owned by the learner (Valiente, 2010).

Initiative: in this report the term *initiative* is used as a general term and refers to project/ programme as well. Therefore, the terms *project*, *programme* and *initiative* are interchangeable.

Laptops or notebooks are personal computers designed for mobile use, integrating most of the typical components of a desktop computer.

Netbooks (sometimes also called *mini notebooks* or *ultra-portables*) are laptops that are small, light-weight, economical, energy-efficient and especially suited for wireless communication and Internet access.

Tablet PC refers to a slate- or tablet-shaped mobile computer device, equipped with a touchscreen or stylus.

iPads™ are proprietary tablet computers designed as platforms for audio-visual media including books, periodicals, movies, music, games, apps and Web content.

Abbreviations:

EUN - European Schoolnet

MoE - Ministry of Education

IWB's - Interactive Whiteboards

1.4 Structure of the Report

Following this introduction, Section 2 of the present report is structured around the description and analysis of the 31 initiatives from 19 European countries according to the following themes:

- *Objectives and Rationale of Initiatives*
- *Scope of Initiatives (e.g. education level, numbers of students involved)*
- *Policy Context (e.g. key initiators, link to national/regional ICT policies)*
- *Organisation and Implementation*
- *Equipment and Financing*
- *Cost of the Initiatives*
- *Support strategies*
- *Training*
- *Evaluation*
- *Areas of Impact*

Furthermore, the analysis of each theme is complemented with insights from the literature review and the experts' interview when available.

Section 3 of the report presents and discusses key findings from the study, while a set of key recommendations for future implementation of 1:1 learning initiatives are proposed in Section 4.

Finally, the report includes the list of experts' profile (Annex 1), the fact sheets of the 31 initiatives (Annex 2) and fact sheets from other (not strictly) 1:1 initiatives (Annex 3).

2. Analysis of 1:1 Learning Initiatives

2.1 Overview of 1:1 Learning Initiatives in Europe

The following Table 1 provides a brief summary of the 31 recent 1:1 initiatives included in this study. Initiatives are listed by country.

Table 1: Overview of the 1:1 initiatives

Country	Project Name	Timeframe	Description
Austria 1	<i>Netbooks in Education</i>	2009-2010	All students of the selected classes received a netbook for their own personal use. The netbooks allowed students to be connected to the Internet anytime and have access to learning resources inside and outside school and at home. The objective of this initiative was to make use of the smaller and more efficient mini notebooks in class.
Austria 2	<i>LMS 4EduBooks</i>	2010-2011	The project aimed to evaluate the use of Apple iPads in a current school learning environment. On the one hand the use of iPads was tested in real lessons (e.g. German, English, Science, Maths) and on the other hand research was conducted and reported to the government. Objectives: <ul style="list-style-type: none"> • To develop a screen design to use LSM contents in different types of schools and lessons; • To evaluate the potential of mobile learning devices in the form of tablet computers in real teaching situations.
Austria 3	<i>Mobile Lernbegleiter im Unterricht</i>	Initial phase: 2009-2010 Pilot phase: 2010-2011 Second phase: 2011-2012	The idea of the project is the pedagogical use of digital devices in lessons. The devices are owned by students and have Internet access (WLAN, 3G) for research and communication purposes. Objectives: <ul style="list-style-type: none"> • To improve digital competence and to offer an effective learning environment; • The exchange of experiences with the enhancement of digital competence among all levels of education.
Cyprus 1	<i>Equipment for School Net DIA.S.</i>	2009-2010	School Net DIA.S. (ΔΙΑ.Σ.) project was a digital educational environment that promoted learning and communication in both school and home, and granted access to information relating to educational methods. The project aimed to provide access for students and educators of the seven pilot schools selected to the School Net DIA.S. services and educational content (26-28 laptops per school) in a classroom that was created for this purpose.
Cyprus 2	<i>Programme for Subsidisation of the Purchase of a Laptop</i>	2008-ongoing	The Ministry of Education and Culture (MoEC) provided a grant to every student attending the second grade of Gymnasium (Lower Secondary School) in order to subsidise the purchase of a portable computer (Laptop). The grant was paid to the beneficiaries (parents/guardians) according to specific guidelines and relevant computer specifications published by the Ministry. The initiative aims at providing students with access to advanced ICT equipment.

Czech Republic	<i>Vzdelani21/ Education21</i>	2009- 2015	<p>This initiative, based on the use of high-quality digital content and a 1:1 computing model, encompasses six primary schools. Each classroom was equipped with a WiFi network and interactive whiteboards.</p> <p>Objectives:</p> <ul style="list-style-type: none"> • Equip learners: support school pupils in the development of core ICT skills in preparation for a digital future; • Demonstrate best practices: put various ICT use cases to the test in a real classroom environment to identify what works best; • Validate ICT use: implement effective, simple-to-execute methodologies for evaluating the impact of ICT on learning.
Denmark	<i>IT Project in the Municipality of Elsinore</i>	2010-2013	<p>The initiative is mainly concentrated on the 1:1 computing programme: students and teachers are provided with personal laptops to be used during classes.</p> <p>Objective: to make a systematic approach with investments in hardware, software, infrastructure, professional development for all teachers and leadership development.</p>
Estonia	<i>Laptop for students/ Laptop for teachers</i>	2008-2009	<p>This initiative followed the 1:1 computing programme: in five selected schools one class received laptops to be used during one school year; students could use laptops at home as well</p> <p>Objectives:</p> <ul style="list-style-type: none"> • To give a laptop computer to all students participating in the study; • To increase the quality and efficiency of teaching.
France 1	<i>POP1, POP2: Plan Ordinateur Portable à la Réunion</i>	Preparatory phase: 2007 1 st phase POP1: 2008-2010 2 nd phase POP2: 2012	<ul style="list-style-type: none"> • POP1 from 2007 -2010: Laptops and USB flash drives were provided for all the students in their first year of lower secondary school in nine schools; • Objective: to equip 1,195 students and their families in nine experimental schools in rural and remote areas of the island; • Pop2 from 2012 onwards: students are being equipped with a laptop: 15,000 students in their first year of higher secondary education (2/3 of all these students); 2,000 students in apprenticeship training; • Objective: to equip 18,000 students in their first year of secondary high school.
France 2	<i>Ordina13</i>	2010-2011, 2011-2012	<p>25,000 laptops and USB flash drives have been provided to students of <i>collège</i> (lower secondary school) in the <i>Département des Bouches du Rhône</i>.</p> <p>The objective of the initiative is to encourage the use of ICT at school and at home.</p>
France 3	<i>Ordicollege19</i>	2008-2012	<p>All students in their 2nd, 3rd and 4th year in lower secondary education (<i>collège</i>) and their teachers were equipped with a computer in the <i>Département de la Corrèze</i>; moreover, in 2010-2011, first year students in lower secondary education were provided with a tablet. The objective of this initiative is to avoid digital division in the course of education.</p>
France 4	<i>Un collégien, un ordinateur</i>	2001-2013	<p>A laptop was provided to each student of the <i>Département les Landes</i>.</p>

	<i>portable (Landes)</i>		Objectives: <ul style="list-style-type: none"> • Ensure equal access to computers so that students will be able to master the new tools they need in their studies, at the workplace and in everyday life; • Encourage the emergence of new teaching practices by using the computer in class but also outside the classroom, for school-based activities.
Georgia	<i>Buki – netbook for all first grade pupils</i>	2010-ongoing	The project aims at raising the level of ICT skills of school pupils. All first grade pupils of state schools in Georgia received the netbook “Buki” free of charge. The netbook contains education games and special software for an administrator to control the pupils’ netbooks.
Germany	<i>1000mal1000 : netbooks in schoolbags</i>	2003-2006/2007; ongoing (now: Mobiles lernen-21)	Students of class 7 were provided with personal laptops. The pilot project was part of the Lower Saxony State Initiative-21. The aim was to study implementation, identify barriers or problems and the impact of notebooks on teaching and learning.
Greece	<i>New school-Digital School</i>	2009-2012	Each student was provided with a personal laptop. Following the implementation of the pilot phase (2007) the Programme has expanded as part of the “Digital School”, aiming at incorporating ICT into the educational process.
Ireland	<i>Connect School Project</i>	2006-2008 3 years initial funding; since then ongoing	The aim of the project was to improve the educational outcomes of students and embed student centred learning through investment in a 1:1 learning environment (laptops and tablet laptops for teachers and students), ICT equipment and infrastructure. The delivery of education to the students of St. Aidan's was enhanced through ICT-enabled classrooms and the use of ICT on a daily basis in the context of a disadvantaged community.
Italy	<i>ArdesiaTech</i>	2010-ongoing	This project adopts an experimental method based on the researchers’ observations about changes in the learning environment after the introduction of new technologies in three pilot primary schools. The data available at the end of this pilot will enable ANSAS-INDIRE researchers to answer some relevant questions on: <ul style="list-style-type: none"> • The change in the traditional classroom learning environment whether the introduction of new technological devices can promote the digital evolution of social interaction in the classes, with particular attention given to the possibility that a digital learning environment, specifically geared to collaborative teaching, can foster deeper and meaningful relationships among students themselves, and with their teachers; • The impact that this environment can have on the teaching/learning model; • The possibility of integration with the existing educational model; • The impact on students’ learning processes.
Italy	<i>CI@ssi 2.0</i>	2009-2012	The project aims at innovate the learning environment using ICT and modification of the future of the classroom. The target of this project is to equip all the teachers and students of primary and secondary schools with technological devices.

Lithuania	<i>Use of iPad tablet devices in education</i>	2011-2012	The initial idea of this initiative was to try to implement e-reader devices, but after discussion with the stakeholders it was decided to pilot tablets. iPads were purchased by CITE, implementing public procurement procedures. 90 pupils from three secondary schools have received the devices. The aim of the initiative was to identify and consider the challenges raised by mobile technologies.
Norway	<i>Imitative</i>	2006-ongoing	From 2006 county school authorities in all parts of Norway have run projects aimed at equipping all students with personal laptops. These projects should partly be seen in relation to the new clause in the education law, which lays down the right to learning resources free of cost in primary and secondary education. The overall objective of this initiative is to equip all upper-secondary students with laptops.
Portugal	<i>e-escolinha</i>	2008-2011	This initiative intended to provide primary level (6-10) students with access to personal computers (netbooks) with educational content. Those computers were named as “Magalhães” (Magellan). Objectives: <ul style="list-style-type: none"> • To expand computer and Internet use in the first stage of education; • To ensure that families have access to computers.
Slovakia	<i>Netbook for Every Pupil</i>	2007-2010	The project focused on a 1:1 ratio in various school settings – (elementary and secondary schools). The goal of the project was to implement 1:1 in schools in Slovakia and gather feedbacks for other projects.
Spain	<i>Escuela 2.0</i>	2009-2013	Escuela 2.0 is a project focused on the integration of ICT in schools based on the use of a netbook per student in the context of classrooms equipped (with DWB) and connected (broadband WiFi intranet and Internet). Its objective is to modernise schools to improve the ways students learn, teachers teach and schools are organised.
Sweden	<i>En-till-En</i>	2008-2010	A 3 year project started with two schools closely followed by a researcher who reported annually in order to learn from the participating pilot schools when expanding to 1:1 for all students in grades 7 – 9. During the launch phase all teachers became familiarised with the technology; during the implementation and institutionalisation phase support for professional development was offered and in parallel the initiative was expanded to more schools. Objectives: <ul style="list-style-type: none"> • To develop new teaching and learning practice; • To enhance motivation; • To get better results.
Turkey	<i>Fatih Project</i>	2011-2013	A project aimed at enabling equal opportunities in education and improving technology in Turkish schools for the efficient use of ICT tools in the learning-teaching processes. This target is to be achieved by providing tablets and LCD Smart Boards in all 42,000 schools in preschool, primary and secondary education.
United Kingdom	<i>Achieving through</i>	2004-2012	An eight-year project involving around 4,200 year 5 and 6 pupils in thirty primary schools across the London Borough of Newham. Its aim is to use information and communications technology (ICT) to support learning and

	<i>Innovation</i>		teaching, both in school and at home, with the ambition of raising pupils' attainment.
United Kingdom	<i>Dudley Project</i>	2011-2021	<p>The initiative provides personal computing devices (netbook, tablet PC, laptops, etc.) to school students at very low cost through monthly parental contributions. Devices can be used in school or at home to access a wide variety of educational resources. The devices are leased for two or three years and then returned to the provider. Schools can decide to implement the scheme and then parents individually elect to participate or not.</p> <p>The objectives of the initiative are to improve pupils' educational outcome by:</p> <ul style="list-style-type: none"> • Increasing access to online educational resources; • Promoting anytime and anywhere access to the provision of a personal device; • Improving ICT skills and confidence through increased usage; • Facilitating the use of the devices to create and share content; • Raising standards across the curriculum.
United Kingdom	<i>Learning2Go Project</i>	2003-ongoing	<p>The initiative is a long-standing project organised by Wolverhampton City Council starting in 2003. It has received substantial national attention and has been replicated by schools across the country. The aim of the project was to give students access to anywhere, anytime learning to help give them a greater desire to learn and raise standards. Students were given handheld PDAs and a range of different devices to support their learning. The devices were funded jointly by the school and parents, were wireless enabled and had in-built imaging capabilities.</p>
United Kingdom	<i>iPad at Longfield Academy</i>	2009-2012	<p>The iPad initiative at Longfield Academy in Kent is a bottom-up, local initiative, started by a public-private partnership and involving about 800 secondary students. The initiative intended to provide:</p> <ul style="list-style-type: none"> • A cutting edge learning experience including access to technology in every lesson and at home; • Every student with their own learning device; • Exciting and engaging lessons; • Every student using technology to improve their learning wherever they are. <p>The introduction of iPads throughout Longfield Academy provided an excellent opportunity for a small scale research study of the initial impact of the iPad on learning and teaching throughout the school and the social and technical issues arising.</p>
United Kingdom	<i>iPad Scotland</i>	March-Summer 2012	<p>The iPad Scotland pilot was part of an exploratory programme launched by the Scottish Government to assess whether pupils across the Region would benefit from having access to portable technology like the iPad. The pilot involved eight primary and secondary schools and six local authorities across Scotland and approximately 365 students had access to an iPad device. The iPad Scotland pilot focused on four main themes related to the use of mobile devices as personal tools for teaching and learning. These were:</p> <ul style="list-style-type: none"> • How tablet devices impact on teaching and learning;

			<ul style="list-style-type: none"> • The leadership and management issues associated with the deployment of mobile devices in schools and local authorities; • Parental engagement with learning when students use mobile technologies as personal devices; • Professional development and learning for teachers introducing personal mobile devices into the curriculum.
Europe	<i>Acer-European Schoolnet Educational Netbook Pilot</i>	2010-2011	<p>The Educational Netbook Pilot ran in parallel in six countries: France, Germany, Italy, Spain, Turkey and UK. The name 1:1 pedagogy highlights the fact that the learners have access to netbooks to all times, taking advantage of a blended learning approach alternating online and offline activities. Also the teachers were equipped.</p> <p>The objective of the initiative was to implement 1:1 pedagogies and to study the best ways to support schools and teachers in their endeavours with netbooks.</p>

2.2 Objectives and Rationale

1:1 initiatives generally pursue more than one objective and indicate clearly one or two primary objectives.

2.2.1 Focus on Pedagogy, Change and Innovation

Almost all of the 1:1 initiatives focus primarily on **pedagogical issues** related to the use of the devices in school. In providing ubiquitous access to ICT devices to school students, the actors involved expect new classroom and learning dynamics. The initiatives aim to explore these dynamics and how to approach the challenges arising from them. For example, the *Learning2Go Project* (UK) identifies the learning dynamics of students as a key focus and highlights how 1:1 computing provides students with “*new ways of approaching learning by themselves*”. Other initiatives such as the *Mobile Lernbegleiter im Unterricht* project (Austria) identify providing a more “*effective learning environment*” in schools as their key objective. The use of iPads in the *LMS 4EduBooks* initiative (Austria) mainly aims to evaluate the use of the device in the current school learning environment.

In various initiatives the **home use of the devices** by students or teachers is specifically mentioned as a primary objective next to using them at school. This is the case for the Austrian pilot project *Netbooks in Education, Escuela 2.0* (Spain), the initiatives from Cyprus, the Estonian project, most of the French initiatives (*POP 1* and *POP2*, *Un collégien, un ordinateur portable*, *Ordina13*, four UK initiatives and the *Acer-European Schoolnet Educational Netbook Pilot*.

The idea that a “1:1 learning model” will lead to **pedagogical change and innovation** is apparent in numerous initiatives ranging from large-scale initiatives (e.g. in Spain and Portugal) to smaller-scale, more experimental initiatives (e.g. *Notebook for Every Pupil* in Slovakia, and the two Italian and the Swedish initiative). More concretely it is a stated objective of project descriptions that innovative curricular approaches will emerge for various subjects (*Vzdelani21*, Czech Republic), or that classrooms and learning environments will change (*Cl@ssi 2.0*, and *ArdesiaTech* in Italy). Innovation is mentioned as a general objective in the Spanish initiatives *Escuela 2.0* and the large-scale *e-escolinha* initiative (Portugal) aimed to progressively introduce pedagogical change. Moreover, in the countrywide *Escuela 2.0* project (Spain) the 1:1 learning model was considered the most suitable to face the challenges of teaching and learning where ICT can facilitate the acquisition of key competences and where each student takes an active role based on the use of a netbook in a connected and well equipped classroom.

2.2.2 Addressing Economic Inequalities

1:1 initiatives do not only deal with new learning strategies, they also address the fundamental problem of economic inequalities impacting on students' ICT skills and learning outcomes. It is therefore not surprising that another key focus of a many of initiatives (e.g. *Programme for Subsidisation of the Purchase of a Laptop* in Cyprus, *Connect School* project in Ireland and *Use of iPad tablet devices in education* in Lithuania) is **reducing the digital divide** or what is also referred to as e-inclusion. E-inclusion concepts, however, go beyond simply addressing ICT access inequalities and highlight the opportunities for ICT to improve inclusion on a more general level. Nevertheless, the potential of 1:1 computing in supporting students with learning difficulties was only emphasised by the *Ordicollège19* initiative in the *Département de la Corrèze* (France).

The countrywide Norwegian initiative (*Imitative*) relates primarily to the right to access learning resources free of costs in primary and secondary education. This is one of the core objectives of the initiative as set out by a new clause in education law.

2.2.3 Supporting Digital Competence

Around one third of the initiatives saw 1:1 computing more in the light of improving **students' ICT skills and motivation**, and only a very few identified overall **improved learning outcomes** as a rationale for the project.

Digital competence development as a major objective is mentioned in the initiative *Mobile Lernbegleiter im Unterricht* (Austria), where an exchange of experiences between different levels of education is also envisaged. The aim of the *Equipment for School Net DIA.S.* initiative in Cyprus was to enhance the digital competence of teachers and students. In two of the French initiatives, *POP1-POP2* and *Un collègien, un ordinateur portable*, as well as in the *Vzdelani21/Education 21* initiative (Czech Republic) ICT skills are also one of the objectives, aiming also to improve ICT skills of parents. The *Buki* initiative in Georgia targeted the ICT skills level of first graders.

All three UK initiatives, the Irish initiative and the Swedish initiative *En-till-En* highlighted improved learning outcomes as one of their main objectives. The evaluation of the projects focused very much on a change in overall exam results rather than on improved ICT skills. The German initiative had among its core objectives the strengthening of key competences (subject-independent), digital competences and subject-related competences. These objectives were likewise evaluated. In the *Escuela 2.0* initiative (Spain) ICT is seen as a key driver to develop key competences.

2.2.4 General Expansion of ICT Provision

Around one third of the initiatives identified a **general expansion of ICT provision** in schools as a key objective. This is most likely due to 1:1 initiatives being part of a second wave of ICT expansion in European schools. The first wave started around 2003-2004, when the first laptop initiatives were developed and ministries of education were interested in increasing the numbers of computers and the quantity of equipment in schools. The tendency of the more recent 1:1 initiatives is to go beyond simply focusing on a further expansion of ICT provision and rather address new pedagogical strategies and narrowing the digital divide. However, countries such as Turkey (Goktas & Yildirim, 2003), Portugal or Greece, which had been lagging behind EU averages of computers per 100 pupils during the last years (Empirica, 2006), have introduced larger-scale 1:1 initiatives, with the objective to ensure a wider provision of ICT and reduce considerably computer per pupil ratios. It is therefore likely that 1:1 initiatives in such countries are seen as an effective way to accelerate the process of improving general ICT provision while at the same time addressing the pedagogical and access questions highlighted above.

Objectives related to **improved communication** between students, teachers and parents or relating to **administration issues** are part of only five initiatives in Austria, the Czech Republic, France and Spain.

Insights from the literature review: The work of Penuel (2006) offers a sound starting point for signposting the history of 1:1 computing initiatives, and whilst to some extent the world has moved on, his review provides an overview that is crucial background reading. He categorises 1:1 computing initiatives into four areas:

- 1) To improve academic achievement;
- 2) To provide access to digital resources;
- 3) Preparation for the workplace;
- 4) To effect a transformation in the quality of instruction.

Insights from the experts' interviews: As regards the pedagogical objectives, which are clearly set out as the main goals in many of the initiatives analysed, experts stated that not all initiatives are driven by purely educational goals. Decisions about 1:1 initiatives are also driven by economic and societal values, as for example in Portugal, Uruguay and the *One Laptop per Child* (OLPC) initiative³ (the two latter initiatives are not part of this analysis). Moreover, 1:1 initiatives, especially those on a larger scale, also serve the political ambitions of high-level educational policy makers to initiate successful flagship projects in education (e.g. the *Magellan* initiative in Portugal). Therefore the existence, continuation and follow-up of 1:1 initiatives may be called into question with changes of political leadership and new governments shifting priorities, which is currently the case in many European countries (e.g. France, Spain, Portugal, and the UK). As one international expert points out: “*There is a real need for a more comprehensive policy and long term vision around 1:1 programmes to involve all stakeholders Ministries of Education, school heads, students, parents, teachers*”.

Whether the goals of achieving pedagogical changes and innovation as formulated in the objectives of 1:1 initiatives have materialised can only be determined from evidence in studies and evaluations.

2.3 Scope of Initiatives

The following section describes the main education levels addressed by 1:1 initiatives, the number of students involved and key target groups involved.

2.3.1 Education level

The initiatives do not indicate that 1:1 learning is more appropriate for a certain school level. However, within the range of initiatives analysed, sixteen focus solely on secondary education (includes 2 initiatives also aiming at vocational education), six only on primary education and nine on the whole school (primary and secondary level) education. The largest project concerning primary schools is *e-escolinha* project (Portugal), which target all the primary schools of the country. The largest initiative for secondary education only is the Norwegian project, which provides laptops to all secondary schools in the country.

Within the projects focusing only on secondary schools, there are no projects based solely on one class, but there is a range of projects involving only a few classes at two or three schools such as the *En-till-En* project (Sweden) or the iPads Pilot in Lithuania. The Austrian pilot project *Netbooks in Education* involved classes in six schools during phase 1 of the pilot, which were subsequently expanded up to 35 schools. This group of initiatives also includes regional projects in France's *départements* such as the *Ordicollège19* project in “*Corrèze*”, or the *POP1* and *POP2* programmes on the island of Réunion.

Initiatives focusing on both secondary and primary schools include large-scale projects such as *Escuela 2.0* (Spain), and also smaller projects which trialled the use of the 1:1 concept in individual classes across the different school levels (e.g. the *iPad Scotland* initiative in UK involving eight

³ <http://one.laptop.org/>

schools in six local authorities). One objective of these projects was to explore the administrative challenges posed by the 1:1 implementation process and how these were different at the primary and secondary school levels. This was the case with *Mobile Lernbegleiter im Unterricht* project (Austria) where the framework of operation was a federal initiative, calling for more vertical cooperation between school levels. Accordingly the project covered secondary and primary schools as well as special vocational schools and highlighted as one of its key objectives “the exchange of experiences [...] among all levels of education”.

Only two of the initiatives focusing on both secondary and primary schools had the explicit objective of easing students’ transition from primary to secondary schools (Austria, *Mobile Lernbegleiter im Unterricht*) or extending the project between levels of education (Spain, *Escuela 2.0*). The *Achieving through Innovation* project (UK), which introduced the 1:1 concept only at primary level, highlighted the potential of personal ownership of ICT devices to increase students’ motivation and independence and thereby assisting them in the significant change from primary to secondary schools.

This might be an interesting area of future exploration for those projects covering both primary and secondary schools. Their potential to identify changes as a result of the use of technology in this area is clearly much greater than for projects only working within one school level. Moreover, attention should be given to whether these projects are evaluated for the respective school levels and their respective impact areas.

2.3.2 Number of students benefitting from the initiatives

The largest fully implemented 1:1 initiatives are the *e-escolinha* (Portugal) and *Escuela 2.0* (Spain) projects, which are among the three projects involving more than 100,000 students. In fact both projects address more than 600,000 students respectively in each country. The Greek initiative involved approximately 113,226 students.

The *Fatih Project* (Turkey) on the other hand is about to expand its 1:1 provision to the entire country. The pilot phase has been completed, with 3,362 schools and 66,289 teachers actively involved in the project (latest figures: May 2013), and the initiative is being expanded to all schools across Turkey from 2013 onwards. This would mean 42,000 schools receiving 1:1 tablet provision, raising the number of students addressed by the initiative to over 15 million.

However, there are other projects such as the *Buki* programme (Georgia) or the *Programme for Subsidisation of the Purchase of a Laptop* (Cyprus), which also addresses students across the entire country. Due to the population size of Georgia and the focus on students from only one grade, the number of students targeted is correspondingly lower: 60,000 grade 1 students in Georgia’s case. In Cyprus, 23,070 students altogether applied and received a grant from the start of the project in 2008 to the end of 2011.

The French initiatives range between 19,195 students (*POP1*, *POP2*) and 25,000 students (*Ordina13*) and can involve up to 46,000 students (*Un collégien, un ordinateur portable*) in the region *Landes*.

Pilot projects, mainly at local or regional level, however vary in size and involve between 4,000 and 10,000 students. The Danish initiative at Elsinore municipality provides 6,000 students and 600 teachers with laptops. A project of similar size is *Cl@ssi 2.0* (Italy) involving 500 classrooms with about 10,000 students in total. The *Achieving through Innovation* pilot (UK) consisted of 4,200 students, the German project likewise included 4,000 students, in Estonia 4,000 out of 15,000 teachers received laptops.

For some of the initiative, there was limited information on the exact student numbers involved. In this case, indications were usually given about the number of schools or the classrooms involved.

Small-scale initiatives in terms of numbers of students (between 100 and 1,000) included in the main analysis are two Austrian initiatives (*Mobile Lernbegleiter im Unterricht*, *Netbooks in*

Education), the *Vzdelani21/Education21* project (Czech Republic), the *Connect School Project* (Ireland), the UK *iPad Scotland* and *iPad at Longfield Academy* and the Swedish initiative. The LMS *4EduBooks* initiative (Austria) and the *Use of iPad tablet devices in education* project (Lithuania) involved 50 and 90 pupils respectively and are, with the *ArdesiaTech* project (Italy) involving three primary school classes, the smallest projects.

2.3.3 Key Target Groups

All initiatives identified the students as their key target group. Given the high focus on pedagogical issues it is also not surprising that teachers are acknowledged as a key target group in most cases.

What seems more surprising is that although “narrowing the digital divide” and e-inclusion are highlighted by twelve projects, parents and families as a key target group are mentioned only by seven projects (e.g. the Czech *Vzdelani21/Education21* initiative, the French *POP1-PO2*, the Portuguese *e-escolinha*). This discrepancy originates from projects, which focus solely on disadvantaged students rather than the improvement of ICT skills amongst disadvantaged parents or families as other projects do. An example of a project taking a more holistic approach in regard to closing the digital divide and therefore addressing more than just the student is the *Dudley Project* (UK) which aims to impact on ICT provision in local “households”.

Although parents are highlighted as beneficiaries of the initiatives this is only in the context of increasing ICT access for them and their children. However, an area worth exploring further is how the parents’ engagement with or oversight of their children’s work develops in the wake of a 1:1 computing initiative. Thereby not only families in socially deprived communities would benefit but also more affluent communities.

Only in three initiatives are head teachers and ICT coordinators mentioned as a target group and thus they are not usually provided with devices as part of 1:1 initiatives. Given the important role that head teachers as well as ICT coordinators have in the implementation of 1:1 initiatives, their current direct involvement in 1:1 initiatives seems to be underexploited.

Insight from the experts’ interviews: As the analysis has shown there are more initiatives focusing solely on secondary education than on primary education. Roberto Carneiro explained that the intention behind investing in early education is to allow better participation later on and to increase social productivity and capital in the long run. For primary education, 1:1 programmes can help to narrowing the equity gap, whereas for secondary education they unlock possibilities for more personalised learning and for creative learning beyond school walls.

2.4 Policy Context

This section focuses on the policy context of the initiatives and how different actors, public or private, at national, regional and local level are linked to the project.

2.4.1 Link to National/Regional ICT Initiatives

More than half of the initiatives (16/31) are directly part of a national strategy. Examples of initiatives, which are at the centre of the strategy are the *Fatih Project* (Turkey), the *e-escolinha* project (Portugal), as well as the initiatives from Austria, Cyprus, France (*Ordina13* and *Ordicollege 19*), Georgia, Italy, Lithuania, Norway and *Escuela 2.0* (Spain). A good example of an initiative, which operates more indirectly within a national ICT strategy, is the *Mobile Lernbegleiter im Unterricht project* (Austria). Here federal education policy encourages cooperation between different school forms in the area of ICT and beyond. This is substantially different from a national ICT strategy advocating 1:1 computing directly. The *Mobile Lernbegleiter im Unterricht project* (Austria) is also interesting because it is the only initiative that highlights the EU’s Lifelong Learning framework ET2020 as a key policy context.

Except the *Achieving through Innovation* project, which was initiated by the Department of Education and Skills (DfES) and the *iPad Scotland* project (which is part of a set of pilot launched by the Scottish Government), the UK projects are currently not linked to any national programme; nor

is the Slovak project, which is a Microsoft initiative, as well as the Czech *Education 21* initiated by a local publishing house. As a consequence of the general set-up of the education system and the sharing of responsibilities for education, the Swedish and Danish initiatives are local projects and the German initiative is linked to the regional ICT programme of Lower Saxony region. Some of the French initiatives are also carried out within the regional policy context.

2.4.2 Key Initiators

About half of the initiatives (13/31) originated from plans or actions coming solely out of the Ministries of Education. However, there were a few projects such as *Escuela 2.0* (Spain), which were initiated by both the Ministry of Education and the regional governments. In the Spanish case the Ministry of Education provided the framework of the 1:1 initiative, which the autonomous regions then initiated or adapted (those which had already started a 1:1 initiative in their region).

In three cases another ministry was involved in the commencing of the projects. In Portugal the Ministry of Public Works, Transportation and Telecommunications cooperated with the Ministry of Education, and in Turkey it was similarly the Ministry of Transportation which worked closely with the Ministry of Education. This is not surprising given that one of the key prerequisites for 1:1 computing to be successful is a functioning communications infrastructure. In Greece, the Ministry of Education cooperated with the Ministry of Finance.

Some of the initiatives which were started by the regional governments nevertheless involved the central Ministry of Education as an actor. This was the case with the initiatives in Austria, Cyprus and the French projects, which were initiated by the *département* governments, but were part of the overall ICT strategy of the Ministry of Education. Therefore the Ministry was closely involved in the running of the project. The local government was the main initiator in the *Dudley* and *Learning2Go* projects and the *iPad Scotland* pilot (UK) as well as in the Swedish case.

2.4.3 Industry Involvement

A small amount of initiatives are private-public partnerships such as the *Netbooks in Education* (Austria), the Danish, German and Lithuanian initiative as well as the *Acer-European Schoolnet Educational Netbook Pilot*. The Slovak initiative and the *Vzdelani21/Education 21* (Czech Republic) project solely emerge from industry.

Given the prospect of potentially huge contracts to supply hardware or software to schools, it is surprising that so few initiatives identified are driven by the private sector (Slovak initiative and the *Vzdelani21/Education21* project in Czech Republic).

Two other projects commenced with the help of both private companies and state institutions such as the *Use of iPad tablet devices in education* project (Lithuania), which was started by the Ministry of Education and Science together with publishers and a mobile communication firm. Similarly the *LMS 4EduBooks* project (Austria) originated from the work of the Ministry of Education and a regional company cluster, which focused on providing ICT services to the Regional Government. Other examples of private-public partnerships are the Danish, German, and Austrian (*Netbooks in Education*) projects, the *iPad at Longfield Academy* (UK) and the *Acer-European Schoolnet Educational Netbook Pilot*.

2.5 Organisation and Implementation

This section examines the key stakeholders and how they are involved in the implementation of the initiatives. It also addresses implementation strategies and identifies plans for expansion.

2.5.1 Key Stakeholders Involved

Project coordinators

The implementation of 1:1 learning initiatives raises a number of challenges, such as financing, wireless infrastructure, and training, which call for planning and organisation involving a variety of actors taking responsibility for the actions required. However, among the initiatives analysed there are only a small number of projects (eight) highlighting the involvement of school principals, school/local authority ICT managers, school/local authority accountants or specific school coordinators and project teams. Some of the initiatives analysed are part of a second phase of a general expansion of ICT infrastructure in schools. It is therefore likely that administrative and coordination expertise is available in schools. However, further investigations are needed to have a clearer picture on the involvement of those actors in the implementation process.

Schools, students, teachers, parents

Similarly, only fourteen initiatives explicitly identify schools as being key actors within the implementation process. Projects that did not point to schools as actors of implementation were mostly large-scale initiatives such as the Spanish and Portuguese project. The *Escuela 2.0* initiative in Spain followed a top-down implementation strategy and schools were, however, taking into consideration for all deployment issues (headmasters, ICT school coordinators, and teachers). As it was a programme for all schools teachers could, however, not “opt in” or “opt out”.

Smaller initiatives such as the *Use of iPad tablet devices in education* pilot (Lithuania), the *Dudley Project* and the *Achieving through Innovation* project (UK) also did not consider the schools as key implementers. Possibly in the Lithuanian case this was due to the focus on e-textbooks and the role of publishers. The two UK initiatives are also interesting for another reason which might be linked to their lack of focus on the school as an implementer. The two initiatives were the only projects where the main implementer was a private company (RM Education). The implementation process was outsourced by the Local Authority to RM Education in the form of a private finance initiative (PFI).

Interestingly, there was no correspondence between those initiatives, which had refrained from identifying schools as key actors and those that identified the process of implementation as top-down. For example the *Dudley Project* and the *Achieving through Innovation* project are both bottom-up implemented but according to the company responsible for implementation, RM Education, schools themselves are not key implementers. In the *Achieving through Innovation* project schools had to submit a bid for participation with the local authority but as soon as their bid was approved they were simply involved in a consultation process with RM Education and the local authority rather than in the actual implementation itself. Therefore implementation did take place bottom-up as each school’s bid varied but the school administration itself was not directly involved in the implementation process. Similarly, in the *Dudley Project*, schools had to set out the required parameters for the project before RM Education took over the implementation.

An example of bottom-up implementation can be seen in the *Learning2Go Project* (UK) where funding, advice and an infrastructure are provided by the local authority but the actual details of implementation depend on the individual school. Some pilots illustrate how schools themselves can be key drivers of innovation and implementation. Examples of initiatives identifying the school as a key actor of implementation are the two Austrian projects, the *Ordicollège19* project (France), and the Slovak and Swedish projects.

Parents were mentioned in only seven initiatives as actors involved in the implementation process. These are the *Acer-European Schoolnet Education Netbook Pilot*, the *Vzdelani21/Education* project

in the Czech Republic, and the UK *Dudley*, *Learning2Go* and *iPad at Longfield* initiatives, where parents had to approve the placement of their child in a digital class and support the funding of the laptop. *Ordina13* (France), *Laptop for students/Laptop for teachers* (Estonia) and in the Austrian *Netbooks in Education* pilot project parents were also involved in the research and evaluation activities (this also emerged from the interview with the Austrian expert).

National and Regional Authorities

Most of the initiatives focused on the Ministry of Education and local or regional governments as the main implementers. In these cases the Ministry provided general guidance and advice while the local or regional government decided on the specific parameters of the project. This was the case, for instance, of the French initiatives and the *LMS 4EduBooks* project (Austria). The latter provides an illustration of the exact dynamics of such lateral organisation. Here the Ministry only provided organisational advice regarding to the ICT infrastructure, the local government sent an inspector to monitor and help with the organisation and the school itself was responsible for training, design and the evaluation of the project.

Private Companies

As regards the involvement of private companies it is worth highlighting that they have a much more prominent role in the implementation process. While other initiatives included mostly IT companies as key stakeholders, the Lithuanian project, *Use of iPad tablet devices in education*, was unique in its involvement of publishing houses. The pilot originated from a Ministry of Education initiative, which aimed to implement e-textbooks in schools. Initially the Ministry had planned for an introduction of e-book readers such as Kindle in schools and was working closely with publishers to provide the necessary content. The initiative was soon expanded to a more comprehensive 1:1 pilot scheme focusing on the use of iPads. However, the focus on e-textbooks remains and the Ministry hopes that publishers will realise the potential of providing content for use in schools by means of the pilot.

While the Lithuanian example is unique in involving publishing houses in the initiative, there were overall fifteen cases of ICT companies being involved in the implementation process. In most cases this was in the form of providing the hardware and software or the infrastructure for the initiative but in some projects this extended to other roles such as providing training and support during the initiative. An example of the former, more limited involvement is Georgia's *Buki* programme where a local computer company called *Algorithm* cooperated with Intel to manufacture specially designed hardware, the "Buki Netbook", for the project. Examples of more comprehensive involvement of a private company are the *Dudley* and *Achieving through Innovation* projects (UK) where *RM Education*, a leading supplier of ICT equipment to schools, was responsible for the entire implementation process.

Universities

Universities played less of a role in the implementation process, but a major role in the evaluation of initiatives (e.g. in Austria, Germany, Estonia, Italy). In the *Vzdelani21/Education21* project (Czech Republic), the university collaborated to the implementation process, defining the holistic model for educational transformation and creating a system for teachers to share resources (e.g. exercises, tests). In the *LMS 4EduBooks* project (Austria) the local university was involved in the training of teachers.

Insights from the literature review: The subject of leadership emerges throughout the literature on 1:1 computing initiatives as the studies look at how the technologies have been implemented. For example, Dunleavy, Dextert and Heinecke (2007, p.451) comment:

"Technology specialists and other technology leaders at schools with laptop programmes will need opportunities to learn about and plan for the challenges of managing ubiquitous laptops in the K-12 environment. It is critical that the leadership implement policies and routines that allow

teachers to focus on the significant tasks of integration, rather than distracting management issues...”

Salerno and Vonhof (2011, p.1) state: “It is our experience that launching an iPad (1:1) program requires a champion with sufficient positional power to command the attention of all constituents within the school community.” In some of the studies, there are single or small groups of named leaders. For instance, the Maine Learning Technology Initiative identified a taskforce (Silvernail & Lane, 2004, p.2).

Insights from the experts’ interviews: Experts reflected on the need to involve a variety of stakeholders in the implementation of 1:1 education programmes.

“School leaders are absolutely key”, as emphasised by John Kershaw. During the implementation of the 1:1 initiative in New Brunswick, Canada, principals were needed as change agents. They took part in different project summits, developed an academy programme for school leaders and then they became mentors for other schools.

Likewise, Bruce Dixon points out that school leaders have little training on how to move from a transformative framework for teaching and learning during a 1:1 programme towards a more systemic change in schools. School leaders need support in understanding what opportunities a technology rich learning environment might provide for students and they also need new tools, such as the “Transformation Index” tool.⁴

The necessity of involving parents is mentioned by all experts. Parents are one of the most critical interest groups, especially as regards, investment and security according to Erich Herber and Bette Manchester. Their specific role as regards financing devices is discussed in the section on finance models.

In the UK, the Wolverhampton local authority worked with an external researcher to help them define the educational principles underpinning the *Learning2Go project* (UK). Another example of involving universities other than in evaluation alone is the *LMS 4EduBooks* project in Austria. Universities offered in-service training for all teachers on a regular basis, organised by the school head teachers. Also, in Maine (U.S.A), links with the university and museums, which could provide additional training during the summer, were established. In the Maine initiative each school had volunteering students who had learnt how to use the equipment. Once a year the school students went to the university as part of their i-teams and universities gave out engineering scholarships.

In Portugal the Magellan computer initiative had some important industry spill-over effects. The producer of the Magellan computers has deployed over three million devices in different parts of the world, e.g. Latin America (Uruguay, Venezuela), Asia and Africa. Major textbook publishers started to invest in digital content and provide content for Magellan computers. The major Portuguese educational publisher had been running the Virtual School for many years and had become a leader in providing digital solutions for students, schools and families. The Hungarian expert Andrea Karpati points to the lack of collaboration with hardware and software developers to develop 1:1 initiatives.

Erich Herber points to stakeholders that need to be involved including parents, commercial suppliers, local sponsors and local maintenance service partners.

2.5.2 Implementation Strategies and Plans for Expansion

Half of the 1:1 initiatives identified are up-scaled or mainstreamed, mainly representing three types of mainstreaming model.

⁴ Big Ideas, Unlimited Possibilities and Agile Development. The IdeasLAB Contemporary Research and Development Model, p.19 (<http://www.ideaslab.edu.au/showcase>)

1. Some projects, especially large-scale countrywide initiatives such as the Cypriot initiative *Programme for Subsidisation of the Purchase of a Laptop* or the *Escuela 2.0* initiative (Spain), have from the very beginning been part of a national mainstream programme. In the Spanish case, previous regional projects of a smaller scale were taken into consideration. In Cyprus, the *Programme for Subsidisation of the Purchase of a Laptop*, is embedded in the Ministry's ICT integration plan and targets students of a specific grade (i.e. lower secondary level) in both public and private schools. Similarly, the *Imitative* initiative in Norway, addresses all students in upper secondary education, The *Fatih Project* (Turkey) is on the cusp of a huge expansion with the pilot project due to end in 2012 and plans in place for the mainstreaming of 1:1 computing to all schools in the country in 2013. This would expand 1:1 computing provision to over 15 million young people across Turkey.

There is however, no intention to mainstream the already large-scale national *e-escolinha* (Portugal), which targeted primary schools or the laptop project in Estonia. Also, in Georgia, where the pilot phase is finalised, all first grade students will receive netbooks free of charge.

2. In other projects, mainly pilot projects, mainstreaming refers to extending the devices (up-scaling) to more students and schools, or equipping different levels of education or regions involved beyond the pilot phase in a second phase of the project. However, actual numbers can vary considerably between initiatives. The *Learning2Go Project* (UK) is a long-standing project organised by Wolverhampton City council, which started in 2003. It has received substantial national attention and has been replicated by schools across the country and is now in its 4th phase of development.

3. In other cases the project comes to an end, but, based on various co-existing initiatives in the field, new projects are emerging driven by the regional government pursuing specific action in the field of 1:1 computing and mobile learning. In Germany, in the region of Lower Saxony, where the *1000mal1000: netbooks in schoolbags* project took place, a new project (*Mobile Learning*) will start on the use of tablets in 18 schools financed by parents but supported by a 1:1 computing project team from the Ministry of Education. The latter is an example of ongoing 1:1 computing activities in a specific region of Germany, where the use of individual ICT devices is now part of the regional ICT plan in that region. Additionally, educational publishers agreed on a standard for digital books, which supports the implementation of the project. In other regions of Germany there are 1:1 computing "project islands", but there is no coordinated mainstreaming of such initiatives.

In some cases results of evaluations are taken into consideration on the follow-up of the project, in other cases the continuation of the project lies in the hands of schools.

In Ireland, the *Connect School* project evaluation recommended that at the time of the evaluation the project was not yet ready to be scaled-up (i.e. applied to other schools). It was first necessary to move away from an over-focus on learning with ICT to a model that focuses more on teaching with ICT and systematically develops ways of supporting teachers through this move.

The analysis of the initiatives clearly shows that there is a strong drive towards mainstreaming of 1:1 initiatives with around half of the initiatives being already mainstreamed or up-scaled and eight initiatives indicating plans for upgrading from a pilot status to a mainstream status or at least up-scaling the number of students involved. This suggests that we are at the threshold of the 1:1 learning model in education becoming part of mainstream education.

Insights from the literature review: The literature review has highlighted that there is a significant difference between the challenges of smaller scale and large scale projects (Kraemer et al., 2009; Penuel, 2006). Bonifaz and Zucker (2004) recognise that certain factors may change considerably depending upon the size and scale of the project including the provision of professional development for teachers, technical support and what Penuel (2006) refers to as "how to co-ordinate learning and teaching when the same equipment is not available to everyone."

Naismith et al. (2006) recognise that in order for projects to be up-scaled, certain issues need to be addressed:

- Context: gathering and utilising contextual information may clash with the learner's wish for anonymity and privacy.
- Mobility: the ability to link to activities in the outside world also provides students with the capability to 'escape' the classroom and engage in activities that do not correspond with either the teacher's agenda or the curriculum.
- Learning over time: effective tools are needed for the recording, organisation and retrieval of (mobile) learning experiences.
- Informality: students may abandon their use of certain technologies if they perceive their social networks to be under attack.
- Ownership: students want to own and control their personal technology, but this presents a challenge when they bring it in to the classroom.

Insights from the experts' interviews: The expert interviews provided valuable insights about the barriers and enablers for the successful mainstreaming and up-scaling of initiatives.

Political changes play an important role during the lifespan of longer-term initiatives. Often new arrangements have to be made with the new administration in charge. For instance, the change of Governor in Maine resulted in new negotiation for the continuation of the 1:1 initiative.

In Spain, where the administration is decentralised with 17 autonomous communities and two autonomous cities, the national plan *Escuela 2.0* was implemented in collaboration with the regions by building on their existing initiatives. However, the *Escuela 2.0* programme, which was supposed to run from the school year 2009 until 2012, is currently stopped. The education budget has been cut and further investment for 1:1 equipment will be rethought. The new government is awaiting the findings of the evaluation of the programme, which is currently being conducted. The regional communities will have an even more prominent role in continuing with the initiatives and financing them further. In the expert review, Muñoz-Núñez, suggests that for any 1:1 initiative to be sustainable it must opt for another financing model than full financing by the state to buy the equipment. With a fall in the market price of netbooks, a co-funding model, where parents participate, should be envisaged. Bruce Dixon concurs with this idea stating that a co-contribution model where parents and/or schools take responsibility offers a more promising long-term prospective and possibility to make 1:1 an ongoing programme.

Likewise, in Portugal the sustainability of the *Magellan* initiative, which was based on co-funding of devices (by government and parents), is affected by the economic austerity measures. Roberto Carneiro points out that in the case of Portugal large-scale implementations can be challenging when the education system is centralised and prescriptive. Trust between stakeholders such as schools and the government can be hindered when the system is controlled top-down and strongly based on annual national testing.

In Canada (New Brunswick), there is no national education ministry and the provinces and territories are responsible for education. Other initiatives have been put in place to try and to sustain the work of the programme, but this has been difficult with changing governments and shifting education priorities. "This is creating a challenge for people in the systems in terms of sustainability of education focus" as John Kershaw said. Erich Herber points out that clear implementation strategies are needed as well as evidence-based support concepts to make mainstreaming of initiatives both sustainable and effective.

In the expert interviews David Whyley discussed that it must be acknowledged that within such projects, the equipment is likely to change, and this again emphasises the point that the project cannot be device dependent.

Bruce Dixon confirms these points: “The secret to ‘sell’ the idea is to make known how technology increases teachers’ pedagogical capacity.” Moreover, he emphasises that scaling-up is only possible if evidence is provided of what is successful and what is not, and what types of changes are desired. In general, many small-scale pilots on 1:1 lack a feedback loop that makes it possible to build evidence. Without this feedback loop, up-scaling becomes a challenge.

Valiente (2010) brings in another interesting aspect: Any knowledge about up-scaling innovations will be relevant for up-scaling 1:1 initiatives, “it is about individuals and social practices”.

2.6 Equipment and Financing Model

This section focuses on the type of devices offered to schools, and on the ownership of the equipment in several initiatives listed in the report.

2.6.1 Type of Equipment

The initiatives analysed offer a wide range of equipment to schools: most of them provided students with laptops, netbooks or tablets, whereas only a few projects are characterised by the provision of smartphones (e.g. the Austrian initiative *Mobile Lernbegleiter im Unterricht*, the *Learning2Go* in the UK). The majority of software provided as part of the initiative consists of word-processing, pedagogical and learning software (the latter including subject’ materials) and, in some cases, antivirus software. Only a few initiatives highlight the opportunity to use free software (e.g. the *Programme for Subsidisation of the Purchase of a Laptop* in Cyprus). Moreover, almost all the initiatives provide Internet access and a WiFi network (in the school but also in communal areas or at home), in order to create a functional environment to accommodate the devices provided.

Furthermore, most of the initiatives offer a wide range of additional equipment to schools. The most comprehensive initiatives concerning the additional equipment provided to schools are: *Ordina13* in France, *Escuela2.0* in Spain, *New school-Digital school* in Greece, the *ArdesiaTech* pilot in Italy, *Achieving trough Innovation* in the UK, and the Irish project *Connect School*. These 1:1 initiatives offer WiFi connection, interactive whiteboards, a virtual learning environment, flash drives, video projectors, digital cameras, scanners and printers.

The general upgrading of the infrastructure including broadband and WiFi are the necessary conditions to create a favourable functional mobile learning environment.

2.6.2 Financial Model

There are three main financing models arising from the initiatives under analysis: full financing, co-financing and free provision of equipment by industry.

The first financing model refers to those projects, which are entirely financed at national level, in general by the Ministry of the Education, or by the regional/local administrative authorities, such as most of the initiatives listed in the report.

In several cases funding is granted to selected schools or classes within a school. School have to create a pedagogical project, submit it to the Ministry of Education and apply for a grant in order to receive ICT infrastructure. This is case with the Italian *Cl@ssi 2.0*, the French project *Ordincolège19*, funded by the local administrative authorities, and the *Equipment for School Net DIA.S* pilot in Cyprus, where the equipment was acquired by the MoEC through public tenders. However, in other initiatives grants are allocated to a selection of schools and/or target students such as for example in the *Programme for Subsidisation of the Purchase of a Laptop* in Cyprus, where MoE provides a grant to every student attending public or private lower secondary school in order to purchase a laptop. In the Czech initiative *Vzdelani21/Education21*, schools apply for a grant, but do not have to submit a pedagogical project.

In addition, there is another substantial group of projects following a co-financing scheme, where parents are responsible, jointly with the schools or with the administrative authorities, for covering the costs of the devices provided. In Portugal, the *e-escolinha* initiative is partly financed by the

Government with a small contribution from families based on families' income. In Norway (*Imitative*) the costs are shared between counties, the Ministry and students (every student in upper secondary education pays an annual leasing fee of about €100 and is provided with a laptop. In Germany (*1000mal1000: netbooks in schoolbags*), parents financed the laptops, supported by the regional government. Finally, in Cyprus (*Programme for Subsidisation of the Purchase of a Laptop*), during the first phase of the initiative parents received a cheque from the MoEC; in a second phase they were responsible for covering the rest of the costs.

The Spanish initiative *Escuela 2.0* is characterised by another form of co-financing model, consisting of a joint financial collaboration between the Ministry of Education and the Autonomous Communities (except the Autonomous Communities of Madrid and Valencia).

Finally, in a few programmes the equipment is delivered free of charge and the project implementation itself is financed by the technological partner companies involved in the initiatives (Microsoft, Intel, Acer, Smart). This is the case with three educational pilots: the *Acer-European Schoolnet Educational Netbook Pilot*, the *Netbook for every student* (Slovakia) and the *ArdesiaTech* (Italy).

2.6.3 Ownership of Equipment

Based on the belief that personal ownership of computing devices is highly motivating for students, in several initiatives (14/31) students become owners of their device for their activities in and out of school, in order to create a personal mobile learning environment.

Students directly own their devices in Georgia (*Buki*), in Portugal (*e-escolinha*), in Slovakia (*Notebook for Ever Pupil*), in France (*Ordina13*), in the UK (*Learning2Go*, *iPad at Longfield Academy*, *iPad Scotland*), in Austria (*Mobile Lernbegleiter im Unterricht*, *Netbooks in Education*) and also in Cyprus (*Programme for Subsidisation of the Purchase of a Laptop*) and Germany.

In other cases the equipment is owned by schools, which receive the devices (such as the Cypriot initiative *Equipment for School Net DIA.S.* and the Italian programme *Cl@ssi 2.0*), or it is lent to the students for 3/4 years for use in and outside class. The latter is the case of the French Project *POP1*; however, during the second phase of this project, called *POP2*, the equipment's ownership has changed, as the devices were bought by the families with a €500 subsidy from regional/local administrative authorities ("Réunion" *Département*). In the Czech initiative *Vzdelani21/Education21* the equipment is generally owned by schools, except in those cases where the devices are owned by pupils as their parents contributed to cover the costs.

In some initiatives, such as the *Acer-European Schoolnet Educational Netbook Pilot*, the equipment became the property of the school after the end of the pilot. This is similar for the Spanish initiative *Escuela 2.0*, where, after four years of usage the devices become students' property. However, in a few projects the vendors themselves own the devices, and schools have been provided with the tablets according to the hardware usage agreement between the private company and the schools. This is the case of the Lithuanian initiative, where CITE (Centre of Information Technologies of Education) owns the devices delivered. Also in the *Dudley Project* (UK) the devices are leased and legal ownership of the devices remains with the leasing company throughout, then the devices are returned to the company at the end of the two or three year rental period. Similarly, in the *ArdesiaTech* pilot (Italy) the technological companies own the devices which are lent to schools.

In Turkey (*Fatih*) and Austria (*LMS 4EduBooks*) the Ministry of Education owns the tablets and lends them to schools. Similarly, in the initiative "*Un collégien, un ordinateur portable*" (France), running in the *Landes Département*, the *Conseil Général* (local authority) retains ownership of the hardware.

Finally, in other projects the local or regional authority subsidises the equipment and retains ownership. This is the case for the Danish (*IT Project in the Municipality of Elisinore*), the French initiative *Ordicollege19* and the project *Achieving through Innovation*, which is currently running in the UK.

Only in two cases, the *Mobile Lernbegleiter im Unterricht* (Austria) and the *iPad at Longfield Academy* (UK), schools adopted the Bring Your Own Device (BYOD) approach, allowing students to use devices not supplied by the schools.

Insights from the literature review: Evidence from the literature shows that significant money is spent every year on education and there is a need to allocate existing long-term funding more effectively (Bonifaz & Zucker 2004, p.5). Salerno and Vonhof (2011, p.1) highlight that:

“The total cost of an iPad 1:1 launch is greater than the cost of the device. Schools will need to consider cases, applications (apps), network improvements, security measures and other related costs. It is our experience that an iPad 1:1 program will not, and cannot be sold to constituents as a cost saving device.”

As regards ownership issues, Rockman (2003) who documented Microsoft’s *Anytime, Anywhere Learning* programme, comments:

“Full-time access seems to encourage responsible ownership of the tools to do the work that students have, and students are likely to differentiate between using the computer for schoolwork and using it for non-school activities. Our research has shown that students will use their home computers for games and instant messaging, while saving their school computers for only the schoolwork.”

In the early days of the *Maine 1:1 Learning Technology Initiative* in the U.S. students were not allowed to take the computers home. Silvernail and Harris (2003, p.43) commented “in interview sessions, teachers have reported that parents feel that they are out of the loop, so to speak, because they are unable to see some of the work that their children are doing at school.” Almost a decade on, and with the development of virtual learning environments, it becomes evident that there are a number of issues to consider alongside the access and ownership of the device.

Insights from the experts’ interviews: Experts suggest a number of financing models and have outlined concrete issues around the ownership of devices based on their experience in the implementation of 1:1 initiatives.

Experts emphasise that it is important that it is recognised the need for 1:1 initiatives to impact across the school and the community; therefore, the financial contributions and the overall budget will need to reflect this. David Whyley highlighted the need for the project leader to develop a ‘working finance model’. In fact, one of the things that will impact on current projects is the overall economic fiscal restraint and constraints.

Erich Herber highlighted the need to be more efficient in the delivery of education services, while at the same time personalising learning much more for students.

Bruce Dixon highlights the principle that parents should be co-owners in the scheme and pay according to their means. Ownership by families is a major factor of awareness towards a balanced use of the laptop for learning purposes.

In Austria, mobile devices in various 1:1 projects were mainly purchased by parents. The schools supported this process by coordinating the technical specifications and purchasing processes. Here it is crucial to involve parents several months before the term starts as they request high security of investment when purchasing devices according to Erich Herber. The big challenge was to bridge the interest of parents, technology suppliers and service partners.

In the *Learning2Go Project* in Wolverhampton David Whyley explained that the financial model needed to be equitable; this was particularly important for “political buy-in”. The e-learning foundation in England helps to develop a financial model, i.e. parents lease the device and then make a small payment to own the device. Parents who pay tax “gift-aid” to the school, which can use these funds to support families in challenging financial circumstances. If parents are unable to

make a financial contribution for the device then the student can use it at school, but it cannot be taken home.

In conclusion, as Bruce Dixon summarises: “A co-contribution model, where parents and/or schools take responsibility offers a more promising long-term prospective and possibility to make 1:1 an ongoing programme”.

As regards ownership issues John Kershaw explains that students in the New Brunswick initiative could, after a testing period to analyse the risks, take the laptops home. The students treated the laptops very carefully since they were allocated to them personally. There is a different attitude when the equipment is for general use and 1:1 allowed the children to take more responsibility.

Valiente (2010) emphasises that 1:1 is “a move from previous practice because integration is based on the individual, each child accesses or owns. These initiatives provide ubiquitous link to learning, school-home-leisure space.”

During the Maine initiative the team made sure that the devices be taken home and students had Internet access at home.

This restriction of “school ownership” of the device preventing students from taking the device home is likewise emphasised by another expert. However, the *Acer-European Schoolnet Educational Netbook Pilot* had showed that even if the device is owned by the school, personal access to students can be granted for a certain period of time (e.g. one term) thus allowing them to take the netbooks home.

2.7 Support

This section describes at what level and in what form support is provided by different organisations involved in the initiatives. In particular the contribution of such organisations is clustered into: policy support, school level support and industry level support.

2.7.1 Policy level support

All the initiatives with a national coverage obtained direct support from the Ministry of Education; this is the case for the Turkish project *Fatih*, the *Buki* programme in Georgia, the Portuguese project *e-escolinha*, and the Cypriot *Programme for Subsidisation of the Purchase of a Laptop*, where the ICT Project Team of the MoEC supports the school boards, providing guidance to students and parents, performing the necessary audit and issuing the cheques for the grant.

The Spanish initiative *Escuela 2.0* and the French project *Un collégien, un ordinateur portable*, managed at two different levels (national and regional), represent a special case, where both the Ministry of Education and the regional/local authorities support the project. In particular in the Spanish initiative national and regional collaboration is based on the provision of online and in-person training and logistic support for the devices provided to schools by the technology companies.

Moreover, we can find examples of several initiatives providing and supporting at regional or local level, such as the four educational programmes in the UK (*Achieving through Innovation* project, *Dudley Programme*, *Learning2Go* and *iPad Scotland* initiative), the Austrian initiatives (*LMS 4EduBooks*, *Netbooks in Education*) and the Slovak project (*Notebook for Every Pupil*).

However, there is a group of regional initiatives or local projects, which also receive national support, such as the French initiative *POP 1*, *POP 2*, which covers rural and remote areas directly supported by the Ministry at all levels (choice of schools/pedagogical aspects/ICT issues). The same schema is followed by three other French initiatives, *Un collégien, un ordinateur portable* and *Ordina13*, *Ordicollège19*, the Italian *ArdesiaTech* and *Cl@ssi 2.0*, and the Lithuanian Project concerning the *Use of iPad tablet devices in education*.

2.7.2 School level support

There are a variety of support strategies at school level. Most initiatives organise the implementation of the project at school via the appointment of one or two project coordinators (usually an ICT teacher teaching in the school involved in the initiative), equipped with a laptop and with all the additional devices, who are charged with providing support to the other teachers of the schools through several training sessions. We can find several examples of this strategy: the *Acer-European Schoolnet Educational Netbook Pilot*, the French project *Ordina13*, the Spanish plan *Escuela 2.0*, the *Equipment for School Net DIA.S.* project in Cyprus, the *Dudley* initiative in the UK, the *Cl@ssi 2.0* programme in Italy and the Turkish *Fatih Project*

In other cases the school chooses to organise workshops, seminars and training on ICT skills with the help of external ICT experts (*Buki* project in Georgia, the French initiatives *Ordicollège19* and *Un collégien, un ordinateur portable*, in the Czech Republic, the Portuguese *e-escolinha*, the Slovak project *Notebook for Every Pupil*, the Swedish *En-till-En* and the Austrian *LMS 4EduBooks*).

The schools involved in the project also have a crucial role in supporting and disseminating the project strategies to the educational community: including teachers, parents, pupils, etc. This was the case, for example, of the *ArdesiaTech* (Italy) and *iPad at Longfield Academy* (UK).

In Denmark (*IT project of the Municipality of Elsinore*), several schools provided also technical and pedagogical support adopting IT patrol where students support other students and teachers at the school.

Finally, in other cases, such as the Czech initiative *Vzdelani21/Education21*, schools have a crucial role in the implementation of the project, investing in building the technical infrastructure basement for the equipment: i.e. wireless connection and a stable network.

2.7.3 Industry level support

There are several initiatives (19 out of 31) where the suppliers of the devices provide technical support to schools under the warranty of the equipment. The support is provided by private companies establishing standard helpdesks for parents and schools, such as the *Netbooks in Education* in Austria, the *School Net DIA.S.* in Cyprus, the two French initiatives (*Ordina13* and *Un collégien, un ordinateur portable*), the *Buki* initiative in Georgia, the Spanish plan *Escuela 2.0.*, the Portuguese *e-escolinha*, the *Dudley* and *iPad Scotland* project in the UK, initiatives in Turkey and Sweden, and the *Acer-European Schoolnet Educational Netbook Pilot*.

In the Lithuanian *Use of iPad tablet devices in education*, the local telecommunication company maintained 1G data per month per tablet.

In other cases the support is provided by sending in educational consultants or technicians to those schools that may require assistance; the latter is the case in the *Achieving through Innovation* programme in the UK.

Insights from the literature review: Bonifaz and Zucker (2004) emphasise the importance of making technology support available “on site as well as offsite.” This is an important consideration and Valiente (2010) raised the point that the teacher needs to be able to access help as and when they need it.

Silvernail and Lane (2004, p.33) highlight in the report about the Maine Learning Technology Initiative:

“Some obstacles, however, have been encountered in this initial phase of implementing the laptop program. Some teachers report technical problems, and many feel they need more technical support.”

Silvernail and Lane (2004, p.30) also discuss the concept of ‘iTeams’ and the role that ‘technology-savvy’ students can play in supporting teachers and classmates during the school day.

Valiente (2010, p. 8) comments on the availability of technical support:

High quality infrastructure and readily available technical support also appear to be important for 1:1 initiatives to succeed. Difficulties in ensuring adequate resources for purchasing and maintaining hardware and software (including policies working with privative software) can reduce the likelihood that teachers will use technology with their students. The technical infrastructure, including the availability of hands-on support, is also a significant factor in shaping teachers use of ICT in the classroom.

Insights from the experts' interviews: David Whyley mentioned that in the *Learning2Go Project* the local authority carried out a survey to identify technical support needs. Then they briefed technicians in schools and appointed a specific technician with expertise in mobile learning to support the project. Moreover, students learn quickly "first-fix" technical support and help each other.

Erich Herber emphasises that as well first level support in schools, second and third level support is needed to quickly repair or replace the devices and local service providers should be available for this purpose. Other important factors are adaptable insurance packages and a pool of spare devices for pupils and teachers in schools. He also refers to teachers, who acted as important facilitators in the maintenance and installation process.

Likewise, John Kershaw points out that constantly more technical support was needed at different levels. There was a 24/7 helpdesk that teachers could call, which was absolutely critical; they also engaged district-based technology mentors, who were teacher practitioners able to offer support. However, school-based support was the most effective.

During the Maine initiative a database was established to monitor support required and to identify any extra training needed as explained by Bette Manchester.

2.8 Training

Training constitutes a crucial aspect of the organisational framework of 1:1 initiatives. With a pedagogical focus, training represents the necessary conditions to create a new stimulating learning and teaching environment.

The findings of this analysis show the existence of various actors organising different types of training:

- Self-organised training sessions established by these schools involved in the project;
- External training provided by local and/or national administrative authorities;
- Training offered by specialised centres or universities (only in the Greek initiative);
- Training provided by the technology companies that equipped the schools.

In-house training is organised by schools via workshops (*IT project in the Municipality of Elsinore* in Denmark, *Mobile Lernbegleiter im Unterricht* in Austria), through a peer-to-peer learning approach (*Connect School Project* in Ireland), or during classes, in order to involve the students as well (*Dudley Project* and *Achieving through Innovation* in the UK). In the *Acer-European Schoolnet Educational Netbook Pilot* schools organised self-driven training sessions and European Schoolnet provided 1:1 pedagogical scenarios in order to allow teachers to share best practices.

Most of the training sessions are offered by the Ministry of the Education or by regions via online tutorials (*LMS 4EduBooks* in Austria, *Equipment for School Net DIA.S.* in Cyprus, *POP1, POP2* and *Ordicollège19* in France, *Buki* in Georgia, *e-escolinha* in Portugal), or through conferences/workshops held either in schools or in the Ministry's premises (*Equipment for School Net DIA.S* in Cyprus). In other cases training sessions are organised in close collaboration with Ministry of Education and regional/local authorities (*Un collégien, un ordinateur portable* in France and *Escuela 2.0* in Spain).

Only a few initiatives foresee the participation of the technology companies involved in the projects for the provision of training sessions. Such private actors offer their support through tutorials on the practical usage of the equipment they provide (*ArdesiaTech* in Italy and *Vzdelani21/Education21* in the Czech Republic). In other cases, such as the Lithuanian initiative *Use of iPad tablet devices in education* and the Swedish *En-till-En*, training is organised under the collaboration of technological companies and administrative authorities.

Training generally focuses on teachers' professional development, covering both pedagogical and technical aspects. However, in some countries, students are also required to achieve the ICT basic skills needed to use the devices (e.g. *Use of iPad tablet devices in education* in Lithuania and *Fatih Project* in Turkey).

Some initiatives foresee a certificate for those teachers who attended the trainings (*En-till.En* in Sweden, the German initiative and the *Ordina13* in France), awarding in some cases the title of "ICT trainer" (*LMS 4EduBooks* in Austria, *New school-Digital school* in Greece, *Vzdelani21/Education21* in the Czech Republic, *e-escolinha* in Portugal, *Fatih Project* in Turkey). In the *Escuela 2.0* (Spain), teachers who completed a course received an official certificate with a number of credits (depending of the course) that counts towards their professional records.

Insights from the literature review: The literature acknowledges the need for continuing professional development; in the early days of 1:1 computing initiatives, this was about more than a technical induction (Penuel, 2006). However, the research recognises that staff also needs access to the devices and to be able to understand how the technology is integrated into learning and teaching (Bebell & O'Dwyer, 2010, p.10). Penuel (2006, p.338) refers to this: "Teacher workshops often focus on providing teachers with skills they need to use the technology themselves, but many reported that what was most critical was a focus on helping teachers integrate technology into their instruction."

There are benefits in giving staff access to equipment to encourage dialogue and opportunities to share practice. The literature demonstrates that teachers need different types of professional development, for example Bonifaz and Zucker (2004, p.7-8).

Insights from the experts' interviews: The expert interviews highlighted the importance of building networks of practitioners who can support each other. Teachers need training at regular intervals, with continuity and consistency, following a blended approach (i.e. face to face and online learning). There is a need to engage people in the process of training and professional development very early in the process – even before the equipment arrives. It may also be beneficial to encourage teachers to engage with their own pedagogical projects, because the teacher then has a reason to continue to develop their own practice. Teachers need time to become more familiar with their resources and also time to develop new materials as pointed out by Bette Manchester.

Moreover, and as is already the case in many of the initiatives analysed, the training should be school-based, regular and ongoing, said Bette Manchester. The latter is sometimes difficult to maintain especially when funding decreases throughout the project. Bette Manchester suggests involving teachers in the pedagogy of teaching and learning and building networks of practitioners. Outstanding teachers delivered training in schools and at professional development centres in Maine.

In Portugal some innovative teacher-training methods were implemented by using, for example, specific tools such as the programming language *Scratch*. *EduScratch* ("Scratch for teachers"), an autonomous local initiative in the area of teacher training with the aim of sharing resources, stories, experiences that may help other teachers start working with Scratch at School as an educational tool. *EduScratch* (<http://eduscratch.dge.mec.pt>) is a new online community where "Scratch educators" share stories, exchange resources, ask questions, and find people.

Bruce Dixon formulates the challenge in the following way: “There should be more excitement about a pedagogical challenge. To twirl pedagogical excitement teachers need tutors and coaches in their school to support them.”

In Canada (New Brunswick) the focus was on training teachers in project-based learning. John Kershaw further illustrates the type of training needed:

- Introducing webinars and online training from the very beginning;
- Blended learning becomes increasingly common practice;
- Develop professional learning communities;
- Integrate the 1:1 programme within an overall learning plan.

Training should follow a systemic approach and to be staged progressively as part of a plan.

Andrea Karpati who carried out the evaluation of the 1:1 computing initiative from Intel in Hungary, emphasised during the interview that teachers need continuous feedback, repeated short bursts of training followed by mentoring at their own premises. Moreover, teachers need to be able to experiment with new learning material suited to the national core curriculum and the regional/local curriculum adopted by the school.

Erich Herber and Oscar Valiente confirm the above mentioned points: regular meetings are needed involving knowledge exchange and, peer-to-peer learning. Even if training is initially about the device, teachers need content and regular training with concrete examples about the change of practice.

2.9 Evaluation

The following chapter outlines the main organisations responsible in each country for the evaluation of 1:1 initiative. Furthermore it aims at identifying the core focus of the evaluations carried out and the methods used in the evaluations.

2.9.1 Organisation responsible for the evaluation

Almost all of the initiatives analysed (26 out of 31) were evaluated or are about to be evaluated as many projects included in this analysis are recent or ongoing, and evaluation results are not yet available. The main actors of the evaluation are in most case universities, which carried out independent external evaluations.

Additionally, in some countries, such as Italy, Lithuania, the UK and France, national organisations with an expertise in evaluation and research were conducting the evaluation (Italy, ANSAS; Lithuania, Education Development Centre; UK, former BECTA; France, Inspectorates). Only three initiatives were evaluated by private research organisations (France, *Département des Landes*), foundations (Italy, *Cl@ssi2.0-Agnelli Foundation*) or the local authority (UK, *Achieving through Innovation*).

In two cases the evaluation was carried out internally and externally (*Portugal and Czech Republic*) and only in the case of the *Acer-European Schoolnet Educational Netbook Pilot* was the evaluation carried out internally. In the case of *Vzdelani21/Education21* (Czech Republic) both the University and industry partner (Fraus Publishing house) carried out the evaluation.

In large-scale 1:1 implementations, such as the *e-escolinha* project in Portugal and the *Escuela 2.0* in Spain it was apparent that a number of different universities were in charge of the evaluation, each of them focusing on a specific part of the study or leading a separate study on the initiative.

2.9.2 Methods

In general, the evaluations carried out are single interventions towards the end of the project. During the *Acer-European Schoolnet Educational Netbook Pilot*, a pre- pilot evaluation was carried

out before the pilot implementation. The main methods used are qualitative, combining several elements, e.g. document and data analysis, carrying out case studies including interviews with various stakeholders, lesson observations and focus groups) and collecting information via online questionnaires.

During the evaluation of the *ArdesiaTech* project (Italy) and the *iPad Scotland Pilot* (UK) more experimental models were used based on researchers' observations, such as log-books, diaries and videos. The three years project evaluation on the educational use of the *e-escolinha Magellan* computers in primary schools (Portugal), develops dynamic research actions with voluntary participation of teachers guided by a research team with experience in initial and in-service training of teachers. During the Estonian initiative, monitoring software was installed to monitor logs in students' computers.

The *Acer-European Schoolnet Educational Netbook Pilot* study used descriptive statistics to quantitatively describe the main trends emerging from the data across pilot countries

The German study on the *1000mal1000: netbooks in schoolbags* is a very comprehensive evaluation in several respects. It used for the first time a bigger sample of students, did competence tests and used control groups. It investigated the research questions according to various school types and levels of education. It also conducted interviews with users at several times during the project in order to document progress over time based on the same sample. In Slovakia, during the *Notebook for Every Pupil* evaluation, cognitive tests, and scaling questionnaires were used.

No real long term evaluations are being carried out except for *e-escolinha* (Portugal), which is running a three-year research project on the educational use of the *Magellan* computers in primary schools in Northern Portugal. *Escuela 2.0* (Spain) is also undergoing an external evaluation which will be available by the end of 2012. It will be based on surveys to teacher, students and parents.

In Czech Republic, during the *Vzdelani21/Education21* regular reporting from each school involved in the pilot was organised. An average of eight hours of video footage (on the use of IT in classes) per quarter is submitted by each school, covering a range of subjects including mathematics, languages, geography, physics and chemistry. A specialist from the Charles University also attended some classes to observe them in real life as well.

2.9.3 Study Focus

Details given as regards the focus of the evaluation and evidence of impact vary greatly between the initiatives analysed. It is therefore in most cases necessary to go back to the original studies to gain a more solid and comprehensive overview of all areas investigated during an evaluation. From the description in the templates (Annex 2) we can identify the following general focus of evaluations.

The evaluations looked at the potential of 1:1 teaching for personalised learning (*LMS 4Edubooks* project in Austria), the use of the devices in class and benefits in learning (*Mobile Lernbegleiter im Unterricht*, Austria, the Estonian initiative, *ArdesiaTech* in Italy, the *iPad at Longfield* in UK) and changes in teaching and learning, (*Vzdelani21/Education21* in the Czech Republic, *Cl@ssi 2.0 in Italy*, and *Ordina13* in France). The evaluation of the Irish *Connect School Project* also had a pedagogical focus investigating the daily use of laptops including participation levels in class, attendance rates, and teaching methods developed and students' outcomes. The impact of the use of different devices on students was the focus of the *Learning2Go Project* by the Wolverhampton City Council.

Other initiatives evaluate the pedagogical, organisational and technical impact of the initiative such as *Un collégien, un ordinateur portable* in France, the *Mobile Lernbegleiter* in Austria or the *Escuela 2.0* programme in Spain.

During the German *1000mal1000: netbooks in schoolbags* initiative a comprehensive overall project evaluation was carried out including changes in students' motivation, competence learning processes and changes in test scores across different education levels and school types. Another focus of the evaluation was the analysis of the framework conditions. Analysis of students' outcomes and motivation while using iPads and teachers' opinion on the development of teaching and learning methods was the evaluation focus of the Lithuanian iPad initiative. The impact of the project on raising attainment mainly in core subjects was studied during the evaluation of the UK project *Achieving through Innovation*.

The evaluations of the Portuguese *e-escolinha* focused on social and school level impacts, the use of the computers by various actors and in various contexts, in school, at home and within the community. The view of parents was likewise the focus of the evaluation of the *Acer-European Schoolnet Educational Netbook Pilot* next to collecting evidence on the use of the netbooks by students, teachers and head teachers in various contexts, in and outside of school, and for various purposes such as for educational activities or leisure. The *Notebook for Every Pupil* project in Slovakia also looked at the impact of the project on all relevant actors.

The implementation of the 1:1 initiative in different regions and levels of education was of specific importance in the evaluation of large-scale evaluations such as the Spanish *Escuela 2.0* and the Portuguese *e-escolinha* initiative.

Looking at the focus of the evaluations we can state that there is a lack of evaluation of the project implementation as such. Moreover, evaluation against specific project goals is not an apparent focus of many evaluations. Parents are key stakeholders of the initiative, but are rarely addressed in the evaluations analysed. More insights into the effective management and implementation of 1:1 initiatives are important for the sustainability, mainstreaming or up-scaling of projects.

2.10 Impact

Detailed information on the impact of 1:1 initiatives can only be obtained from original evaluation reports or published academic articles in the field; the latter often provides summaries of the evidence base. As many evaluations are written in the national language and rarely published in English, access to the evidence base remains a difficult endeavour. The following information is based on information input from national/regional authorities and from evaluation reports, when published in English, French, German or Spanish. Overall, evaluations from only 11 initiatives provide results of impact.

2.10.1 Evidence of Impact

Motivation

Almost all studies (e.g. evaluation of *Un collégien, un ordinateur portable* initiative, Lithuanian iPads project, *Ordicollège19*, German initiative) refer to students being more motivated when using the device (e.g. laptop, netbook or iPads or PDA). In the small-scale experimental *ArdesiaTech* project (Italy), the ICT-rich classroom stimulated the active participation of teachers. In the *Un collégien, un ordinateur portable* initiative high usage rates by teachers and students were reported. The Irish evaluation of the *Connect School Project* emphasises that the intervention led to improved participation levels in class, and better school attendance rates, which was a core intention of the project. The evaluation of the *Laptops for students'* project in Estonia, however, showed that the duration of laptop usage decreased in the course of the project and high expectations at the beginning declined towards the end of the project (Luik, Tõnisson & Kukemelk, 2009). In the evaluation of the "Mobile Lernbegleiter" project in Austria (Gutknecht-Gmeiner, Neugschwenter, 2012), students highlighted that the lessons are more interesting and varied, but only 26% of students thought to be more motivated (as opposed to 48% of the teachers). As the study

mentions students were partly not satisfied with the unregular and little use of the netbooks in school by teachers. Despite many positive impacts, such as the application of more varied pedagogical practices (more personalised learning and collaboration), the Austrian evaluation also points to the issue that 61% of the teachers estimate their students to be more distracted when using mobile devices, which requires strategies to handle this.

In the German evaluation teachers report a high level of student motivation at the beginning of the project because of the “newness” effect of the devices as opposed to classes that did not use notebooks. However, the motivation could be maintained in the long term, when the notebooks were regularly used; especially when students were able to work and do exercises independently with learning software giving them immediate feedback. Other positive factors that motivated students were the possibility of carrying out research on the Internet, presenting the results of their work and exchanging more easily with other students.

Learners when using tablet in the *iPad at Longfield* and handheld PDA's in the *Learning2Go Project* in the UK clearly associate the use of handheld devices with learning, both inside and outside school. Moreover they see the devices as supporting effective learning. This perception is not dependent on level of use and persists over time; it is not a novelty effect.

Student-centred learning

A principal goal of the *Connect School Project* (Ireland) was to develop student centred technology that supports an innovative learning culture. In general teachers noted that the interactive multisensory nature of the project was especially useful for weaker and middle band students. The ICT environment including the use of the Virtual Learning Environment (VLE) improved ICT skills and fostered independent learning, although the latter was variable across classes. The German evaluation also found that students using notebooks become more independent learners. The Austrian evaluation of the *Mobile Lernbegleiter* also found that students are more independent learners when using mobile devices as confirmed by teachers and the students themselves.

The evaluation of the Lithuanian iPad project suggests that students received more opportunities for learning because of the mobile character of the device, became more independent in their learning, more responsible and used it at home. Likewise the evaluation of the *Acer-European Schoolnet Educational Netbook Pilot* showed that the fact that the students have ownership of netbooks and can use them after the school day offers extended learning opportunities and educational activities outside official school hours. The capacity of ICT devices such as netbooks to boost learners' motivation, a good class atmosphere and more independent and individualised learning brings added value to every day work in school.

Teaching and learning practices

The new technology rich environment provided teachers in the *Connect School Project* with the opportunity to develop interactive materials. However, the project has been more a technology-driven rather than a pedagogically-led intervention to date.

In *ArdesiaTech Project* (Italy) ICT was used as a means for communication, sharing and exchange. How far the project achieved its initial intentions such as enhancing social relationships, teamwork, cooperation and a decentralisation of the role of the teacher remains to be investigated.

Two studies evaluating the *Magellan* initiative (Silva, 2011) and (Osório, 2012-still ongoing) show that the laptop is used by children in various contexts as a personal tool. In the family context the laptops were mainly used for educational entertainment and communication, writing, drawings, educational games, online encyclopaedias and the Internet for carrying out research. In the classroom, word processing was mainly used for language learning (Portuguese), the laptops were also used in environmental studies, Mathematics and Arts.

Attributes of the PDA associated with effective learning and valued by students in the *Learning2Go Project* include the fact that it facilitates individual, co-operative and interactive work in class;

enables the sharing of ideas and responses and the building of knowledge; increases participation in whole-class settings; and enables learners to revisit areas for consolidation and reflection outside the classroom. This helps to increase understanding and provides opportunities for autonomy and independence.

In the Lithuanian initiative, iPads were rarely used to integrate several teaching subjects and to closely interconnect learning topics to real life.

As well as making learning more exciting for the student, in the *Vzdelani21/Education21* (Czech Republic) laptop use in the classroom helped the teacher to better monitor progress and provide more informed, timely guidance and feedback to students.

During the Austrian *Netbooks in Education* initiative an external evaluation was carried out with a focus on 1:1 pedagogy and implementation. Results of the evaluation, however, were to inform the Ministry of Education and are not publicly available as pointed out by Reinhold Hawle (Austrian Ministry of Education). Erich Herber, who was part of the evaluation team of the Danube University Krems, points out that pupils were able to demonstrate their learning through the device, and that netbooks were partly used for learning outside of school. However, there is little evidence that learning behaviour changed tremendously through the use of netbooks. Also, the project had underexploited adaptable arrangements in the school, e.g. flexible seating positions. The evaluation was carried out using focus groups on didactical and pedagogical issues, additional interviews with teachers and students. The use of netbooks outside school was evaluated using micro-blogging entries. Moreover, the process of implementation was monitored and evaluated. Apart from the equipment in schools, careful planning of didactic scenarios is essential for the success of a learning project (Herber & Waba, 2011).

With the majority of pupils now having the devices, the outcomes from the *iPad at Longfield* initiative (UK), clearly demonstrate the value of iPad as an educational tool and the positive impact on learning and teaching. Students are very positive about the devices and the impact they have on their motivation, ability to research, communicate and collaborate, while staff increasingly exploited the range of educational Apps made available (Heinrich, 2012).

Learning outcomes

The evaluation of the *Learning2Go* initiative (UK) carried out by BECTA, where students used handheld PDA's to support anytime, anywhere learning, showed that the level of use is not associated with overall attainment level. Some high-level users achieved beyond their predicted levels or grades in end-of-key-stage assessments; others did not. Similarly, some low-level users exceeded their predicted attainment levels or grades, and others did not. Unskilled low users do not work out how to operate the devices, nor do they seek out tuition, for example from technicians or other learners; they are more likely to become dependent on others to achieve the minimum level of use required. There is a need to identify these learners and provide support to make sure they know how to operate the device competently.

In the Estonian laptop project evaluation, students' grades were compared with the same period of the previous year (Luick et al., 2009). The authors note that they do not know whether teachers used the same assessment criteria and methods during both periods. The laptop as such is not related to changes in students' grades, it was the use of special study software that brought about positive change. The evaluation also concludes that students with learning difficulties need specific support and guidance in using laptops for educational purposes as they had the tendency to use them for playing games throughout the project implementation period.

Schaumburg et al. (2007), show that there was no difference in test results between the groups of notebook users and non-users in Mathematics. In German (national language), students in a specific school type (*Haupt-und Realschulen*) showed better results.

Parents

Parents have a positive attitude towards using tablets in school, as the Lithuanian project evaluation showed on the basis of head-teachers' impressions. During the *Learning2Go* project (UK) parents signed up to ICT courses as a result of their son/daughter bringing home an IT device. Netbooks in the *Acer-European Schoolnet Educational Netbook Pilot* seemed to have worked as a bridge facilitating parents' involvement in their child's education.

In the *iPad Scotland* pilot (UK), the personal 'ownership' of the device is seen as the single most important factor for successful use of this technology. Parents also appear to become more engaged with the school and their child's learning when the iPad travels home with the student.

Insights from the literature review: Dunleavey, Dextert and Heinecke (2007) comment that "the challenges of teaching in a 1:1 environment can be substantial" as the 1:1 technology can be 'competitive or disruptive'. Studies within the last two to three years have indeed changed their focus, moving away from the role of the teacher to how this impacts on the role of the learner (Penuel, 2006; Valiente, 2010). However, this has to be aligned to the reality that students still intrinsically expect instruction and direction from the teacher as Oscar Valiente points out in the expert interview.

Throughout the literature associated with 1:1 initiatives, there are continuous references to assessment, and there is an ongoing thread that this remains a challenge that is often left unsolved (Bebell & O'Dwyer, 2010). It becomes evident that there is a mismatch between the technology being implemented and the types of assessments that are available to the teacher (Cuban 2006; Rockman 2003).

This suggests that alongside any 1:1 initiative there would need to be an almost experimental approach, it would be hard to envisage how any research could determine how outcomes were affected by the introduction of the technology without control groups. This is asserted by Oscar Valiente (2010).

The earlier implementation of 1:1 initiatives focussed on the technology and getting it in place, but those currently responsible recognise that whilst some projects are surrounded by fragile economies, the initiatives have to be able to justify financial spend and demonstrate how it impacts on student results (Weston & Bain, 2010).

In the ACOT2 programme (2008, p.11), one of the six design principles is the use of 'informative assessment'; this documents that: "Assessments used in the classroom should increase relevant feedback to students, teachers, parents and decision makers and should be designed to continuously improve student learning and inform the learning environment."

In one of the most recent reports on "Technology and Child Development: Evidence from the One Laptop per Child Programme", Cristia et al. (2012) describe how the initiative looked 'to improve learning in the poorest regions of the world through providing laptops to children for use at schools and home.' This programme has been implemented in 36 countries and more than two million laptops have been distributed. The report describes randomised controlled trial evaluation and the data collection that has taken place for this programme and looks in close detail at the implementation in Peru (p.7 – 40,000 Laptops, 500 schools). The conclusions highlight that "limited effects on academic achievement, but positive impacts on cognitive skills and competences related to computer use."

2.10.2 Barriers and Enablers

Only a few initiatives collected evidences in relation to conditions for successful implementation and scaling-up.

According to the evaluation of the Estonian initiative several barriers during implementation were identified. Therefore, teachers' expectations, which were high when laptops were introduced,

diminished towards the end of the project. The following necessary conditions for the successful use of laptops were concluded:

- Rules for laptop usage need to be established, especially when this is a new concept in schools;
- Provision of sufficient computer-based study material;
- 1:1 pedagogy and training of teachers (in-service as well as initial);
- Inclusion of the management in the usage of the devices;
- Ensure technological support.

In addition, the stakeholder (i.e. parental) involvement as well as regular exchange of experience, guidance and consultation by experts and sharing of best practice examples were reported as key enablers in the Austrian *Netbooks for Education* initiatives. Conversely, the following conditions were identified as major barriers to successful and sustainable implementation of 1:1 initiative in the Austrian case:

- lack of implementation strategies;
- unprofitable technology investment;
- lack of flexible teaching scenarios and/or digital content.

In Austria the *Mobile Lernbegleiter* project was a natural continuation of the project *Netbooks in Education*. Participating schools (new and experienced) followed a 10 point action plan when implementing the project in their school considering issues such as: verification of motivation to participate in the project, selection of classes, convince teachers and establish a steering group of teachers in the school, include parents and involve them in the decision making process, agree on rules with students, establish a pedagogical plan for the school using mobile devices.

Moreover, cluster activities, clustering several schools in certain regions, to work and undergo training together and share experiences was an important element to strengthen the capacity of new schools implementing new mobile learning approaches.

During the implementation of the one-to-one schema using the iPad at the *Longfield Academy* (UK), a relevant number of key conditions emerged, that other schools can adopt when starting similar processes. These include:

- Developing a clear vision and strategy for the 1:1 scheme;
- Defining 'your' own learning culture;
- Defining and creating user experience and support model;
- Evaluating 'your' existing position;
- Knowing how many staff and students already own a device;
- Getting everyone involved;
- Getting devices in teachers and learners hand as soon as possible;
- Recording and sharing experiences.

All these points should be developed into a robust structural framework appropriate to the individual school (Heinrich, 2012).

Insights from the literature review: Weston and Bain (2010) describe the 'fertile ground for the creation of new paradigm schools, schools that are self-organizing.' It would seem that there is a growing awareness that the implementation of the technology needs to be seen as only one of the seeds for improvement.

Salerno and Vonhof (2011) write: "Most schools are ill-prepared to enter the 21st century owing to a lack of resources, a dearth of appropriate personnel, and some unrealistic expectations." They outline that schools should consider six 'critical areas' for successful iPad 1:1 implementation; "leadership, cost, network function, security, philosophical frameworks, and pedagogy."

In the *Acer-European Schoolnet Educational netbook pilot* led by EUN, (Vuorikari, et al. 2011, p.45), the research team identified the importance of the school's vision for ICT "to ensure that the netbooks were not a separate experiment." This viewpoint is evident across other 1:1 initiatives and there is a clear understanding to integrate the use of the technologies alongside other developments (Bonifaz & Zucker, 2004).

Insights from the experts' interviews: The experts interviewed identify some areas of impact in the projects they were involved in, the type of evaluations needed when implementing 1:1 initiatives, and lastly discuss remaining barriers in the successful change of practices as a result of 1:1 interventions.

John Kershaw points to changes in teaching and learning: teachers' role shifted to being facilitators in the classroom; students became mentors. Learning itself became more collaborative and project-based and students could select the topics as long as they achieved learning outcomes. In hindsight he regrets students did not use the laptops in assessment: "I wish we had let students (of demonstration schools) use the laptops, this would have allowed us to compare results and see if they were different." Likewise he emphasises that it is very difficult to correlate any improvement with only the 1:1 initiatives, as during the implementation many other improvements were introduced. Moreover, it can take much longer to demonstrate impact: "Students who had laptops by Grade 9 tests at National assessments did have better scores within PISA assessments." As regards the types of studies, he mentions that teachers often face difficulties in evaluating the impact on students' commitment and satisfaction. In Canada there are student "Perception studies" that showed the importance of the programme. It is also very important to appoint somebody for evaluation from the very beginning.

Erich Herber outlines that there is evidence from various projects that they do not achieve their return on investment, that schools start from a low base and need process models and that overall more models are needed based on evidence. He also highlights the more long term possible impacts on lifelong learning.

The investigation of the long-term impacts of large-scale programmes was likewise emphasised by Muñoz-Núñez (Spain), who also calls for in-depth evaluations in the field: "What are for example the effects and real benefits of the use of netbooks when students finish their secondary education and move on to Higher Education?" The final report of the *Escuela 2.0* initiative, which will be available at the end of 2012, will include insights from students, head teachers, teachers and families, who participated in the project. There is also other independent research⁵ carried out in the early stages of the programme by a research consortium of different universities on teachers' perceptions on the programme and the use of ICT in schools. Teachers mainly value the equipment and the opportunity for innovation in their teaching and the professional development opportunities. They are less positive as regards the possible impact on improving students' learning, collaboration among colleagues or communication between parents and the school.

Andrea Karpati considers: "The biggest asset of 1:1 computing is the promotion of educational equity. The tool could be efficiently used in schools of low socio-economic status (SES) regions. Arts and Science projects, dance and music, literature and interdisciplinary approaches can be very well supported by 1:1 computing". She further suggests that 1:1 initiatives using mobile phones should be envisaged for Hungary.

Several experts, point to the existing barriers and type of changes needed in schools in order to implement 1:1 education programmes more effectively and systematically and therefore lay the foundations for pedagogical change and innovation as expressed in the objectives of several 1:1 initiatives.

⁵ http://ntic.educacion.es/w3//3congresoe20/Informe_Escuela20-Prof2011.pdf

Redesigning the curriculum for 21st century learning and changing the traditional assessment methods by allowing students to use the mobile devices in their assessment is emphasised by John Kershaw. The Ministry of Education in New Brunswick (Canada), responsible for the implementation of the laptop programme, recognised that “Innovative teachers and school and students need innovative systems”.

Bruce Dixon points out that schools need models for contemporary learning which is self-directed, inquiry-driven and socially constructive. He also emphasizes that “the challenge when implementing technology-rich learning environments is that if you do not get the fundamental part right, you never get to the pedagogical fireworks”.

3. Summary of findings

3.1 Key points from the analysis of 1:1 initiatives in Europe

The report identified 31 recent 1:1 initiatives from 19 European countries. These cover large scale initiatives involving a large number of students, e.g. up to 600,000 as in Portugal or Spain, (or Turkey, which will expand the pilot to all schools in 2013-2014), and other nationwide initiatives involving fewer students, but equipping schools across the entire country, such as in Georgia (60,000 students) and Cyprus (23,000 students). Medium-scale initiatives can be found in various regions in Italy or France, where respectively 10,000 and 19,000 students are involved in a 1:1 initiative. Small-scale initiatives analysed in the report still involve between 100 and 1,000 students and can be found in Austria, the Czech Republic, Italy, Sweden and UK.

The main beneficiaries of 1:1 initiatives are the students and teachers, who received laptops and netbooks in most cases, and in some cases, tablets. Only a small number of projects provided students with smartphones. Likewise, most of the initiatives provided additional equipment to schools, such as interactive whiteboards or video projectors, or WiFi access. Eight of the initiatives covered primary and secondary education, six covered primary education only, and fourteen initiatives are aimed solely at secondary education.

In general, more than half of the initiatives are linked to a national or a regional ICT strategy. Thus, national and/or regional authorities are often the main initiators of 1:1 initiatives, especially those of a larger-scale, and are also often involved in the implementation process. Only a few initiatives are solely initiated by industry. Industry rather plays a role in the implementation phase of the project as part of a public-private partnership to equip schools with the devices; less so in providing training and ongoing support. The initiatives illustrate three main approaches of implementation. The majority of initiatives are based on top-down approaches or a mix of top-down and bottom-up approaches. A few initiatives relied solely on a bottom-up process, reflecting the degree of active involvement by the schools themselves in the process. In only one third of initiatives head teachers, school or ICT coordinators play an active role in the implementation process. Parents are mentioned to an even lesser extent as actors in the implementation process.

Half of the initiatives are up-scaled or mainstreamed; the three types of mainstreaming model are as follows:

1. Large scale, nationwide initiatives that are from the very beginning part of a mainstreaming programme: the equipment was gradually provided to schools throughout the country.
2. Extension of existing pilot projects: more devices will be given to more students in the same school at different education levels and/or to other schools in other regions during a second phase of the project.
3. The emergence of new co-existing 1:1 initiatives: these are not necessarily complementary and not part of a coordinated mainstreaming approach.

There are three main financing models emerging from the analysis. Full financing (e.g. by the state or local authority), co-financing involving the state, local authorities and other stakeholders such as parents, and finally the free provision of equipment by industry.

In most of the initiatives, students own the device for their activities in and out of school, in other cases the equipment is owned by the schools, and in a few initiatives the Ministry of Education owns the devices and lends them to schools.

The idea that a 1:1 learning model will lead to pedagogical change and innovation is a stated objective in the majority of the 31 1:1 initiatives. Another key focus of initiatives is to address economic inequalities by improving access to ICT for students and promoting e-inclusion on a more general level. A smaller number of initiatives, around one third, aim to improve students' ICT skills and motivation, or to expand ICT provision in schools by further reducing computer-per student

ratios. Various initiatives state the home use of devices as a primary objective next to using the devices at school.

Policy support is provided as part of national 1:1 initiatives and can include providing guidance to students and parents, logistics support, and training. There are a variety of support strategies at school level, with the majority of initiatives appointing a school coordinator to support other teachers. Alternatively, schools organise workshops, seminars and training with the help of external experts. Industry level support is marginal in the initiatives analysed, and suppliers primarily provide technical support to schools via standard helpdesks.

The findings arising from this analysis show the existence of various actors organising different types of training, ranging from self-organised training sessions by the schools, external training provided by local and/or national administrative authorities, specialised centres or universities, or by the technology companies that equipped the schools.

Most of the initiatives analysed were evaluated or are about to be evaluated, as many projects included in this analysis are recent or ongoing and evaluation results are not yet available. The main actors of the evaluation are in most cases universities, which carried out independent evaluations. In general, the evaluations are single interventions towards the end of the project. Except in one case, no long-term evaluations have been carried out.

The focus of the evaluations and evidence of impact vary greatly between the initiatives analysed. Overall, evaluations of just 11 initiatives provide results of impact and with different levels of detail. The evaluations examined the use of the devices in class, changes in teaching and learning, impact on students' behaviour, and outcomes in test results.

Almost all studies refer to students being more motivated when using the devices. Studies also show a positive impact on student-centred learning and evaluate the impact on teaching and learning practices. There are a few evaluations highlighting the impact on learning outcomes of students and the role of parents throughout the project as well as identifying enablers and barriers.

3.2 Key points from the literature review

The review of the literature shows that there is a growing number of research studies looking specifically at 1:1 initiatives, with a focus on implementation studies and outcome studies on 1:1 programmes (e.g. Argueta, Huff, Tingen & O'Connell, 2011; Queensland Government, 2011). At the time of writing this review, there are various examples of sustained large-scale, long-term projects documented within the literature review (e.g. Alberta Education School Technology Group, 2010; Bakia, Murphy, Anderson & Trinidad, 2011). However, there is still a limited number of studies that look into the deeper learning practices of students using their own devices (e.g. Fried, 2008; Holcomb, 2009) or testing the links between hypothesised outcomes for 1:1 initiatives and different implementation measures, such as teacher training (Valiente, 2010).

There are limited references to finance models, but this is perhaps because some projects have been reluctant to showcase their costs (e.g. eLearning Foundation, 2012). For instance, Bjerred, and Bondi (2012) provide some experiential classroom evidence and insight contributing to the ongoing conversation taking place about the use of these devices in schools. Thanks to new business models that make devices and connectivity more affordable than ever and to the sweat equity contributions of everyone involved, they present this "guerrilla research" project has yielded interesting outcomes at a cost of less than \$200 per student per year (by amortizing the cost of the device over three years). Dixon and Tierney (2012) stimulate the discussion about which questions should be addressed when considering allowing students to bring their own devices, and which option might be best suited to a school or system's culture.

Sustainability and future implementation have also been continually addressed in the literature as part of the reflective work of some of the key authors (ACOT2, 2008; Penuel, 2006; Salerno & Vonhof, 2011; Silvernail & Lane, 2004; Valiente, 2010). For example, Weston and Bain (2010)

argue that both advocates and critics must “take on the big questions about scalable and sustainable change.” They present a case for embedding the use of technology within the learning and teaching environment so that technology becomes implemented into the curriculum.

By the time of undertaking the literature review, there are a growing number of emerging 1:1 initiatives that should recognise the unique opportunities that need to be communicated as a commitment to sustainable change that is systemic and underpinned by pedagogical values (e.g. Greaves et al., 2011).

Reports point to the fact that technology alone is not enough. It will demand clear co-ordination and understanding of the potential content that both teachers and students need access to. In essence, whilst the goals and intentions may be to introduce a 1:1 initiative and equip every student and teacher with a device, it is necessary to be able to define educational principles and a strategy in order to proceed with the project (e.g. Bannister, Balanskat & Engelhardt, 2013; Vuorikari, Garoia & Balanskat, 2011).

There is a distinct need for the research community to report on 1:1 initiatives further (e.g. Intel, 2011) and to be involved with the evaluation from the very beginning (e.g. Burden et al., 2012; Faggioli et al., 2012; Heinrich, 2012). The literature review of 1:1 initiatives is challenging because researchers all document the same initiatives, rather than being able to select from a huge research field (Penuel, 2006; Valiente, 2010). However, it demonstrates that the future success of 1:1 initiatives is dependent on embedding the use of the technology within the learning environments of the student (see also New South Wales Government's Digital Education Revolution, 2010). To some extent the authors are able to conclude that this will only ever be achieved by starting to apply the existing evidence to new projects.

Up-scaling and sustainability has to be an ongoing focus, long before any initial implementation. This is a complex issue because of the changing technologies. It impacts on all the other areas beyond the provision of devices, i.e. continuing professional development, resources, and learning and teaching.

The research and impact of 1:1 initiatives within the learning environment needs to be documented more widely (e.g. Dunleavy, Dexter & Heinecke, 2007; Herber & Waba, 2011). Evidence needs to be shared and made relevant to others. Practitioners need to increase research capacity, develop resources and embed research at the very beginning of 1:1 initiatives and as an ongoing activity throughout the project, rather than just at the end.

3.3 Key points from the validation workshop

1:1 education experts from Ministries of Educations, research and industry involved in the design, implementation or evaluation of 1:1 initiatives as well as other organisations (e.g. foundations or schools) discussed the main findings of the study, the analysis of 1:1 initiatives, and the literature review. Moreover, selected national and international experts gave interventions around 1:1 topics from a specific perspective, such as the “U.S. The Irving, Texas, Technology immersion” 1:1 initiative, “The nationwide Escuela 2.0” initiative and the involvement in the “ACER-European Schoolnet educational 1:1 netbook/tablet” pilots (policy perspective), “The Connect project” in Ireland (evaluation perspective) and “1:1 and mobile learning initiatives at UNESCO” (institutional perspective).

In interactive group sessions key questions related to the implementation, evaluation and up-scaling of 1:1 initiatives were discussed by participants. As a result of the discussions, recommendations were drafted and agreed upon by participants.

Discussions are summarised according to the following key themes combining in some cases several questions.

3.3.1 Up-scaling and the role of stakeholders

Workshop participants agreed that whereas the technology as such can be up-scaled, pedagogy that supports 1:1 learning needs to be “cultivated” or developed. Crucial factors for up-scaling include considering those elements from the pilot that are to be implemented system-wide and to create a framework (objectives, guidelines, tools, knowledge) for system-wide transfer of innovation and incremental change of pedagogical practice. Within the process of up-scaling, incentives for teachers and the need for facilitators should be acknowledged.

A variety of stakeholders play an important role in this process, the government with its responsibilities for ICT policy and vision, funding, curriculum, assessment, and teacher training. Teachers have a special responsibility as regards the welfare of students and to facilitate their learning process. Teachers need to be trained, open to change, part of a team and accountable within the process of implementing 1:1 initiatives. School leaders have a strategic role in leading and managing the innovation process and creating capacities within the school. Participants also highlighted the importance of including parents in the process as they are committed to children’s well-being, learning, and development. Industry should align products and services to the needs of the educational community and ensure high quality. Research likewise needs to be of high quality, relevant, and appropriately disseminated in order to support the process of implementation.

3.3.2 Sustainable finance and business models

Sustainable planning for investment requires a model that has both cost and value dimensions. Value propositions should be built around human capital and technology as well as the competencies and commitment of the people within an organisation (e.g. fostering distributed leadership and credentials). Secondly, they should entail an understanding of organisation capital and technology (e.g. leadership strategies, culture of the school) and lastly, they should include an understanding of information capital and technology (e.g. robust IT infrastructure and support systems).

3.3.3 Supporting students and teachers

Participants agree that 1:1 initiatives have to have a pedagogical focus drawing on learning and evidence of what works. Pedagogical learning scenarios should outline how digital devices can be used to support a plethora of learning strategies.

The teacher is key to guide the learners’ experience in a technology rich environment, e.g. in helping him/her to be autonomous. A change of teaching practice is therefore necessary. The system in which the teacher operates should give encouragement and recognise teachers’ work within a 1:1 learning context. Peer-led training, learning, and project participation should be the focus of advanced professional development supported by online content, tools and platforms. The curriculum, which has already been reformed in many European countries, should favour more active learning and constructivist approaches, regardless of 1:1 approaches. Assessment, which is still more traditional in many countries, could be changed in terms of content and format. In Denmark students’ access to the Internet during exams is piloted.

3.3.4 The impact on informal and non-formal learning

The role of informal learning enabled by 1:1 has to be acknowledged and the potential of using devices out of schools needs to be supported by policy makers and practitioners. This means to tackle questions related to dissolving boundaries between the more formal and informal/or non-formal learning spaces, giving up control but more responsibility to students, and studying possible shifts in learning behaviour. Likewise, 1:1 initiatives can help to re-engage marginalised learners and develop 21st century skills. A knowledge base on informal learning spaces could include the development of new scenarios that expand outside classroom teaching such as activity based learning, project based learning and study visits. 1:1 initiatives need to be complemented with stakeholder and parental involvement to foster the sharing of information and transparency of the learning process.

3.3.5 Bring Your Own Device

Participants highlighted that there are substantial differences between countries as to whether students can bring their own devices (e.g. as in Denmark or Switzerland) to the classroom or not. Moreover, there are many issues related to it. These range from questions around the school infrastructure (internet connection, access points, using the cloud), compatibility issues between different devices and software, to equity issues and the use of the devices for assessment. Finally, there are some questions around who has responsibility and control of the device (teacher, learner or school).

3.3.6 The role of research and evaluation

The discussions around what type of research and evaluations are vital to the success of future initiatives highlighted the need for more qualitative action research and observation based approaches, research that is formative and ongoing and evaluating competencies rather than knowledge. Evaluating the impact of ICT on the learning process is more important than looking at the infrastructure and technology based indicators. Moreover, research on ICT in general should explore new fields (e.g. neuroscience), such as the effectiveness of multitasking or the impact of ICT on concentration.

4. Conclusions and Recommendations

Based on the evidence gained from the different parts of the study, namely the analysis of 1:1 initiatives, the literature review, insights from the experts interviewed, and the validation exercise with experts in the workshop, the following recommendations are given. They relate to the core objectives and themes of the report and are addressed to the main stakeholders involved in 1:1 initiatives, policy makers, schools, research and industry.

4.1 Implementation strategies and up-scaling

4.1.1 Models and practices for sustainability and up-scaling

With more than half of the initiatives mainstreamed and eight with plans for up-scaling, there are indications that we are on the threshold of the 1:1 learning model becoming part of mainstream education.

More detailed insights and evidence is needed on effective implementation processes (what worked, what did not work, and under which conditions), and effective models and practices for sustainability, mainstreaming and up-scaling. As experts have pointed out, mainstreaming and up-scaling efforts require consideration of pedagogical cultures, the building of teachers' networks, and creating incentives for teachers. Clear implementation strategies -based on evidence-based research- are needed to make mainstreaming of initiatives both sustainable and effective.

- ➔ Change must be systemic and underpinned by pedagogical values.
- ➔ A flexible framework should be created, which contains objectives, guidelines and tools for system-wide transfer of innovation and incremental change of pedagogical practice.
- ➔ Pedagogy that supports 1:1 learning needs to be “cultivated” or developed and incentives for teachers to “buy in” should be provided. Up-scaling needs to be based on evidence and is dependent on individual and social practices, regardless of technology.

4.1.2 Involvement and collaboration between all stakeholders

Based on the overall analysis and findings, it can be concluded that a variety of stakeholders need to be included in the process of 1:1 initiatives in order to successfully them. Parents need to be engaged in order to oversee their children's work in the wake of a 1:1 initiative. Experts point out that parents are also the most critical stakeholder group as regards investment and security. Head teachers have a crucial role in promoting a transformative framework for teaching and learning. Their role could be further explored to shed light on their concrete contribution to and impact on successful 1:1 project implementations, which impose a number of financial, organisational, technical and training issues on schools. Industry could also be more involved as part of the implementation process by providing tools, e-content/e-books and training. There could be, for example, more collaboration between hardware and software developers and publishing houses.

- ➔ A variety of stakeholders should be involved in the implementation of 1:1 education programmes, such as commercial suppliers, local sponsors and the community, parents and head teachers, and increase exchanges between these stakeholders to encourage wider collaboration in this area.

4.1.3 Sustainable finance and business models

Business models for 1:1 initiatives should contain both cost and value dimensions. Value propositions should be built around human capital and technology, and the competencies and commitment of the people within an organisation (e.g. fostering distributed leadership and credentials). Secondly, they should demonstrate an understanding of organisation capital and technology (e.g. leadership strategies, culture of the school). Lastly, they should include consideration of information capital and technology (e.g. robust IT infrastructure and support systems).

There is consensus among some experts that the co-financing model in the provision of devices, where parents and/or schools take responsibility, offers a more promising long-term prospect and the possibility to make 1:1 an ongoing programme.

- Sustainable planning for investment requires a model that has both cost and value dimensions. Policy makers should consider long-term investment.
- Co-financing models in the provision of devices offer a more promising long-term prospect and the possibility to make 1:1 an ongoing programme.

4.2 Teaching and Learning

4.2.1 1:1 Pedagogy

1:1 initiatives have to have a pedagogical focus which draws on learning and evidence of what works. The role of informal learning enabled by 1:1 has to be acknowledged and the potential of using devices out of schools needs to be supported by policy makers and practitioners.

Teachers can offer key guidance to learners in a technology-rich environment: a change of teaching practice is therefore necessary. Likewise, assessment and curricula need to be aligned with 21st century learning

- Pedagogical learning scenarios should outline how digital devices can be used to support a plethora of learning strategies.
- Assessment should be formative and also take into account new competencies as potentially acquired by learning with technology.
- A knowledge base on informal learning spaces could include the development of new scenarios that expand outside classroom teaching, such as activity-based learning, project-based learning and study visits.

4.2.2 1:1 Personal learning environments

Experts commonly highlight the importance of allowing students to use and familiarise themselves with the devices in other informal and non-formal learning environments, e.g. at home. In schools where devices are only provided within one level of education, the transition between levels of education and students taking responsibility for the device over a longer timeframe is a particularly important area of further exploration. In this context, how long students usually own the device in a 1:1 programme, and how this affects the learning process could be further investigated.

- Students' ownership of the device is important if they are to take responsibility for the device, and essential if they are to create a personal mobile learning environment that spans formal, informal and non-formal learning settings.
- Bring your own device (BYOD) requires consideration of the school infrastructure, a minimum standard for software, equity issues and the use of the devices for assessment.

4.2.3 Training and support

Though the analysis identified a number of different training and support models during 1:1 interventions, it gave no indication of which type of training and support is best suited to teachers. However, experts agreed on a number of training provisions that were useful for teachers during specific 1:1 initiatives, such as school-based support, training that is school-based, ongoing, and part of an overall learning plan. Blended learning is more and more frequently practiced. Early familiarisation with the equipment by teachers is crucial. Experts agree that peer support and peer learning among teachers is essential.

Future areas of investigation should include how far online support strategies, blended learning approaches, and communities of practice contribute to successful teacher training. More insights are needed on how 1:1 learning pedagogies can be developed and supported by training measures.

- ➔ Effective training and support mechanisms include early familiarisation with the equipment, ongoing school-based support and training, blended learning and peer learning among teachers. Staff access to equipment can encourage dialogue and opportunities to share practice. 1:1 programmes should be integrated within an overall learning plan.
- ➔ Training should focus on helping teachers integrate technology into their instruction.

4.2.4 Research and evaluation

Access to the evidence base of national evaluations remains difficult as these are mainly compiled to inform national policy making and are not widely published in English in academic research journals. More insights are needed on the impact of 1:1 initiatives on teaching and learning practices. To date, evaluation which focuses on project implementation as such is largely lacking. Moreover, evaluation against specific project goals is also lacking. Parents are key stakeholders of the initiative, but are rarely addressed in the evaluations analysed. Evidence of effective management and implementation of 1:1 initiatives is important for the sustainability and mainstreaming of projects.

There is still a lack of studies that look into the deeper learning practices of students who use their own devices or studies that test the link between hypothesised outcomes for 1:1 initiatives and different implementation measures.

- ➔ Access to national evaluation results should be more commonly shared.
- ➔ Evaluation should be designed from the very beginning of a 1:1 initiative, with a designated institution or individual taking responsibility.
- ➔ Research should explore new impact areas such as evidence of effective implementation strategies, learning practices or possible long-term impacts of 1:1 initiatives on lifelong learning.
- ➔ Research should be more qualitative, formative, competence and outcome-based.
- ➔ Research should involve teachers in action-based research and involve observations.

References

- ACOT2 – *Apple Classrooms of Tomorrow – Today: Learning in the 21st Century*. Background Information (April 2008). Retrieved from: <http://bit.ly/13oYDej>
- Alberta Education School Technology Group. (2010). *Emerge One-to-One Laptop Learning Initiative: Final Report* (pp. 1–99). Alberta, Canada: prepared by The Metiri Group and the University of Calgary for Alberta Education, School Technology Sector. Retrieved from <http://www.education.alberta.ca/admin/technology/emerge-one-to-one.aspx>
- Argueta, R., Huff, J., Tingen, J., & OCorn, J. (2011). *Laptop Initiatives: Summary of Research Across Six States* (pp. 1–20). North Carolina, USA. Retrieved from <http://bit.ly/1aH7OCC>
- Bakia, M., Murphy, R., Anderson, K., & Trinidad, G. E. (2011). *International Experiences with Technology in Education: Final Report* (pp. 1–278).
- Balanskat, A. & Garoia, V. (2010). *Netbooks on the rise: European overview of national laptop and netbook initiatives in schools*. Brussels: European Schoolnet.
- Bannister, D., Balanskat, A., & Engelhardt, K. (2013). *Developing Practical Guidelines for 1:1 Computing Initiatives* (p. 48). Brussels, Belgium. Retrieved from http://files.eun.org/netbooks/1to1_Practical_Guidelines_EN.pdf
- Baumgartner, P., Waba, S., & Herber, E. (2010). New learning and teaching models emerging from 1-to-1 computing. *International Conference on 1-to-1 Computing in Education: Current Practices, International Comparative Research Evidence and Policy Implications*. Vienna, February 22–24, 2010. Retrieved from <http://nml.bmukk.gv.at/?site=programm>
- Bebell, D. & O'Dwyer, L.M. (2010). *Educational Outcomes and Research from 1:1 Computing Settings*. *Journal of Technology, Learning and Assessment*, 9(1). Retrieved from <http://www.jtla.org>
- Bjerede, M., & Bondi, T. (2012). *Learning is personal. Stories of Android tablet use in 5th grades schools* (pp. 1–47). Retrieved from <http://bit.ly/19s4OD1>
- Bocconi, S., Kampylis, P., & Punie, Y. (2013). Framing ICT-enabled Innovation for Learning: the case of one-to-one learning initiatives in Europe. *European Journal of Education*, 48(1), 113–130. doi: 10.1111/ejed.12021
- Bonifaz, A. & Zucker, A. (2004). *Lessons learned about providing laptops to all students*. Newton, MA: Education Development Centre.
- Burden, K., Hopkins, P., Male, T., Martin, S., & Trala, C. (2012). *iPad Scotland Evaluation* (pp. 1–117). Retrieved from <http://www.janhylen.se/wp-content/uploads/2013/01/Skottland.pdf>
- Cristia, J., Cueto, S., Ibararán, P., Santiago, A., & Severín, E., (2012). *Technology and Child Development: Evidence from the One Laptop per Child Program*. Inter-American Development Bank. Retrieved from <http://bit.ly/17CsBlh>
- Cuban, L. (2006, October 18). Commentary: *The laptop revolution has no clothes*. *Education Week*, p. 29.
- Dixon, B., & Tierney, S. (2012). *Bring Your Own Device To School* (pp. 1–16) Microsoft Corporation.
- Dunleavy, M., Dexter, S., & Heinecke, W. (2007). What added value does a 1:1 student to laptop ratio bring to technology-supported teaching and learning? *Journal of Computer Assisted Learning*, (23), 440–452. Retrieved from <http://bit.ly/17aOGIq>
- eLearning Foundation. (2012). *Model of delivering a 1:1 programmes*. Retrieved from <http://www.e-learningfoundation.com/options>
- Empirica. (2006). *Benchmarking Access and Use of ICT in European Schools*. Empirica, 2006. http://ec.europa.eu/information_society/europe/i2010/docs/studies/final_report_3.pdf

- Faggioli, M., Caresia, G. A., Di Stasio, M., Moscato, G., Nulli, G., Staderini, G., Tosi, L., et al. (2012). *Ardesia Tech* (p. 72). Retrieved from <http://bit.ly/13oXWSq>
- Fried, C. B. (2008). In-class laptop use and its effects on student learning. *Computers & Education*, 50(3), 906–914. doi:10.1016/j.compedu.2006.09.006
- Galvin, C., Coates, D. & Murray, T. (2010). *Evaluation of the CONNECT School Project*, final report. South Dublin County Council, Ireland.
- Goktas, Y & Yildirim, Z (2003). *A comparative analysis of the EU countries' and Turkey's integration of ICT in the primary education curricula and teacher education programs*, Turkey. Retrieved from <http://www.leeds.ac.uk/educol/documents/00003490.htm>
- Greaves, T., Hayes, J., Wilson, L., Gielniak, M., & Peterson, R. (2011). *The Technology Factor: Nine Keys to Student Achievement and Cost-Effectiveness* (pp. 1–180). Brunswick, Maine. Retrieved from http://pearsonfoundation.org/downloads/ProjectRED_TheTechnologyFactor.pdf
- Gutknecht-Gmeiner, M., & Neugschwenter, M. (2012). *Mobile Lernbegleiter im Unterricht 2011-2012, Evaluationsbericht*, Wien, May, 2012.
- Heinrich, P. (2012). *The iPad as a Tool for Education. A study of the introduction of iPads at Longfield Academy, Kent (UK)*. Nottingham, UK. Retrieved from <http://www.naace.co.uk/publications/longfieldipadresearch>
- Herber, E., & Waba, S. (2011). It's not a netbook – it's a lifestyle! How could mobile technologies be used didactically to bridge formal and informal learning? In K. Rummler, J. Seipold, E. Lübcke, & N. Pachler (Eds.), *Mobile learning: Crossing boundaries in convergent environments* (pp. 81–84). Bremen, Germany: London Mobile Learning Group. Retrieved from <http://bit.ly/1aH5WR5>
- Holcomb, B. L. B. (2009). Results & Lessons Learned from 1:1 Laptop Initiatives: A Collective Review. *Technology Trends*, 53(6), 49–56.
- Intel. (2011). *Portugal Transforms Primary Education with 1:1 Technology Integration*. Retrieved from <http://intel.ly/15o2v0y>
- Kraemer, K. L., Dedrick, J. & Sharma, P., (2009). *One Laptop per Child vs. reality*. Communications of the ACM, 52(6), 66–73. Retrieved from <http://bit.ly/19s60ep>
- Naismith, L. Lonsdale, P. Vavoula, G. & Sharples, M. (2006). *Literature review in mobile technologies and learning*. Bristol, UK: Futurelab. Retrieved from http://www.futurelab.org.uk/research/lit_reviews.htm
- New South Wales Government's Digital Education Revolution, (2010). *One-to-One Computers in Schools. Literature Review* (p. 20). Retrieved from <http://bit.ly/116jekB>
- Osório, A. J. (2012 - ongoing). *Educational use of Magalhaes computer in primary level in the Northern region of Portugal (Utilização educativa do computador Magalhães no 1º ciclo no Norte de Portugal)*. Universidade do Minho. Project website <http://pigafetta.ie.uminho.pt/>
- Pedro, F. (2009). *Is technology use related to educational performance? Evidence from PISA*. OECD CERI. Retrieved from <http://bit.ly/ZK8rIT>
- Penuel, W. (2006). *Implementation and effects of 1:1 computing initiatives: A research synthesis*. Journal of Research on Technology in Education, 38(3), 329–348.
- Luik, P., Tõnisson, E. & Kukemelk. H. (2009). *Laptops for Students, Research Project in Estonia*. University of Tartu <http://bit.ly/ZxB1XM>
- Queensland Government (2011). *21 steps to 21st Century 1-to-1 success* (pp. 1–16). Australia. Retrieved from <http://bit.ly/11sCecO>
- Rockman, S. (2003). *Learning From Laptops*. Retrieved from <http://rockman.com/Articles.htm>

- Salerno, M. & Vonhof, M., (2011). *Article on starting iPad 1to1 program*. Retrieved from <http://thejournal.com/articles/2011/12/14/launching-an-ipad-1-to-1-program-a-primer.aspx>
- Schaumburg, H., Prasse, D., Tschackert, K., & Blömeke, S. (2007), *Lernen in Notebook-Klassen. Endbericht zur Evaluation des Projekts 1000 mal 1000: Notebooks im Schulranzen*, Germany, Schulen ans Netz. Retrieved from <http://bit.ly/133wuZU>
- Silva, P. (coord.) (2011). *O computador Magalhães entre a escola e a família num Agrupamento de Escolas de Leiria: um olhar sociológico sobre os seus efeitos*. Centro de Investigação Identidade e Diversidade. Instituto Politécnico de Leiria.
- Silvernail, D., & Harris, W.J. (2003). *The Maine Learning Technology Initiative: Teacher, Student and School Perspectives. Mid-Year Evaluation Report*. Retrieved from <http://www2.umaine.edu/mepri/sites/default/files/mltimidyearevalreport.pdf>
- Silvernail, D., & Lane, D. (2004). *The impact of Maine's one-to-one laptop program on middle school teachers and students (Research Report #1)*. Gorham, ME: Maine Education Policy Research Institute. Retrieved from <http://bit.ly/142a79X>
- Valiente (2010). *1-1 in education: Current practices, international comparative research evidence and policy implications*. OECD working papers, No.44, OECD Publishing. Retrieved from http://www.oecd-ilibrary.org/education/1-1-in-education_5kmjzwfl9vr2-en
- Vuorikari, R., Garoia, V., & Balanskat, A. (2011). *Introducing Netbook Pedagogies in Schools. Acer - European Schoolnet Educational Netbook Pilot*. European Schoolnet (Belgium). Retrieved from http://files.eun.org/netbooks/Acer_Netbook_Study.pdf
- Weston, M. E. & Bain, A. (2010). *The End of Techno-Critique: The Naked Truth about 1:1 Laptop Initiatives and Educational Change*. *The Journal of Technology, Learning, and Assessment*, 9(6). Retrieved from <http://www.jtla.org>

Annex 1: Experts Interviewed

Interviews with international experts were carried out by Diana Bannister (University of Wolverhampton), Riina Vuorikari and Anja Balanskat (European Schoolnet) during March 2012.

Roberto Carneiro is a former Portuguese Minister of Education (1987-91). He is currently a professor at the Portuguese Catholic University (School of Human Sciences, School of Education, School of Management), where he also chairs the Study Centre on Peoples and Cultures and is Dean of the Institute for Distance Learning. He is President of the Observatory of the Technological Plan for Education.

Bruce Dixon is the co-founder and Director of “IdeasLAB”, a non-profit organisation based in Australia, aiming at changing the way of learning and teaching and finding new ways to take technology into the classroom. He is also co-founder and president of the non-profit organisation Anytime Anywhere Learning Foundation, based out of Seattle (U.S.A.) He led the development of the first 1:1 initiatives in the world, in schools across Australia. He consults to schools, School Districts, Education Departments, Ministries of Education as well as technology companies such as Microsoft, HP-Compaq, Apple, Bertelsmann and Toshiba on 1:1 teaching and technology in education.

Reinhold Hawle is Head of Department, IT Systems for Educational Purposes, at the Federal Ministry of Education, Science and Culture in Austria. He is responsible for the creation of national and European educational servers and networks and resource planning of hardware and software for education, coordination of data security for school computers, multimedia applications and the use of new technologies in class. He was involved in the 1:1 initiative *Netbooks in Education*.

Erich Herber is a researcher in the field of Educational Technology at Danube University Krems and specialised in mobile learning technologies and scenarios. He has worked on studies on 1:1 educational computing and was involved in the evaluation of the netbook pilot project in Austria, initiated by the Ministry of Education. He focuses his 1:1 computing research particularly on implementation and support processes (from an educational governance perspective), and also worked on ICT infrastructure analysis and ICT benchmark indicators in education.

Andrea Karpati is Professor of Education, Head of Centre and UNESCO Chairholder at the Centre for Science Communication and UNESCO Chair for Multimedia in Education at ELTE University, Faculty of Science in Hungary. Commissioned by INTEL Hungary, she co-ordinated a joint research project of ELTE and Szeged University on the evaluation of the effects of the first large-scale introduction of Classmate laptop computers in Hungarian education between 2007 and 2009. The team plans a participant evaluation study to follow the next 1:1 initiative to be launched in September 2012.

John Kershaw is the Former Deputy Minister of Education in New Brunswick, Canada where he lead a team responsible for designing a 21st Century learning agenda and the 1:1 laptop programme. He is currently the President of 21st Century Learning Associates and President of C21Canada.

Bette Manchester is President of the Maine International Center for Digital Learning. The former teacher, elementary, middle and high school principal and director of special education served, for seven years, as Director of Special Projects in the Maine Department of Education leading the Maine Learning Technology Initiative. Since 2001 the Maine project has focused on ‘learning,’ not on the technology.

Agustín Muñoz Núñez works as a pedagogical advisor in the Ministry of Education in Spain in the unit implementing ICT policies for education, namely INTEF. The INTEF was involved in the design of the nationwide ICT plan for schools *Escuela 2.0*. He coordinated Spanish pilot schools participating

in the *Acer-European Schoolnet Educational Netbook Pilot* and the *Acer-European Schoolnet Tablet Pilot*.

David Whyley has over 30 years' experience as a teacher and educationalist in the City of Wolverhampton and as part of the e-Services team has the role of Headteacher Consultant - Learning Technologies for the City. David specialises in developing new ways of learning and teaching integrating a wide range of the latest technologies such as e-books, mobile devices and learning platforms. He is a lead member of the award winning innovative Wolverhampton "Learning2Go" mobile learning initiative and holds an Honorary Doctorate of Technology by Wolverhampton University.

Oscar Valiente formerly worked for the OECD as a consultant in the Centre for Educational Research and Innovation (CERI). His work focused on students' use of ICT in education and its effects on the development of 21st century skills. He carried out overviews and research on 1:1 initiatives as part of the New Millennium Learners project of the OECD. He now works for the Sussex University, where he is also looking at developing countries such as Latin America and Africa.

Annex 2: Initiatives by Country

Austria

Netbooks in Education	
Timeframe	2009-2010
Objective	The primary objective of this initiative was to enhance 1:1 pedagogy in education as well as to increase the use of mobile devices by means of netbooks.
Short description	This 1:1 computing initiative was designed as a “pilot project”. During Phase 1 Pilot Project, 120 students of 6 selected schools were equipped with a netbook for their own personal use. The netbooks allowed students to be connected to the Internet anytime and to have access to learning resources inside and outside school, e.g. at home.
Context	
ICT policy context	This activity matches the aims of federal education policy by improving 1:1 pedagogy in Austrian schools and the development of sustainable 1:1 computing.
Rationale behind the initiative	An important rationale of this pilot was to collect hands-on experience from early-adopters of 1:1 computing as well as evidence for future follow-up initiatives (e.g. project <i>Mobile Lernbegleiter im Unterricht</i>).
Scope	
Target audience	Students and teachers of 6 pilot schools in secondary education.
Number of schools	<ul style="list-style-type: none"> Phase 1 Pilot Project: Sept. 2009 - Feb. 2010: 6 schools. Focus: introduction & new developing methodological approach; Phase 2 Extended project: March 2010 - June 2010: 9 schools. Focus: data collection for research on 360° learning lifestyle; Phase 3 Dissemination: Sept. 2010 - June 2011: 20 additional schools. Focus: dissemination educational governance educational scenarios.
Age range and levels of education	14-18 years old (secondary education).
Geographical coverage	National (Vienna, Upper Austria, Lower Austria, Salzburg, Vorarlberg).
Organisation and implementation	
Initiator	Austrian Ministry of Education Bundesministerium für Unterricht, Kunst und Kultur.
Actors involved	Danube University Krems provided scientific support (monitoring/evaluation). Microsoft provided computers (netbooks) and software. A1 provided Internet connection.
Strategies for implementation	The Ministry of education coordinated the pilot project and provided support with respect to technology offers, purchasing mechanisms and contracting issues (e.g. mobile contracts) to achieve a better cost and use relation in the project. The process of implementation was supported through regular exchange of experience within the pilot group (by means of workshops, regular group meetings and discussion groups) as well as through consultation of experts.
Strategies for mainstreaming and up-scaling	An important rationale of this pilot was to collect hands-on experience from early-adopters of 1:1 initiatives to extract strategies for future implementation policies and projects (e.g. project “Mobile Lernbegleiter im Unterricht”). For this purpose, the process of implementation was monitored by the scientific partner and relevant experience consolidated in a final study report (from an educational governance perspective).
Equipment and infrastructure	
Number and type of devices	Internet Netbook Q10Air+ (4 schools). Diverse other netbook types (2 schools).
Additional equipment and infrastructure development	Mobile Internet (for each netbook).

Ownership of equipment	Private ownership (5 schools) School ownership (1 school)
Costs	
Financing model	Purchase model: financed by parents (1 school) / by school (1 school). Leasing model: financed by parents (4 schools).
Direct costs	
Indirect costs	
Total costs	
Support	
Policy level support	Project coordination, regular meetings, project website, and conference contributions.
School level support	Regular meetings and exchange of experience within and across schools, infrastructure support (partly).
Industry level support	Software support / Maintenance in rare cases (Second-/Third-Level-Support).
Training	
Target audience, mode of delivery of training, training methods	Support to coordinating staff of the pilot schools was given by means of focused discussions within the project group as well as with experts. Additionally, a workshop about media didactics was organised by the coordinator of the project. Additional trainings for teachers took place occasionally (in some schools).
Focus	The focus of training and regular discussions with experts was related more to implementation and technology aspects (e.g. parental involvement, technology guidance, support concepts etc.) rather than to pedagogical issues.
Duration	Training & support was part of the 5 regular meetings within the group of school coordinators in the project, each lasting some hours according to subject and requirement.
Main provider	Ministry of Education in cooperation with Danube University Krems.
Outputs/Certification	No
Evaluation	
Was the 1:1 initiative evaluated?	Yes. The process of implementation was monitored by the scientific partner of the project and relevant experience consolidated in a final study report.
Focus	The research had three main interests: (1) Pedagogical focus: didactic advantages of netbooks in education; (2) 360 degree learning: type and extent of netbook use outside school; (3) Educational governance: implementation strategies of 1:1 initiatives. The research was based on the assumptions of the Actors-Network Theory (ANT) by Bruno Latour. The primary target of the research was to collect first-hand experience from 'early-adopters' of netbooks in schools, based on interviews, participatory observations, micro-blogging and expert discussions.
Organisation responsible for the evaluation	University of Donau Krems.
Method used	A series of interviews, participatory observations and expert discussions were conducted involving 6 schools, 120 learners and 12 teachers. Additional empiric data sets were produced by means of micro-blogs and analysed with respect to ubiquitous learning /360° learning.
Impact	
Evidence of impact (including sustainability and up-scaling)	There is no formal evaluation externally published, reports are produced for the ministry and the government.
Barriers and enablers	Barriers: lack of implementation strategies, unprofitable technology investment, funding, lack of flexible teaching scenarios and/or digital content, etc. Enablers: stakeholder (parental) involvement, continuing education of teachers, regular exchange of experience, guidance and consultation by experts, best practice examples, technology & financial support concepts, etc.

Additional information	
Expert	Erich Herber Erich.Herber@donau-uni.ac.at
Further information	http://www.elearningcluster.com/aktuell/303.php http://www.elearningcluster.com/themen/laptopklassen.php

LMS 4EduBooks	
Timeframe	From 2010 to 2011.
Objective	<ul style="list-style-type: none"> To develop a screen design to use LMS contents in different types of schools and lessons. To evaluate the potential of mobile learning devices in the form of tablet computers in real teaching situation.
Short description	The focus of the project was to evaluate the use of Apple iPads in a current school learning environment. On the one hand the use of iPads was tested in real lessons (e. g. German, English, Science, Maths, etc.) and on the other hand research was conducted and reported to the government.
Context	
ICT policy context	The use of mobile learning devices in education (Ministry of Education Austria).
Rationale behind the initiative	To support the learning process with mobile learning devices. To research the possibility of using iPads (mobile devices) in the classroom and in a variety of lessons.
Scope	
Target audience	Students in vocational education and first level of secondary education in the region of Burgenland, project from the Education Ministry of Austria. The teachers supported in developing strategies to use mobile learning in the classroom.
Number of schools	2 schools, 2 classrooms and approx. 55 students were directly involved in the project. Project results should be serving the whole education community in the region.
Age range and levels of education	At the first secondary school level between the age of 10 and 14 and at the vocational school between the age of 15 and 19.
Geographical coverage	A regional project (cooperation between the local school board, Educational Network Burgenland and the Ministry of Education).
Organisation and implementation	
Initiator	The Ministry of Education and Educational Network Burgenland.
Actors involved	Mr Christian Fuchs (training, design, technology, organisation) – project leader, teacher; Mr Herbert Gabriel (training, research, design) – project leader, teacher; Mr Heinz Zitz (organisation), ICT inspector, local school board; Mr Robert Kristöfl (organisation), officer of the Ministry of Education, ICT.
Strategies for implementation	It was a top-down organised project, but required close cooperation between the project leaders and the local school board (province). There were a lot of different persons to involve: the inspector of ICT, the officers of the Ministry.
Strategies for mainstreaming and up-scaling	An increased budget and further efforts by the Ministry of Education were required to finance an up-scaling of the project. The aim was to develop 1:1 teaching material for use with the mobile devices and provide more didactic training for teachers.
Equipment and infrastructure	
Number and type of devices	Internet connection, wireless access points, learning management system, learning objects, mobile devices, different learning software (Apps).
Additional equipment and infrastructure development	Electricity, docking stations.
Ownership of equipment	Ministry of Education

Costs	
Financing model	Ministry of Education
Direct costs	App. €25,000
Indirect costs	App. €40,000
Total costs	App. €65,000
Support	
Policy level support	<ul style="list-style-type: none"> • Special support from the learning management team Burgenland; • Teacher Training by the teacher training institution.
School level support	Teacher training, wireless campus, workshops within the schools.
Industry level support	
Training	
Target audience, mode of delivery of training, training methods	The target groups are teachers and content developers. In-house training and online learning. Workshops.
Focus	Pedagogical (to give the teachers the opportunity to teach in this kind of teaching and learning environment), didactical (to have the tools for teaching in such a classroom), organisational (financing and organising the implementation in the school).
Duration	Throughout the project period; it depends on the requirement of every individual teacher.
Main provider	PH-Burgenland.
Outputs/Certification	In Austria teachers attending training courses always get a certification.
Evaluation	
Was the 1:1 initiative evaluated?	Yes
Focus	To evaluate the potential of 1:1 teaching in a scenario of individualisation of the lessons.
Organisation responsible for the evaluation	PH-Burgenland
Method used	
Impact	
Evidence of impact (including sustainability and up-scaling)	
Barriers and enablers	
Additional information	
Expert	Dr. Herbert Gabriel Mag. Christian Fuchs Mag. Heinz Josef Zitz
Further information	Ministry of Education Austria

Mobile Lernbegleiter im Unterricht	
Timeframe	The initial phase was from Sept. 2009 until June 2010. OECD 1:1 Education Conference in Vienna 22-24 February 2010. The pilot phase was from Sept. 2010 until June 2011. The project is currently running in the second phase until June 2012.
Objective	<ul style="list-style-type: none"> • To improve the digital competence and to offer an effective learning environment; • The exchange of experiences in the enhancement of the digital competence between all levels of education.
Short description	The idea of the project is the pedagogical use of digital devices in lessons. The devices are owned by students and have Internet access (WLAN, 3G) for research and communication purposes.

Context	
ICT policy context	This activity matches the aims of federal education policy by improving the vertical cooperation between schools and all levels of education and the development of the digital competence according to the EU initiative ET 2020.
Rationale behind the initiative	To support the learning process with mobile devices in all subjects.
Scope	
Target audience	Pupils and teachers from all levels of education.
Number of schools	Pilot project with currently 30 schools and approx. 500 students.
Age range and levels of education	Primary schools (students between the age 6 and 10 years). The lower secondary school (between the age 11 and 14 years). The vocational school (between the age 15 and 19 years).
Geographical coverage	A national project: Lower Austria, Upper Austria, Tirol, Vienna.
Organisation and implementation	
Initiator	Austrian Federal Ministry for Education, Arts and Culture: Christian Schrack.
Actors involved	Austrian Federal Ministry for Education, Arts and Culture: Dr. Christian Dorninger; Principal coordinators of the 30 schools; Cooperation with the University of Vienna for using the notebook Web shop for students.
Strategies for implementation	Offering special guidelines and top-down organised national meetings. The project is organised bottom-up by coordinators of 8 schools, which build local “clusters” with schools in the area.
Strategies for mainstreaming and up-scaling	Schools of the upper secondary level are well equipped with student owned laptops - regular laptop classes and BYOD classes (bring your own device). To address the primary and lower secondary level the devices should become more user friendly and reliable with less need for maintenance. The market price should fall under €300.
Equipment and infrastructure	
Number and type of devices	It depends on the school and the decision of parents involved: Notebooks, netbooks, tablet or smartphones.
Additional equipment and infrastructure development	
Ownership of equipment	Learners
Costs	
Financing model	Co- financing (parents and ministry).
Direct costs	€800 - per school.
Indirect costs	€3,000 – evaluation.
Total costs	
Support	
Policy level support	Meetings, additional website.
School level support	Visit of schools.
Industry level support	
Training	
Target audience, mode of delivery of training, training methods	Self-organised teacher training between the partner schools.
Focus	Pedagogical, technical and organisational focus.
Duration	As necessary.
Main provider	Self-organised training.
Outputs/Certification	
Evaluation	
Was the 1:1 initiative evaluated?	Yes. Last evaluation: May 2011.

Focus	Use of the devices in class, participation of the teachers, cooperation between the schools.
Organisation responsible for the evaluation	External evaluation by: Dr. Maria Gutknecht-Gmeiner m.gutknecht-gmeiner@impulse.at
Method used	
Impact	
Evidence of impact (including sustainability and up-scaling)	School development.
Barriers and enablers	
Additional information	
Expert	Mrs. Ulrike Wiedersich, principal ulrike.wiedersich@gmail.com
Further information	www.eeducation.at ruth@sattlercom.com Gutknecht-Gmeiner, M. and Negschwenter, M. (2012). <i>Mobile Lernbegleiter im Unterricht, Evaluationsbericht</i> , Wien, May 2012. Evaluation report 2011-2012 http://p109100.mittwaldserver.info/fileadmin/UPLOAD/PDF/Angebote/Netbooks/Bericht%20Mobile%20Lernbegleiter%202012.pdf

Cyprus

Equipment for School Net DIA.S. (ΔΙΑ.Σ.)	
Timeframe	October 2009 - June 2010.
Objective	To provide students and educators of the 7 pilot schools with access to the School Net (ΔΙΑ.Σ.) services and educational content (26-28 laptops per school) in a classroom that was created for this purpose (one tablet pc and a projector for each key person, 3 desktop pcs in educational staff room).
Short description	School Net DIA.S. (ΔΙΑ.Σ.) project was a digital educational environment that promoted learning and communication from both school and home and granted access to information relating to educational methods. School Net (ΔΙΑ.Σ.) services consisted of a Learning Management System, Educational Portal, E-mail, User Personal Site and Collaboration tool. In each school two teachers were assigned as key persons for the project and equipped with a tablet PC and a projector. Furthermore, a classroom was defined as School Net DIA.S. (ΔΙΑ.Σ.) Classroom and equipped with laptops and interactive systems.
Context	
ICT policy context	This initiative was embedded in the Ministry's ICT integration programme plan in education. The aim of this programme was to effectively use Information and Communication Technologies (ICTs) in the educational process and to enhance the digital literacy of students and teachers. All teachers in Cyprus used ICT towards innovative teaching and learning in order to achieve the goals of the national curriculum.
Rationale behind the initiative	Teachers (of all subjects) and students had access to an ICT-equipped classroom, with a 1:1 computer-to-learner ratio, in order to make effective use of the digital educational environment, offered by the School Net DIA.S. (ΔΙΑ.Σ.) project.
Scope	
Target audience	Students and teachers of the 7 pilot schools.
Number of schools	7
Age range and levels of education	15 - 18 years old (students). 22-60 years old (teachers) of all levels of education.
Geographical coverage	4 Nicosia District (3 urban, 1 rural). 2 Limassol District (urban). 1 Larnaca District (urban).
Organisation and implementation	
Initiator	Ministry of Education and Culture of Cyprus (MoEC).
Actors involved	Three ICT Projects MoEC teams were involved in the process: the School Net DIA.S. (ΔΙΑ.Σ.) project Team, the ICT Infrastructure and Equipment Team and the ICT Contracts Monitoring Team, coordinated by their Inspectors, and supervised by the MoEC's ICT Projects General Coordinator.
Strategies for implementation	The project was a top-down initiative.
Strategies for mainstreaming and up-scaling	The School Net DIA.S. (ΔΙΑ.Σ.) environment was available to the users of the 7 pilot schools. The Ministry evaluated the pilot implementation and planned its up-scaling accordingly.
Equipment and infrastructure	
Number and type of devices	LAPTOPS (HP6730b): 192. TABLET PC (Fujitsu Siemens Lifebook, Toshiba Portege, IBM Thinkpad): 14. DESKTOP PC (ASUS PC, OMICRON PC, PLATO PC): 21.
Additional equipment and infrastructure development	Structured cabling, projector, interactive system, alarm system, classroom security, headsets.
Ownership of equipment	School

Costs	
Financing model	The initiative was funded 100% by national funds. The equipment was acquired through public tenders.
Direct costs	LAPTOPS €125,184.00 TABLET PC €17,965.52 DESKTOP PC €14,034.36
Indirect costs	
Total costs	The total budget of the project is estimated at €157,183.88.
Support	
Policy level support	Support was provided by the School Net DIA.S. (ΔΙΑ.Σ.) project Team, the ICT Infrastructure and Equipment Team and the ICT Contracts Monitoring Team.
School level support	In each school two teachers were assigned as key persons for the project and equipped with a tablet pc and a projector. These teachers along with the school principal provided support to the teachers and basic training on how to use the equipment (along with and the platform).
Industry level support	Technical Support provided by the equipment suppliers (as per the terms of the contract).
Training	
Target audience, mode of delivery of training, training methods	Training for the use of the School Net DIA.S. (ΔΙΑ.Σ.) platform was carried out for all teachers from the 7 schools during school hours both at the Ministry of Education and Culture's premises and at the schools.
Focus	
Duration	
Main provider	School Net DIA.S. (ΔΙΑ.Σ.) project Team.
Outputs/Certification	
Evaluation	
Was the 1:1 initiative evaluated?	N/A
Focus	
Organisation responsible for the evaluation	
Method used	
Impact	
Evidence of impact (including sustainability and up-scaling)	
Barriers and enablers	
Additional information	
Expert	Andreas Eleftheriou, Chief Education Officer, Technical & Vocational Education, School Net DIA.S. (ΔΙΑ.Σ.) Project Team Coordinator, aeleftheriou@schools.ac.cy Andreas Trakoshis, Inspector of Design & Technology, General Secondary Education, ICT Infrastructure and Equipment Team Coordinator, a.trakoshis@cytanet.com.cy Ninos Josephides, Inspector of Design & Technology, General Secondary Education, ICT Contracts Monitoring Team Coordinator, njosephides@cytanet.com.cy
Further information	http://www.dias.ac.cy

Programme for Subsidisation of the Purchase of a Laptop																					
Timeframe	The initiative started during the 2008-2009 school year and is ongoing.																				
Objective	To provide students access to advanced ICT equipment, and more specifically a personal portable computer (laptop) in order to utilise them both in their classrooms/schools and their homes, within the framework of the ongoing Educational Reform Programme.																				
Short description	<p>After the approval of the Council of Ministers, the Ministry of Education (MoEC) provides a grant to every student attending the second grade of Gymnasium (Lower Secondary School) in order to subsidise the purchase of a portable computer (Laptop). The grant is paid to the beneficiaries (students' parents/guardians), according to specific guidelines and relevant computer specifications published by the Ministry.</p> <p>The amount of the grant per student is as follows:</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>School Year</th> <th>No of students entitled to the grant</th> <th>No of students who applied & received the grant</th> <th>Grant amount for every student for laptop purchase</th> </tr> </thead> <tbody> <tr> <td>2008-09</td> <td>8,762</td> <td>7,684</td> <td>€400</td> </tr> <tr> <td>2009-10</td> <td>8,511</td> <td>7,140</td> <td>€300</td> </tr> <tr> <td>2010-11</td> <td>10,050*</td> <td>8,246</td> <td>€300</td> </tr> <tr> <td>2011-12</td> <td>9,739*</td> <td>Still pending</td> <td>€250</td> </tr> </tbody> </table> <p>*Since the 2010-11 school-year the above action was extended in order to also include the students attending the 2nd grade of Private Lower Secondary Schools as well as the students attending the preparatory class of the Evening Schools.</p>	School Year	No of students entitled to the grant	No of students who applied & received the grant	Grant amount for every student for laptop purchase	2008-09	8,762	7,684	€400	2009-10	8,511	7,140	€300	2010-11	10,050*	8,246	€300	2011-12	9,739*	Still pending	€250
School Year	No of students entitled to the grant	No of students who applied & received the grant	Grant amount for every student for laptop purchase																		
2008-09	8,762	7,684	€400																		
2009-10	8,511	7,140	€300																		
2010-11	10,050*	8,246	€300																		
2011-12	9,739*	Still pending	€250																		
Context																					
ICT policy context	This initiative is embedded in the Ministry's ICT integration programme plan in education. The aim of this programme is to effectively use Information and Communication Technologies (ICTs) in the educational process and to enhance the digital literacy of students and teachers. These actions are taken towards achieving one of the core objectives of this programme: to provide schools (teachers and students) with advanced ICT infrastructure and equipment.																				
Rationale behind the initiative	<p>To provide students access to advanced ICT equipment, in order to utilise them both in their classrooms/schools and their homes, within the framework of the ongoing Educational Reform Programme.</p> <p>The Ministry has been distributing laptops and other ICT equipment to schools (students and teachers) in order to facilitate the integration of ICT in all subjects and to eliminate obstacles constraining access and offer equal opportunities to the students irrespective of their background or level of need, within the framework of the Educational Reform Programme and the top priorities of the Cyprus educational system: the shaping of a democratic and humanistic school.</p> <p>A "democratic school" is a school in which all children study together - regardless of any differences they may have - in order to prepare for their common future. In addition, it is a school in which no child is excluded from acquiring the fundamentals that characterise an educated person. In contrast to the traditional school, which is oriented towards the provision of equal opportunities for all children and rejects responsibility for inequality in the results; the democratic school is organised in such a way so as to offer every child the ability to achieve all educational aims without any reductions in the quantity and the quality of the educational commodities.</p>																				

Scope				
Target audience	Students attending the Second Grade of Gymnasium (Lower Secondary School) – both Public and Private, as well as the students attending the preparatory class of the Evening Schools.			
Number of schools	School Year	N of Students entitled to the grant	N of Students who applied & received the grant	Grant Amount for every Student / Laptop Purchase
	2008-09	8762	7684	€400
	2009-2010	8511	7140	€300
	2010-2011	10050*	8246	€300
	2011-2012	9739*	Still pending	€250
Age range and levels of education	Average: 13 years old (Students attending the Second Grade of Gymnasium (Lower Secondary School) – both Public and Private, as well as the students attending the preparatory class of the Evening Schools).			
Geographical coverage	National (public and private).			
Organisation and implementation				
Initiator	<p>The design and management of the programme as well as the guidance and support given to the Local or Regional School Boards were undertaken by: a) the Office of the Minister; b) the office of the Director General; and c) the ICT Projects Team of the MoEC.</p> <p>The Local or Regional School Boards along with the Schools: a) provided guidance to the students and parents/guardians; b) performed the necessary audit/control; and c) issued the checks for the grant.</p>			
Actors involved	The project was a top-down initiative.			
Strategies for implementation				
Strategies for mainstreaming and up-scaling	These actions are already targeting all students of the specific grade, in both public and private schools of Cyprus, and are embedded in the Ministry's ICT integration programme plan in education.			
Equipment and infrastructure				
Number and type of devices	<p>Technical Minimum Specifications for the laptops in order to be eligible for the grant (school year 2001-12):</p> <ul style="list-style-type: none"> • Motherboard; • Supported Types of RAM; • Hard Disk Drive; • Internal Optical Drive; • Screen; • Microprocessor; • GHz with dual core technology; • Internet connections (WLAN, WiFi 802.11 a/b/g, Interface); • USB (2.0); • Software; • Windows 7 Home Premium Edition or equivalent (the latest version should be installed before the delivery of the laptop); • Warranty (by the sales company). 			
Additional equipment and infrastructure development	Various open-source and free software were also distributed to the students (via CD-ROMs), through the Local / Regional School Boards.			
Ownership of equipment	Parents / Guardians of the students are the owners of the equipment (the check was issue to the parents/guardians).			
Costs				
Financing model	The MoEC is subsidising the purchase of the laptop that complies to the minimum requirements, with a specific amount/grant – see above. The parent/guardian is responsible to cover the rest of the costs.			

Direct costs	School Year	Total amount of Grant provided by the MoEC
	2008-2009	€3,073,600
	2009-2010	€2,142,000
	2010-2011	€2,473,800
	2011-2012	€2,434,750*
*The cost for 2011-12 is still pending. The number represents the estimated cost in case, during this school year (2012-12), all the eligible students apply for (and receive) the grant.		
Indirect costs		
Total costs	See above - €7,689,400 for the three school years (2008 – 2011). The cost for 2011-12 is still pending. If during this school year (2011-12) all the eligible students apply for (and receive) the grant then the total cost will be €10,124,150.	
Support		
Policy level support	Guidance and support were given to the Local or Regional School Boards by the ICT Projects Team of the MoEC. The Local or Regional School Boards along with the Schools: a) provided guidance to the students and parents/guardians, b) performed the necessary audit/control and c) issued the checks for the grant.	
School level support		
Industry level support	Technical Support provided by the equipment suppliers (as per the requirement for the warranty of 2 years).	
Training		
Target audience, mode of delivery of training, training methods	During this school year, an official circular sent by the Ministry to all Secondary Schools urges the principals and teachers to draw up a programme of utilisation and effective use of the students' laptops, which were purchased using the subsidiary grant of this initiative. The Ministry suggested that the schools (and the teachers) could arrange that the students attending the 3rd grade of Gymnasium (Lower Secondary School) and the students attending the 1st Grade of Lyceum (Higher Secondary School) bring their laptops one day per week in order to use them in all their courses taught on that day. Teachers are also urged to take advantage of this 1:1 computer-to-student ratio and more easily integrate ICT-related tools and approaches in their teaching (the participation of teachers was voluntary). More specifically, the Ministry suggested that the teachers could integrate and use the Digital Educational Content (DEC) that has recently been developed for 25% of the curriculum of 17 subjects of the Secondary General and Technical-Vocational schools. The good practices that will be implemented in schools, within the framework of this initiative, will be evaluated and awarded by the Ministry.	
Focus	See above	
Duration	See above	
Main provider	See above	
Outputs/Certification	See above	
Evaluation		
Was the 1:1 initiative evaluated?	N/A	
Focus		
Organisation responsible for the evaluation		
Method used		
Impact		
Evidence of impact (including sustainability and up-scaling)		

Barriers and enablers	
Additional information	
Expert	Elias Margadjis, Director of Technical and Vocational Education Directorate, ICT Projects General Coordinator, margadjiselias@gmail.com Constantia Xenofondos (cxenofondos@cytanet.com.cy) and Elena Theodosiadou (etheodosiadou@moec.gov.cy).
Further information	www.moec.gov.cy

Czech Republic

Vzdelani21/Education21	
Timeframe	1 st September 2009 – 31 st June 2015 – long term project.
Objective	<ul style="list-style-type: none"> • Equip Learners for the Future: Support school pupils in the development of core ICT skills in preparation for a digital future; • Demonstrate Best Practices: Put various ICT use cases to the test in a real classroom environment to identify what works best; • Validate ICT Use: Implement effective and simple-to-execute methodologies for evaluating the impact of ICT on learning.
Short description	<p>A holistic model for educational transformation, based on the use of high-quality digital content and a 1:1 computing model, it encompassed six primary schools. The classes involved were for children aged 11-12, with 65 teachers and 275 students participating. Each classroom is equipped with a WiFi network and electronic whiteboard.</p> <p><i>Education21</i> validates and describes the real contribution of information technologies in teaching using a 1:1 computing model. The concept of teaching is based on high-quality educational content in connection with modern and interactive technologies.</p> <p>Students can integrate digital elements into their learning to a greater or lesser extent, depending on their own preferences, allowing those who prefer to work with traditional text books to do so where appropriate.</p> <p>Teachers can use the Smart Notebook software that comes as part of the <i>Education21</i> package to create practice and self-test exercises for pupils. Applets – available online or created by the teacher – can be given to students to enable them to practice a particular aspect of the course. This may include algebra calculations in mathematics class, or grammar exercises in language lessons. Students access an applet from their own device and the teacher can review their progress and provide feedback and help in real-time. Within one class, different students may use different applets depending on their level of ability.</p> <p>Once students have had the opportunity to practice their new skill, the teacher can also provide each individual with a self-test exercise. The students use their own laptop to perform the test at their own pace while teachers are able to view and mark their completed tests immediately to assess their readiness to move on in the syllabus.</p> <p>Use of applets and self-test exercises has been trialled in some classes to date, but the Charles University team has identified opportunities for further improvements in this area. In particular, it plans to create a system for teachers to share exercises and tests to minimise the time-consuming process of creating new applets for each class.</p> <p><i>Regular Reporting</i></p> <p>Each of the six schools involved in the pilot nominated a teacher to act as <i>Education21</i> project coordinator. This teacher holds responsibility for liaising with their colleagues to ensure that every individual participating in the project submits at least two hours of camcorder video footage of the use of IT in their classes. An average of eight hours of footage per quarter is submitted by each school, covering a range of subjects including mathematics, languages, geography, physics and chemistry.</p> <p>A specialist from the Charles University team also attends some classes to observe them in real life as well. This specialist then collects the footage from all schools, along with their notes taken on-site, to review and evaluate the effectiveness of the ICT resources.</p>

Context	
ICT policy context	The project that the university initiated to meet these objectives was called <i>Vzdělání21 (Education21)</i> . It was launched in collaboration with ICT and education experts including HP, Microsoft, Avmedia and Fraus. As part of its commitment to create economic and social opportunities for all by improving the quality of education systems, Intel also formed part of the team.
Rationale behind the initiative	Teachers were provided with HP Probook 6560b and students with Intel® [PROCESSOR]-powered XM739ES-HPMini 5103–N550, 10.1” HD, LED, 2GB, 320 GB, WLAN, BT, Win7Pro laptops through which they could access interactive tools and documents including pdf, photos, videos and online tests. Interactive textbooks were also supplied.
Scope	
Target audience	Teachers, Directors, Pupils, Parents.
Number of schools	6 pilot schools – second level of elementary school – age of 11 to 15. 65 teachers. 275 pupils.
Age range and levels of education	Age of 11 – 15.
Geographical coverage	Regional coverage. Initiative <i>Vzdělání21</i> covers 6 schools chosen regionally in order to achieve more objective results, knowing that there are natural differences among regions in the Czech Republic. <ol style="list-style-type: none"> 1. ZS Kunratice, Praha4 2. ZS T.G.Masaryka, Ceska Kamenice 3. ZS L.Kuby , Ceske Budejovice 4. ZS Mladeze 3, Znojmo 5. ZS L.Cecha, NM na Morave 6. ZS Plzen
Organisation and implementation	
Initiator	Publishing house Fraus –publisher and producer of the textbooks– both printed and electronic books in the Czech republic.
Actors involved	Participation in the project depended on three stakeholder groups – parents, teachers and the school authority. Parents had to approve the placement of their child within a digital class and to support funding of their child’s laptop, and the teacher had to agree to integrate interactive technologies into their lessons. Finally the school authority needed to agree to set up the digital classes and provide teachers and students with adequate support.
Strategies for implementation	<ul style="list-style-type: none"> • A Collaborative Model: Intel joined experts in hardware, software and educational content to create the <i>Education21</i> initiative; • Include the Community: Teachers, school boards and parents were all encouraged to support and participate in the project; • Pilot Project: Six Czech schools were chosen to run pilots of the new <i>Education21</i> model during the 2009-2013 academic year.
Strategies for mainstreaming and up-scaling	The Faculty of Education set out to analyse the ways in which schools in the Czech Republic were using ICT to enhance the quality of education. As well as identifying best practices and common use cases, the Faculty wanted to develop and demonstrate effective methodologies for measuring the positive impact of technology on learning processes and outcomes. Dr Nataša Mazáčová (Ph.D) from the Faculty of Education, Charles University, explains: “Many schools and higher education establishments are considering the use of ICT in the classroom now, but it’s often hard for them to know how to use it best. Measuring the impact of newly-deployed technology can be difficult as well; but it is essential to justify often hefty investments in PCs, connectivity, digital content and other equipment. Our aim was to identify and validate a selection of valuable use cases of modern IT in the classroom, particularly for

	grades six to nine.”
Equipment and infrastructure	
Number and type of devices	The classes involved were for children aged 11-12, with 65 teachers and 275 students participating. Each classroom was equipped with a WiFi network and electronic whiteboard. Teachers were provided with HP Probook 6560b and students with Intel® [PROCESSOR]-powered XM739ES- HPMini 5103– N550, 10.1” HD, LED, 2GB, 320 GB, WLAN, BT, Win7Pro laptops through which they could access interactive tools and documents including pdf, photos, videos and online tests. Interactive textbooks were also supplied.
Additional equipment and infrastructure development	Pilot schools in the project <i>Vzdělání21</i> benefit from the support of partner companies such as Intel, HP, and Microsoft which help them to solve permanently established, technical problems, but pilot schools also invest in building a computer network. Teachers were equipped with selected laptops for themselves and child-resistant treatment netbooks were provided to children.
Ownership of equipment	All the equipment as the hardware and software is owned by schools. Mostly the pupils’ netbooks are paid by the school, in that case the school is just renting the netbook to each pupil, but there is some practice, that some parents cooperate on covering the costs to purchase pupils’ netbooks and in that case the netbook is owned by the pupil.
Costs	
Financing model	Schools can apply for financial support from the state programme EU Money for schools to use grants from European union to implement and support ICT in their school. Also the schools authorities participate financially and parents co-finance the purchase of pupils' netbooks.
Direct costs	Partners of the project provide special prices for hardware and software.
Indirect costs	Training and human support, technical support from parents of the project provided to the 6 pilot schools during the time, the project is running.
Total costs	20,000USD for each partner
Support	
Policy level support	<ul style="list-style-type: none"> • The Faculty of Education set out to analyse the ways in which schools in the Czech Republic were using ICT to enhance the quality of education; • Intel joined experts in hardware, software and educational content to create the <i>Education21</i> initiative; • HP provided teachers notebooks and pupils netbooks; • AVMedia provided Interactive boards and Smart Sync software; • Microsoft provided legal operating software Win7; • FRAUS provided licenses for interactive learning content.
School level support	Schools had to invest into building the technical basement: wireless connection, stabile network.
Industry level support	
Training	
Target audience, mode of delivery of training, training methods	The main target audience for training are teachers. They receive training in classes and also can use e-learning materials provided by partners of the project <i>Vzdělání21</i> .
Focus	Training is technical, mainly the purpose is to teach teachers how to use technical equipment properly, such as notebooks, SMART software, interactive board, interactive textbooks. All the learning content aims at meeting the didactical conditions 100% so the teachers are not provided with extra pedagogical training, but they share best practices on a regular basis.
Duration	It depends on the level, training for beginners can take 10 hours, and average duration is 6 hours.
Main provider	Partners of the project <i>Vzdělání21</i> . AV Media provide the training for SMART technologies. FRAUS, house of publishing provides the training for interactive textbook. HP provides the training for using the Internet and Facebook.

Outputs/Certification	Yes. At the end of each training session, either for SMART technologies (interactive board or SMART notebook) or for using the interactive textbooks the participants are provided with the diploma or the certificate.
Evaluation	
Was the 1:1 initiative evaluated?	Yes. The initiative is being evaluated on a regular basis.
Focus	Main objective is to track and validate changes in teaching style, change in pupil motivation and last but not least, change in public perception of digital and interactive teaching.
Organisation responsible for the evaluation	1. Pedagogical Faculty Charles University. 2. Nakladatelství Fraus (Publishing House).
Method used	<ol style="list-style-type: none"> 1) Method of comparison between digital and non- digital class; 2) Parents and pupils survey; 3) Public assessment report from the expert of Charles University; 4) Teachers' evaluation reports. <p>The evaluation takes place at several levels:</p> <ol style="list-style-type: none"> 1. Team of a specialist from Pedagogical Faculty of the Charles University evaluates the project on a regular basis to watch and check the didactic level of teaching and to assess the pupil's achievements in comparison with non-digital parallel classes. The team of University experts uses plenty of testing methods such as video recording, questionnaires for pupils and teachers etc. 2. Partners of the initiative <i>Vzdělání21</i> on a quarterly basis inquire student's parents to the Internet survey to receive their feedback. 3. Partners of the initiative meet the school directors and teachers on the trainings and seminars which are organised regularly for the pilot schools and which provide a good opportunity to receive feedback and any comments or complaints in person.
Impact	
Evidence of impact (including sustainability and up-scaling)	<ul style="list-style-type: none"> • Access to a wider library of engaging educational content and the ability to interact on a one-to-one basis with the teacher means that it is much easier for students to work at their own pace when using a laptop. • An education experience that is tailored to the needs and interests of the individual student is more likely to encourage perseverance and motivation to do well. • The ability to allocate tasks to different individuals or groups within a single class also means that teachers can give each student one-to-one attention without creating 'dead' time for the rest of the class. While focusing on a task with one student, either on their PC or using the interactive white board, the teacher can assign work to the rest of the class to ensure all class time is used productively by every participant. While tasks may not always be appropriate to the use of a laptop, even more 'traditional' activities such as essay writing can be carried out electronically, providing students with the opportunity to practice core word processing skills. • As well as making learning more exciting for the student, ICT in the classroom can help the teacher better monitor progress and provide more informed, timely guidance and feedback. For example, the teacher can highlight details in a text on their own screen, which then appears on the same text on students' devices, to help draw attention to important information.
Barriers and enablers	
Additional information	
Expert	Julie Růžičková Tel.:+420 733 100 057 Julie.ruzickova@mediakom.cz
Further information	The project has its web site, www.vzdelani21.cz . The content is in Czech,

	includes also plenty of videos from pilot schools. If you need more information to be provided in English, please contact the spokesperson, Julie Růžičková, mailto: julie.ruzickova@mediakom.cz , tel.:+420 733 100 057.
--	--

Denmark

IT project in the Municipality of Elsinore	
Timeframe	01.06.2010-01.08-2013. All notebooks, interactive smart board and wireless infrastructure have been already delivered –the last part (10 hours), consisting of teachers training has not been completed.
Objective	The overall objective of this programme is to make a systematic 360° approach with investments in hardware, software, infrastructure, professional development for all teachers and leadership development.
0	The initiative is mainly concentrated on the 1:1 computing programme: student and teachers are provided with personal laptops to be used during classes.
Context	
ICT policy context	Politicians in Elsinore Municipality decided to invest 120 million d.kr in the learning environment and some of this should go to IT and learning. This was based on a recommendation from the school management and teachers at all 17 schools.
Rationale behind the initiative	The reason is to change teachers' pedagogical practices and support the teacher in this, in being able to differentiate learning in relation to the individual, to create a rationale for cost of ownership for AV equipment that prepares each student for a community which today involves the use of IT.
Scope	
Target audience	About 6,000 students and 600 teachers.
Number of schools	17 schools, 600 classrooms.
Age range and levels of education	Primary school.
Geographical coverage	Local, Municipality of Elsinore.
Organisation and implementation	
Initiator	Municipality of Elsinore + Microsoft.
Actors involved	Microsoft's educational programme (Partners in Learning).
Strategies for implementation	A working group prepared a working basis and policy-this was adopted by the school management and councillors.
Strategies for mainstreaming and up-scaling	It was decided that all pupils and teachers at once should have a netbook – no pilot project.
Equipment and infrastructure	
Number and type of devices	Samsung N145 as netbook, MS Windows 7, MS Office 2010 and school-relevant programmes as platform.
Additional equipment and infrastructure development	Interactive smart board and wireless infrastructure.
Ownership of equipment	Elsinore Municipality.
Costs	
Financing model	The investment is split between Elsinore Municipality and the Danish State.
Direct costs	Approximately 26 million d.kr.
Indirect costs	
Total costs	Approximately 26 million d.kr.
Support	
Policy level support	None
School level support	Technical, pedagogical and pupils. Several schools have IT patrol where students support students and teachers at the school.
Industry level support	None

Training	
Target audience, mode of delivery of training, training methods	200 teachers' training workshops have been organised in order to improve teachers' professional development.
Focus	IT and pedagogical practices.
Duration	See above
Main provider	See above
Outputs/Certification	No, but there is a website with blogs, etc.
Evaluation	
Was the 1:1 initiative evaluated?	No
Focus	
Organisation responsible for the evaluation	
Method used	
Impact	
Evidence of impact (including sustainability and up-scaling)	
Barriers and enablers	
Additional information	
Expert	Tommy Sørensen tso30@helsingor.dk
Further information	

Estonia

Laptop for students/Laptop for teachers	
Timeframe	2008-2009
Objective	To give a laptop computer to all students participating in the study. Teachers' programme: using modern tools and learning environment for teachers to contribute to the quality of work and increase efficiency (stopped due to the economic crisis).
Short description	Students' programme: 1:1 computing. In 5 selected schools one class received laptops to be used during one school year. Students could use laptops at home as well.
Context	
ICT policy context	
Rationale behind the initiative	
Scope	
Target audience	Students/teachers.
Number of schools	In 5 selected schools one class from each. In 2008 about 4,000 teachers out of 15,000 received laptops.
Age range and levels of education	
Geographical coverage	National
Organisation and implementation	
Initiator	Ministry of Education.
Actors involved	The University of Tartu monitored the use of computers in schools and the impact on the 2008-2009 academic year and presented the study in November 2009. Private partners provided laptops.
Strategies for implementation	<ul style="list-style-type: none"> • Student programme: schools participating in the project had to have an Internet connection and the teachers were required to be active users of ICT. • Conditions for teachers getting a laptop: <ul style="list-style-type: none"> - the teachers had to express the wish to get a laptop; - the teacher had to pass the last three years methodological training of the use of ICT and/or had to be graduated from university and/or to involve in training other teachers - at least one classroom was set up as a modern learning environment.
Strategies for mainstreaming and up-scaling	
Equipment and infrastructure	
Number and type of devices	Laptop equipped with learning software.
Additional equipment and infrastructure development	
Ownership of equipment	
Costs	
Financing model	
Direct costs	
Indirect costs	
Total costs	

Support	
Policy level support	
School level support	
Industry level support	
Training	
Target audience, mode of delivery of training, training methods	
Focus	
Duration	
Main provider	
Outputs/Certification	
Evaluation	
Was the 1:1 initiative evaluated? **	Yes. <i>** Complementary data from the desk research</i> The evaluation study included 98 students (8th grade), their parents, subject teachers and school administrator from 5 schools involved in the initiatives. Source: http://bit.ly/ZxB1XM
Focus	Concrete usage of laptops.
Organisation responsible for the evaluation	University of Tartu
Method used	Laptop usage was analysed with special monitoring software (Track4Win, Monitor). Questionnaires, interviews, lesson observations, analysis of documentation and monitoring logs installed in students' computers were used for data collection.
Impact	
Evidence of impact (including sustainability and up-scaling)	Some recommendations followed: <ul style="list-style-type: none"> • Rules: a set of rules should be laid down since laptop usage is a relatively new concept in schools. What could a laptop be used for? When is it appropriate to use it for (e.g. information search/gaming etc.)? • Computer-based study material: insufficient materials suiting the Estonian context; • Development of methodology and teacher training. More expertise in computer-assisted teaching is required. This should be an important aspect in pre-service training too; • Educational-political conditions: educational management could consider possible computer usage; • Educational technological support: appropriate educational technological support together with ideas and materials could be very helpful for teachers.
Barriers and enablers	Expectations, which were high during the distribution of laptops, diminished towards the end of the project.
Additional information	
Expert	Piret Luik, Eno Tõnisson, Hasso Kukemelk (2009), Laptops for Students, Research Project in Estonia, University of Tartu http://www.tiigrihype.ee/sites/default/files/tekstifailid/Sylearvuti_opilastele_raportENG_2009.pdf
Further information	

France

POP 1, POP 2 : Plan Ordinateur Portable (en direction des élèves de 6ème) à la Réunion	
Timeframe	2007: preparatory phase. 2008-2010: the 2-year project (POP 1). 2012: 2nd phase of the project (POP 2).
Objective	POP 1: Equipping 1,195 students and their families in 9 experimental schools in rural and remote areas of the island. POP 2: equipping 18,000 students in their 1st year of secondary high school.
Short description	Pop 1 from 2007 -2010: Laptops and USB keys for all the students in their 1st year of lower secondary high school in 9 schools. Pop 2 from 2012 onwards when the following students will be equipped with a laptop: <ul style="list-style-type: none"> • 15,000 students in their 1st year of higher secondary education (2/3 of all these students); • 2,000 students attending apprenticeship training; • 30 drop-out students attending a remedial class.
Context	
ICT policy context	Not really part of the national ICT plan but of a local/regional (“départemental”) plan for social cohesion (Plan Départemental de Cohésion Sociale).
Rationale behind the initiative	Enabling students and their families to acquire ICT skills. Pedagogical change in the selected schools.
Scope	
Target audience	Students and families. + 2 laptops by school
Number of schools	POP 1: 9 schools, 1,195 students. POP 2: 18,000 students.
Age range and levels of education	POP 1: 11-12 year old students, 1st year of lower secondary education. POP 2: 14-15 year old students, 1st year of higher secondary education.
Geographical coverage	Regional/local project (“département de la Réunion”). Rural and remote areas.
Organisation and implementation	
Initiator	Regional/local administrative authorities (“département de la Réunion”).
Actors involved	Funded and implemented by regional/local by regional authorities; pedagogical/educative participation of the local/regional education authorities (“Académie”); call for school projects.
Strategies for implementation	Top-down initiative. Actors: Pedagogical/educative participation of the local/regional education authorities (“Académie”) as concerns choice of schools and pedagogical/technical advice to teachers.
Strategies for mainstreaming and up-scaling	POP 2 (Plan Ordinateur Portable n°2) launched in 2011.
Equipment and infrastructure	
Number and type of devices	POP 1, POP 2: Laptop + USB key. Software: antivirus/parental control/ Open Office/ pedagogical software.
Additional equipment and infrastructure development	POP 1: Computer cabling and wiring for the 73 schools of the island. For each of the 9 selected schools: mobile class of 16 to 24 laptops, printer, and video-projector. Classroom links to the school network.
Ownership of equipment	POP 1: Equipment owned by the school, lent to the students for 3 years for use at home.

	POP 2: Equipment bought by the families with a €500 subsidy from the regional/local administrative authorities (“département de la Réunion”).
Costs	
Financing model	POP 1: Plan funded by the regional/local administrative authorities (“département de la Réunion”). POP2: subsidised by the regional/local administrative authorities (“département de la Réunion”).
Direct costs	POP 1: Phase 1: €780,000 for the purchase of 1,300 laptops and USB keys. POP 1: Phase 1: €200,000 for the purchase of mobile classes.
Indirect costs	POP 1: Phase 1: €200,000 for cabling and wiring.
Total costs	POP 1: Phase 1: €1,180,000 , phases 1 + 2 = €9m. POP 2: €27m over 3 years.
Support	
Policy level support	<ul style="list-style-type: none"> • Support of the ministry and the local/regional education authorities (“Académie”/Rectorat”) at all levels (choice of schools/pedagogical aspects/ICT issues). • Support of the regional/local administrative authorities (“département de la Réunion”): 2 technical assistants per school recruited.
School level support	See above
Industry level support	
Training	
Target audience, mode of delivery of training, training methods	Teachers, unspecified mode of delivery.
Focus	Pedagogical and technical.
Duration	
Main provider	Local education authorities.
Outputs/Certification	
Evaluation	
Was the 1:1 initiative evaluated?	
Focus	
Organisation responsible for the evaluation	
Method used	
Impact	
Evidence of impact (including sustainability and up-scaling)	
Barriers and enablers	
Additional information	
Expert	
Further information	http://oten.fr/?Equipement-en-ordinateurs http://www.regionreunion.com/fr/spip/POP-2011-lancement-de-l-appel-aux.html

Ordina13	
Timeframe	2010 -2011, 2011-2012.
Objective	To encourage the use of ICT at school and at home.
Short description	25,000 laptops and USB flash drives provided to students in the last 2 years of “collège” (lower secondary schools) in the “département des Bouches du Rhône”.

Context	
ICT policy context	Part of the national plan for the development of digital use at school.
Rationale behind the initiative	To lower the digital divide, equip schools and homes of students, to change pedagogical approaches.
Scope	
Target audience	Students
Number of schools	25,000 students.
Age range and levels of education	13-15 year old, lower secondary level.
Geographical coverage	Regional/local. All areas.
Organisation and implementation	
Initiator	Ministry of Education.
Actors involved	Ministry of Education, local authorities, inspectors.
Strategies for implementation	Ministerial call for projects (part of the plan for the development of digital use at school); approval and selection of this project; consultations with actors at different levels of the education system: teachers, school principals, inspectors, educational authorities (“Académie”), parents.
Strategies for mainstreaming and up-scaling	This initiative is based on generalisation. It relied first on lending then on giving laptops to students. Up-scaling this initiative means taking into account the evolution of technologies (as concerns the choice of equipment) installing infrastructures adapted to the development of uses (networks).
Equipment and infrastructure	
Number and type of devices	HP 625 laptops. USB flash drives (KDS4Go Ordina 13).
Additional equipment and infrastructure development	1 computer for 5 students in all the schools. WiFi access in 15 classrooms per school + staffroom, broadband access. Printers, digital projectors, digital cameras, scanners and IWBs in all the schools Software.
Ownership of equipment	Owned by the learner
Costs	
Financing model	Yearly funding by the "Conseil Général" Open market purchases including warranty and insurance.
Direct costs	
Indirect costs	
Total costs	
Support	
Policy level support	Ministry + local authorities.
School level support	New ATI staff (Technical + IT staff), one in each school.
Industry level support	Extended warranty on equipment, breakage insured (once).
Training	
Target audience, mode of delivery of training, training methods	In-school and out of school training sessions for teachers (as part of the PAF, Plan Académique de Formation).
Focus	Main focus on pedagogical training and the use of resources and services.
Duration	Varied durations.
Main provider	Local education authorities (“Académie”).
Outputs/Certification	Possibility for teachers to obtain the C2i certification.
Evaluation	
Was the 1:1 initiative evaluated?	Yes, in 2006 by university laboratories.
Focus	
Organisation responsible for the evaluation	Consortium of university laboratories selected by way of a call for tenders.

Method used	
Impact	
Evidence of impact (including sustainability and up-scaling)	Evidence of impact on pedagogical approaches even though its scope turned out inferior than expected. Important social impact. Evidence that using digital approaches is now common in schools.
Barriers and enablers	
Additional information	
Expert	Gerard.puimatto@crdp-aix-marseille.fr
Further information	http://www.cg13.fr/education/collegiens/ordina-13/

Ordicollège19	
Timeframe	2008 -2012.
Objective	Taking into account the evolution of new technologies, avoiding gaps in the use of digital devices during the course of education (15,000 students).
Short description	<ul style="list-style-type: none"> • Providing all students in their 2nd, 3rd and 4th year in lower secondary education (“collège”) and their teachers with a computer in the Département Corrèze. • In 2010-2011 providing 1st year students in lower secondary education with a tablet.
Context	
ICT policy context	Part of the national plan for the development of digital use at school. The initiative was developed by the “Conseil Général” of the Department of Corrèze.
Rationale behind the initiative	To facilitate learning, help students with learning difficulties, lower the digital divide.
Scope	
Target audience	Students and teachers.
Number of schools	2011-2012: 30 schools, 2,500 students, 800 teachers were equipped with tablets.
Age range and levels of education	2011-2012: 11- 13 year old students, 1st and 2nd year of lower secondary school.
Geographical coverage	Regional/local (“Département”).
Organisation and implementation	
Initiator	Regional/local administrative authorities (“Conseil général de la Corrèze”).
Actors involved	Regional/local education authorities of the Ministry of Education, Inspectors, CDDP (regional/local pedagogical documentation centre), headmasters and teachers.
Strategies for implementation	Top-down strategy.
Strategies for mainstreaming and up-scaling	The plan is maintained for 2012 - 2013: tablets to be given to new teachers and students in the 1st year of lower secondary school (January 2013). In September 2012 devices are to be upgraded.
Equipment and infrastructure	
Number and type of devices	Acer laptops. 2010-2012: iPads. + 50 apps (word processing software, scientific calculating app, doc sharing app, maths textbook for 1st year lower secondary, mental arithmetic app, French grammar app, English textbook, library of 20 literature books, 10 newspapers + media apps).
Additional equipment and infrastructure development	Infrastructure: a support and maintenance platform in the city of Tulle.

Ownership of equipment	The device is owned by the local administrative authorities (“Conseil Général”).
Costs	
Financing model	Call for tenders. Funded by the local administrative authorities (“Conseil Général”).
Direct costs	€1.3m
Indirect costs	€200,000
Total costs	€1.5m in 2008-2009. €1.5m in 2010-2011.
Support	
Policy level support	Pedagogical support provided by CNDP, CRDP (Local Pedagogical Documentation Centre of the “Département”).
School level support	Pedagogical training sessions for teachers.
Industry level support	No support.
Training	
Target audience, mode of delivery of training, training methods	In-school training for teachers (PAF: Annual Training Plan). 2012: increase of demand for training related to pedagogical use.
Focus	Pedagogical focus.
Duration	10 hours for each teacher on average.
Main provider	CRDP of Corrèze.
Outputs/Certification	No certification up to now but the C2i may attributed later (Higher Certificate for IT and Internet Use).
Evaluation	
Was the 1:1 initiative evaluated?	Yes
Focus	Report on all aspects: pedagogical + technical aspects (obstacles).
Organisation responsible for the evaluation	National Board of Inspectors.
Method used	School visits, interviews.
Impact	
Evidence of impact (including sustainability and up-scaling)	Positive overall impact.
Barriers and enablers	List of suggestions to improve impact (aimed at all the actors involved).
Additional information	
Expert	
Further information	ordicollège accompagnement de l'opération ordicollège

Un collégien, un ordinateur portable (Landes)	
Timeframe	2001 - 2002 : trial deployment in three secondary schools; 2002 - 2005: generalization to all other secondary schools in year eight classes; 2005 - 2013: widespread in all secondary schools for two levels: grades 8 and grades 9.
Objective	With the initiative “one student, one laptop” the “Conseil Général” of the “Départements des Landes” (local administrative authority) established a comprehensive plan of action to: <ul style="list-style-type: none"> • Ensure equal access to a computer so that students will be able to master the new tools they need in their studies, at the workplace and everyday life. • Encourage the emergence of new teaching practices by using the computer in daily class, but also “outside the classroom” for school-based activities.

Short description	<p>Providing each student with a laptop.</p> <p>In France responsibilities are shared between the “Communes”, “Départements”, “Régions”. The State gave the “Conseil Général” control over all issues concerning the “Département”. Since 1982, the State has also transferred certain responsibilities to the “Conseil Général”, such as land regrouping and local water policy, urban and rural planning, social and health policy, school transport and secondary schools. The operation “one student, one laptop” for secondary schools was set up at the start of the 2001 academic year by the Landes “Conseil Général”.</p> <p>Trialled for one year in three secondary schools, and extended throughout the “Département” the following year, the initiative involved the free loan of one laptop computer for each student in year eight for the duration of one year. Principals, teachers and students in the Landes “Département”, quickly saw the advantages of using such a tool in addition to using paper.</p> <p>The initiative “one student, one laptop” became the national reference for all stakeholders in education and spread to other “Départements” (Bouches-du-Rhône, Corrèze, Val-de-Marne, etc.), allowing the Landes “Conseil Général” “to share its expertise”.</p>
Context	
ICT policy context	<p>In 2001, the MoEd decided to create the B2i certification to assess the IT and Internet skills of students in their last year of lower secondary school.</p> <p>The President of the “Conseil Général”, at local level, decided to accompany that initiative. Rather than providing schools with computer rooms he decided to lend computers to students on a school year basis.</p>
Rationale behind the initiative	<ul style="list-style-type: none"> • Pedagogical change: to increase the motivation of students and teachers; • To improve the communication between students, teachers, and parents. <p><u>Stakeholders are convinced of the academic benefits:</u></p> <p>46 % of parents believe that their child found lessons and learning more enjoyable, 52 % that he or she worked more independently and 51 % that he or she founded difficulties to do without a laptop the next year. New behaviours which had an influence on the students’ school results, since 18 % of parents questioned said that their child’s marks have improved. 64 % of children under 15 in the Landes “Département” are today trained in using computers, i.e. 17 % more than other children in the Aquitaine region.</p> <p><u>New teaching practices emerged:</u></p> <ul style="list-style-type: none"> • In the learning of modern foreign languages, for example through the availability of attractive sound documents and of information about the daily affairs of the foreign countries being studied; • In the assimilation of two - or three - dimensional geometry, for example thanks to an interactive table and adapted mathematical software; • In understanding present-day history, for example through access to video and sound resources from media archives or to photo banks; • In a better visualisation of Physical, Astronomical, Biological or Geological Sciences, for example thanks to multimedia presentations, access to video banks of filmed experiments, etc. <p><u>Generator of creativity</u></p> <p>In music, plastic arts and technology, new creative, learning and disseminating tools are available to everyone to stimulate the imagination and the desire to create their own work.</p> <p><u>Enables equality</u></p> <p>Between families in the Landes “Département” regarding the use of new technologies in homes through the free loan of equipment without a deposit. 10-15 % of secondary school pupils in the “Département” entering year eight don’t</p>

	have any computing equipment, although the presence of a child who is at school is the main trigger for families to buy it. For these families, the operation solved what remains the main issue: the cost of the computer.
Scope	
Target audience	Students, teachers, schools.
Number of schools	State secondary schools in the Landes “Département”: 37. Year nine classes: 147. Year eight classes: 165. Students: 7,800 per year. Teachers: 1,300. Since September 2001, 46,000 lower secondary high school students have received a laptop on loan for one or two years of their schooling.
Age range and levels of education	13-15 year old, lower secondary level.
Geographical coverage	Regional/local. All areas.
Organisation and implementation	
Initiator	Regional/local administrative authorities (“Conseil Général”).
Actors involved	Ministry of Education, local authorities, Inspectors.
Strategies for implementation	The « Conseil Général » provided students and teachers with <ul style="list-style-type: none"> • Individual equipment (computers); • Software (120 including documentation banks, textbooks, educational software) installed on the computers. Schools provided with <ul style="list-style-type: none"> • A wired school network; • a double Internet outlet, a double electric plug per school desk; • 2 servers per school; • an Internet connection; • classroom equipment for collective visualisation (video-projectors, IWBs, digital visualizers). The “Conseil Général” was in charge of maintaining and replacing equipment. It was also in charge of one full time (35h) educative assistance per school and it was responsible for the maintenance and functioning of all the equipment and the IT network. The education system <ul style="list-style-type: none"> • Was responsible for training teachers, managing incitements, inspections and some of the evaluations; • Supported the “Conseil Général” in terms of pedagogical expertise. A steering committee consisting of various departments of education, the principals of the secondary schools involved and the “Conseil Général” acted as a forum for dialogue but ultimately the Chairman of the Landes “Conseil Général” decides.
Strategies for mainstreaming and up-scaling	A year of trial in three secondary schools in academic year 2001-2002 allowed then to make the necessary adjustments.
Equipment and infrastructure	
Number and type of devices	The operation was implemented gradually over time: <ul style="list-style-type: none"> • In 2001: 500 Hewlett Packard laptops, 12 NEC video projectors, 12 Smart Technologie ActivBoards, 6 Computer-Servers, 12 Scanners, 20 Epson Printers, wired cabling tables classrooms; • In 2002: 4,530 Hewlett Packard laptops, 66 Computer-Servers, 300 NEC video projectors, 300 Smart Technologie ActivBoards, 500 Hewlett Packard Printers, 300 Scanners, wired cabling tables classrooms;

	<ul style="list-style-type: none"> • In 2005: 8,500 Dell laptops, 500 EPSON video projectors, 150 Hewlett Packard Printers; • In 2008: 9,500 Toshiba laptops, 400 Epson video projectors, 600 Promethean ActivBoards, 70 Computer-Servers, 976 Aver Document visualising cameras, 150 OKI Printers; • In 2011: 4,700 Toshiba laptops, 200 NEC video projectors, 150 Promethean ActivBoards, 150 Cisco-Flip cameras; • In 2012: 4,600 Dell laptops. <p>Equipment to date (April 2012):</p> <ul style="list-style-type: none"> • Laptops: 9,500; • Video projectors: 976; • Interactive boards: 960; • Document visualising cameras: 976; • Scanners: 145; • Video cameras: 150; • Printers: 375; • Servers: 68; • Firewall - safety platforms: 37; • Electricity and Internet points: 24,000.
Additional equipment and infrastructure development	<ul style="list-style-type: none"> • Video projectors: 976; • Interactive boards: 960; • Document visualising cameras: 976; • Video cameras: 150; • Scanners: 145; • Printers: 375; • Servers: 68; • Safety platforms: 37; • Electricity and Internet points: 24,000.
Ownership of equipment	The laptops are not given, but lent to the families of secondary school students. The Landes "Conseil Général" retains ownership of the hardware.
Costs	
Financing model	100% funded by the Landes "Conseil Général".
Direct costs	Internal network cabling of schools: €7 m. Investments in hardware and collective visioning: €27 m. Software: €4 m. Staff/education assistants (1 per school): €2 m.
Indirect costs	Logistics deployment, training, small equipment, evaluation, communication: € 7 million.
Total costs	€47 m since 2001.
Support	
Policy level support	Ministry + local authorities.
School level support	The role of the principals of secondary schools was essential in organising training among teachers within the school.
Industry level support	Maintenance of equipment was included with each purchase for at least four years.
Training	
Target audience, mode of delivery of training, training methods	42% of teachers benefited from in-school training. 52% of teachers attended training sessions conducted by Inspectors.
Focus	Pedagogical focus.
Duration	Varied.
Main provider	Schools + Inspectors +CA –TICE.
Outputs/Certification	In the French educational system the initial training of apprentice teachers is essential, but once appointed teachers are not obliged to follow in-service

	training, they are not better paid or better recognised in the educational system if they do so.
Evaluation	
Was the 1:1 initiative evaluated?	Yes
Focus	Pedagogical, technical and organisational focus.
Organisation responsible for the evaluation	SOFRES, a private survey institute (external evaluation).
Method used	
Impact	
Evidence of impact (including sustainability and up-scaling)	<p>Positive overall impact.</p> <p>Two-thirds of secondary school teachers recognised that with the use of digital tools in the classroom, the motivation of students increased dramatically. The written production of students (personal blogs or wikis or collaborative platforms) increased, teenagers preferred to communicate by typing texts on their computer. Oral production in foreign languages was also simplified: in the classroom or at home, students recorded some of their homework and sent their audio files to the teacher who could regularly evaluate oral production.</p> <p>According to a TNS-Sofres survey published in July 2009,</p> <ul style="list-style-type: none"> • 57 % of 1,300 secondary school teachers in “Landes” used the computer in class, at least for half of their lessons; • 40 % of teachers reported that students used their laptops at least for half of their lessons. <p>Compared to other territories or other schools in France, those results were exceptional.</p>
Barriers and enablers	
Additional information	
Expert	<p>Alain Chaptal (LabSic University Paris 13) chaptal.alain@laposte.net</p> <p>Pierre-Louis Ghavam (Landes General Council) pierrelouis.ghavam@cg40.fr</p>
Further information	<p>Un collégien, un ordinateur (Conseil général des Landes) Mission Fourgous : Opération « un collégien, un ordinateur portable » Etude d'évaluation (SOFRES) For the timeframe, cfr. http://www.dailymotion.com/cg40#video=xcpg98)</p>

Georgia

Buki – netbook for all first grade pupils	
Timeframe	Pilot phase of the project was held in fall 2010. In the frame of the pilot phase 3,000 pupils from Tbilisi, Batumi, Kutaisi, Zugdidi, Mestia and Tserovani, and 150 Class tutors received “Buki”. Last year, 2011, all first grade 60,000 pupils received netbooks and also 3,300 class tutors the same netbooks (with special software for to control pupils netbooks).
Objective	The main aim of the project is the raise the ICT skills of pupils. Additionally, as pupils took their netbook home it could be used by other family members. Together with the netbooks, small printed manuals for parents were provided which contained basic information on how to use the netbooks.
Short description	The project aim is focused on raising the level of ICT skills of school pupils. All first grade pupils of public schools in Georgia received the netbook Buki free of charge. Buki was equipped with education games and special software for an administrator to control the pupils’ netbooks.
Context	
ICT policy context	The project is a part of the national ICT Strategy.
Rationale behind the initiative	The main rationale is to raise ICT skills of school children and also to contribute to digitally enhanced learning.
Scope	
Target audience	All first grade pupils, class tutors. Indirectly – first grader students’ families.
Number of schools	2,086 public schools, around 60,000 pupils and 3,300 Class tutors. 40 1-1 trainers have received Bukis with slightly enhanced capabilities to train and coach primary teachers.
Age range and levels of education	5-7 years old primary school children.
Geographical coverage	National, whole country.
Organisation and implementation	
Initiator	President of Georgia, Ministry of Education and Science of Georgia.
Actors involved	Ministry of Education and Science of Georgia; Intel; Microsoft; Computer Company “Algorithm”.
Strategies for implementation	Delivered netbooks to pupils and their class tutors. Trained class tutors in ICT and skills needed to use netbooks in class.
Strategies for mainstreaming and up-scaling	Project has already passed a pilot phase and from last year all first grade pupils of public schools in Georgia receive netbooks free of charge.
Equipment and infrastructure	
Number and type of devices	50,000 Bukis were purchased in 2012 and 45,000 distributed in public schools, including 3500 primary grade teachers. Microsoft – OS Windows 7 and MS Office; Intel – education materials; Skool materials localised to Georgian; education games by local developers; localised international education games. Buki were assembled by “Algorithm”, a local tech company.
Additional equipment and infrastructure development	All schools were equipped with WiFi routers in Classrooms for first grade pupils.
Ownership of equipment	The Buki netbook is the property of pupils.
Costs	
Financing model	Government of Georgia.
Direct costs	Cost of devices, equipment installation, other related direct costs. 25,000,000 Gel (approx. 15 million USD).

Indirect costs	No
Total costs	25,000,000 Gel (approx. 15 million USD).
Support	
Policy level support	Intel provides learning materials which were localised by Intel's project Skool. Algorithm assembled netbooks in Georgia. Central Government, MoES Georgia.
School level support	Trained school teachers in ICT skills.
Industry level support	Legal Entity of Public Law EMIS (established by MoES Georgia) is providing helpdesk and Telephone consulting.
Training	
Target audience, mode of delivery of training, training methods	Coaching sessions are offered for primary teachers in addition to introductory 5 day training session before the start of a school-year and 4-day training sessions in October. Each trainer-coach provides 2 individual coaching sessions (up to 2 weeks) with at least half of the trained primary teachers (in Autumn-Winter and Spring). The goal is to help integrate use of netbooks to the classroom teaching process and design technology enhanced lessons. Class tutors were trained by the Ministry of Education and Science of Georgia, based on an Intel software tutorial and locally developed training materials. Training was delivered on the workplace during the summer holidays (Source: http://tpdc.ge/old/en/news/bukebis-maswavleblebs-treningebi-daiwyo).
Focus	Raise the ICT skills of class tutors. Methods of 1-1 computing and pedagogy.
Duration	Overall training of school tutors lasted 3 months; the course consisted of 35 hours.
Main provider	Ministry of Education and Science of Georgia. http://mes.gov.ge/content.php?t=srch&search=net-book&id=2696&lang=eng
Outputs/Certification	No certification.
Evaluation	
Was the 1:1 initiative evaluated?	Not done yet.
Focus	
Organisation responsible for the evaluation	
Method used	
Impact	
Evidence of impact (including sustainability and up-scaling)	
Barriers and enablers	
Additional information	
Expert	http://www.mes.gov.ge
Further information	http://www.tlg.gov.ge/uploads/2010-%202011%20TLG%20Year%20End%20Report.pdf http://www.dea.gov.ge/uploads/GITI%202011/eStrategy.pdf http://www.mes.gov.ge/content.php?id=1110&lang=eng http://www.mes.gov.ge/content.php?t=srch&search=buki&id=2746&lang=eng http://blogs.worldbank.org/edutech/georgia http://papidze.blogspot.it/2011/10/buki-generation.html

Germany

1000mal1000: netbooks in schoolbags	
Timeframe	2003-2006/2007; now: mobiles lernen-21.
Objective	The aim was to study implementation, identify barriers or problems and the impact of notebooks on teaching and learning.
Short description	Students of class 7 were provided with personal laptops. The pilot project is part of the Lower Saxony State Initiative-21.
Context	
ICT policy context	
Rationale behind the initiative	
Scope	
Target audience	Students of class 7 receive personal netbooks and use them until the end of schooling.
Number of schools	28 schools, 4,000 students, more than 150 classrooms (Year 2006/2007).
Age range and levels of education	13-14. Secondary education.
Geographical coverage	Regional.
Organisation and implementation	
Initiator	Public-private partnership: regional government, counties and local authorities, private partners were involved.
Actors involved	Humboldt University in Berlin evaluated the project. There were also numerous private partners, who offered financing at low interest rates (paid by parents) and which sponsored hardware and software.
Strategies for implementation	Regional information events.
Strategies for mainstreaming and up-scaling	Further training of teachers. Reference schools network.
Equipment and infrastructure	
Number and type of devices	Notebooks.
Additional equipment and infrastructure development	WiFi for schools.
Ownership of equipment	Parents.
Costs	
Financing model	Parents financed the laptops, supported by the regional government and local authorities participating in the project.
Direct costs	(Depends on devices).
Indirect costs	
Total costs	
Support	
Policy level support	
School level support	
Industry level support	
Training	
Target audience, mode of delivery of training, training methods	The action programme n. 21 was responsible for organising teacher training.
Focus	Local/regional
Duration	4h/8h

Main provider	n-21 (best practice workshops by teachers for teachers).
Outputs/Certification	Yes
Evaluation	
Was the 1:1 initiative evaluated?	Yes
Focus	Project analysis and practical recommendations for action for all those who were planning a body of notebook class.
Organisation responsible for the evaluation	The Humboldt University in Berlin.
Method used	
Impact	
Evidence of impact (including sustainability and up-scaling)	The Humboldt University in Berlin report provided a detailed project analysis and practical recommendations for action for all those who were planning a body of notebook class.
Additional information	
Expert	
Further information	http://www.schulen-ans-netz.de/waswirbieten/publikationen/dokus/n21evaluationsbericht.pdf

Greece

New school-Digital school	
Timeframe	2009-2012.
Objective	Following the implementation of the pilot phase (2007) the Programme was expanded as part of the “Digital School”, aiming at the incorporation of ICT into the educational process.
Short description	Students were provided with laptops.
Context	
ICT policy context	
Rationale behind the initiative	
Scope	
Target audience	All A’ grade students and teachers in lower secondary schools all over Greece.
Number of schools	113,226 students, in all lower secondary schools all over Greece (1,894). 9,157 teachers of Philology, Mathematics and Physical Sciences.
Age range and levels of education	12-13 (lower secondary schools).
Geographical coverage	National
Organisation and implementation	
Initiator	The MoE in cooperation with the Ministry of Finance.
Actors involved	<u>MoE (supervising)</u> <ul style="list-style-type: none"> • Information Society; • Pedagogical Institute (educational software & specifications). <u>Ministry of Finance (funding)</u> <ul style="list-style-type: none"> • Digital Aid.
Strategies for implementation	Total number of students of A’ grade lower secondary school and teachers of Philology, Mathematics and Physical Sciences.
Strategies for mainstreaming and up-scaling	
Equipment and infrastructure	
Number and type of devices	122,383 laptops.
Additional equipment and infrastructure development	Supply of “Digital School” classroom equipment, consisting of: <ul style="list-style-type: none"> • 16 software programs and digital books, developed by the P.I.; • interactive whiteboards; • USB sticks \geq 4GB (included in the sum of €450 coupon). Minimum Hardware requirements: <ul style="list-style-type: none"> • CPU \geq1.3 GHz; • RAM \geq1024 MB (DDR2 or better); • Screen \geq10 inch; • Hard disk \geq120 GB (SATA); • USB ports \geq2; • Wireless LAN. Software requirements: <ul style="list-style-type: none"> • Dual Boot; • Win XP Home or better; • Open source operating system (e.g. Linux); • Educational software (installed); • Anti-virus for Windows (3 years license); • Parental Control (3 years license); • PDF reader; • Office suite for both Operating Systems.

Ownership of equipment	
Costs	
Financing model	Co-funding EU and Greece.
Direct costs	A coupon worth €450 per student.
Indirect costs	
Total costs	€55m
Support	
Policy level support	
School level support	
Industry level support	
Training	
Target audience, mode of delivery of training, training methods	<p>During 2002-2004, from a total number of 145,000 school teachers, 108,500 attended teachers' ICT basic skills training programme (Phase 1) and of these 80,500 were already successfully certified. The programme consisted of the following units: basic concepts of Informatics and the use of a PC; word processing; spread sheets; presentation and database applications.</p> <p>The subject of Phase 2 of the teachers' training programme was the professional development of teachers in ICT exploitation in school practice, aiming:</p> <ul style="list-style-type: none"> • to familiarise them with the use of the basic computer applications; • to enable them to exploit the new technologies in class and; • to support the educational process. <p>Thus, during 2005–2008:</p> <ul style="list-style-type: none"> • 4,200 attended a teachers' ICT basic skills training programme (Phase 2.1) and of these 2,821 have already been successfully certified at Specific Training Centres (KΣΕ); • 357 attended University Training Programmes (ΠΙΑΚΕ) on ICT and have been awarded the title of ICT trainer. <p>In the last part of the project:</p> <ul style="list-style-type: none"> • 27,600 school teachers attended a Training Programme at Specific Training Centres (KΣΕ); • 202 awarded the title of ICT trainer, after having attended a University Training Programme (ΠΙΑΚΕ) in ICT.
Focus	
Duration	
Main provider	
Outputs/Certification	
Evaluation and Impact	
Was the 1:1 initiative evaluated?	Yes
Focus	
Organisation responsible for the evaluation	
Method used	
Impact	
Evidence of impact (including sustainability and up-scaling)	Still in progress.
Barriers and enablers	
Additional information	
Expert	
Further information	<p>MoE(supervising) Information Society (www.ypepth.gr/ktp_index.htm) Pedagogical Institute (educational books, software & specifications) (www.pi-schools.gr)</p>

	<p>(http://www.pi-schools.gr/books/gymnasio)</p> <p>(http://www.pi-schools.gr/books/dimotiko)</p> <p>E-yliko (www.e-yliko.gr)</p> <p>Training Phase</p> <p>(http://bepipedo.cti.gr/portal/index.php?option=com_content&task=view&id=242&Itemid=880)</p> <p>http://www.oepek.gr/index_gr.html</p> <p>RACTI (Research Academic Computer Technology Institute)</p> <p>(http://www.cti.gr)</p> <p>(http://b-epipedo2.cti.gr/portal)</p> <p>(http://b-epipedo.cti.gr/portal)</p>
--	---

Ireland

Connect School Project - St Aidan's Community School	
Timeframe	2006-2008 (3 years initial funding), since then ongoing.
Objective	To develop student-centred technology and create a Virtual Learning Environment for students and teachers.
Short description	The aim of the project was to improve the educational outcomes of students through investment in ICTE. The delivery of education to the students of St. Aidan's was enhanced through ICT- enabled classrooms and the use of ICT on a daily basis in a context of a disadvantaged community.
Context	
ICT policy context	
Rationale behind the initiative **	<i>** Complementary data from the desk research</i> The CONNECT Project is an initiative of South Dublin County Council and comprises a range of projects and strategies that are being implemented in South Dublin to achieve a vision where everyone in the County uses the internet as an everyday tool to improve their quality of life. CONNECT's mission is to deliver a free and easy to use service that enables local communities to use technology in innovative ways to achieve their goals and to put local content on the worldwide web. (Source: http://es.scribd.com/doc/98287986/Connect-School-Evaluation-Report , p. 10)
Scope	
Target audience	Students, teachers.
Number of schools **	Laptops were rolled out to the teachers of St. Aidan's in May 2006. In February 2007 laptops were rolled out to all 1st years for use throughout their school career and to each subsequent year's intake of students. <i>** Complementary data from the desk research</i> 300 students (Source: http://es.scribd.com/doc/98287986/Connect-School-Evaluation-Report p. 11).
Age range and levels of education	1st – 5th year students, secondary education.
Geographical coverage	Local
Organisation and implementation	
Initiator	The <i>Connect School Project</i> was officially launched by Minister Mary Hanafin, Department of Education and Science in April 2007.
Actors involved	Connect School was delivered with the support of South Dublin City Council, National Centre for Technology in Education/the Department of Education and Dublin West Education Centre and Institute of Technology.
Strategies for implementation	Student commitments to participate in the project on entering school.
Strategies for mainstreaming and up-scaling	
Equipment and infrastructure	
Number and type of devices	550 laptops
Additional equipment and infrastructure development	A wireless network was installed throughout the school. Video projectors were installed in all classrooms and the school invested in a number of digital cameras and IWBs.
Ownership of equipment	
Costs	
Financing model	Funding for broadband, teacher professional development and other supports provided by the NCTE.

Direct costs	South Dublin County Council funded the yearly purchase of the laptops.
Indirect costs	
Total costs	
Support	
Policy level support	
School level support	
Industry level support	
Training	
Target audience, mode of delivery of training, training methods	A Core Group of Teachers with high ICT Skills was initially identified through an ICT audit and this group led the project within the school and developed and delivered the training programme to their colleagues. The success of this peer-to-peer learning approach was the key to the success of the project.
Focus	Pedagogical focus: daily use of laptops incorporated into existing pedagogical approaches, but within a developed technology management strategy for the classroom developed by the teachers.
Duration	
Main provider	
Outputs/Certification	
Evaluation	
Was the 1:1 initiative evaluated? **	Yes, available at: http://scotens.org/docs/2010-mvet.pdf http://es.scribd.com/doc/98287986/Connect-School-Evaluation-Report
Focus **	** <i>Complementary data from the desk research</i> - Measure and assess the effectiveness of the project in achieving its stated goals and the outcomes over the duration of the project lifetime; - Make recommendations to inform the future planning of the project and other ICT in education initiatives over the duration of the project lifetime. (Source: http://es.scribd.com/doc/98287986/Connect-School-Evaluation-Report)
Organisation responsible for the evaluation**	FGS Consulting.
Method used**	** <i>Complementary data from the desk research</i> - Desk-based research including a literature review and analysis of VLE data and school administrative statistics; - Focus groups with students and teachers at St Aidan's Community School; - Semi-structured interviews with key stakeholders identified by the Steering Committee. (Source: http://es.scribd.com/doc/98287986/Connect-School-Evaluation-Report)
Impact	
Evidence of impact (including sustainability and up-scaling)	Project outcomes: <ul style="list-style-type: none"> • Higher school attendance rates; • Improved participation levels in class; • Better educational outcomes for students; • New teaching methodologies developed; • Increased awareness and application of ICT.
Barriers and enablers	
Additional information	
Expert	
Further information	http://connect.southdublin.ie/ http://connect.learnonline.ie http://connectschool.blogspot.it

Italy

ArdesiaTech	
Timeframe	2010 – ongoing.
Objective	Evaluate the positive effects associated with the provision of technological devices in primary schools.
Short description	<p>This project adopts an experimental method based on the researchers' observation about changes in learning environment after the introduction of new technologies in three pilot primary schools. The data available at the end of this pilot will enable ANSAS-INDIRE researchers to answer to some relevant questions on:</p> <ul style="list-style-type: none"> • The change in the traditional classroom learning environment. If the introduction of new technological devices could promote the digital evolution of the social structure of the classes, with particular attention given to the possibility that a digital learning environment, specifically geared to collaborative teaching, can foster deeper and meaningful relationships between students themselves, and with their teachers; • The impact that this environment can have on the model of teaching/learning; • The possibility of integration with this existing educational model; • The impact on students' learning processes.
Context	
ICT policy context	This project is embedded in the framework of the National Initiative for the implementation of information Technology and it was implemented from INDIRE-ANSAS since the construction of the plexus "Baccio da Montelupo Institute", which clustered together the scattered small schools, giving access to Internet connection.
Rationale behind the initiative	The project was created with the intention of observing, in a limited controlled context, the innovative practices initiated in a technologically-advanced learning environment. The results of the research provide experience-based areas of focus, which can guide those who would like to take on innovative educational technology projects.
Scope	
Target audience	Students, teachers, schools.
Number of schools	1 comprehensive school, 3 primary classes involved.
Age range and levels of education	Primary classrooms, level III and IV.
Geographical coverage	Local
Organisation and implementation	
Initiator	ANSAS-INDIRE
Actors involved	<ul style="list-style-type: none"> • Schools: "Baccio da Montelupo"; • Universities: The Department of Human Sciences for Education "Riccardo Massa" of University Milano Bicocca; • Private companies: ASPHI, Intel, Microsoft, SMART Technologies.
Strategies for implementation	In order to gather a multi-perspective narrative of the ongoing experience, the evaluation has been carried out as an extended unit through the typical instruments of qualitative inquiries (focus, interviews, field observation, logbooks, diaries and videos) and the observation of the impact with respect to three fundamental directions of school autonomy: identity, collaborative learning and organisational models.
Strategies for mainstreaming and up-scaling	A case study was extrapolated from the research, which in itself does not lead to functional generalisations and full explicability, nor the perfect exportability of the study. But the case study demonstrates that this experience can indeed be considered pragmatic and can provide the basis for a larger-scale test of this

	model.
Equipment and infrastructure	
Number and type of devices	One Interactive Whiteboard to each classroom, SMART Wireless Slates, SMART Interactive Learning Tables, SMART Classroom Suite Interactive Learning Software, Microsoft Windows 7, Microsoft Office, 68 Classmate PCs Intel.
Additional equipment and infrastructure development	<ul style="list-style-type: none"> • A local network device was developed with broad band network connectivity in order to allow greater access between students' personal and shared devices as the interactive whiteboard – class and the interactive table; • Mobile storage devices; • Wi-Fi access points dedicated to each class.
Ownership of equipment	Technological companies own the devices which are lent to schools.
Costs	
Financing model	The technological companies directly provided the equipment to the schools and ANSAS-INDIRE funded the research team. The budget included: one project manager, several experts who carried out direct observation in classes and formed a focus group on teachers, external consultants and technological support.
Direct costs	
Indirect costs	Estimated costs for external sources: about 20,000 €.
Total costs	
Support	
Policy level support	The local authority provided the Internet access.
School level support	The school supported the project through the involvement of the teachers and the development of project dissemination strategies to the local community.
Industry level support	Several companies in the technology sector provided schools with new technology for testing their devices into a controlled setting.
Training	
Target audience, mode of delivery of training, training methods	Trainings have been conducted to primary schools' teachers covering vast areas of different skills and abilities to enable a successful start-up.
Focus	Trainings mainly focused on the presentation of some examples of using SMART Notebook software including on the Interactive Whiteboards, then move on to the concrete use of the tools and eventually introduces the instruments in the collection of multimedia software, and ending with the use of Internet and the SMART Exchange online community (http://exchange.smarttech.com) as a source of examples and ideas for the very first stage. Other trainings promoted by ASPHI focused on the subject of the "digitally inclusive classroom" through simulations.
Duration	The first intensive training is done throughout the month of July 2010.
Main provider	ANSAS-INDIRE, ASPHI.
Outputs/Certification	
Evaluation	
Was the 1:1 initiative evaluated?	Some first results are available after the first year of the project's implementation.
Focus	The evaluation was focused on what happens in the classroom with an advanced technological setting. Researchers observed the social dynamics of the classroom, the role of the teacher and teachers' and students' perceptions of the atmosphere of the new learning environment.
Organisation responsible for the evaluation	INDIRE – ANSAS researchers.
Method used	

Impact	
Evidence of impact (including sustainability and up-scaling)	<p>First results after one year:</p> <ul style="list-style-type: none"> • The computers introduced in the classroom didn't replace what already existed but exploited their real potential for innovation in the learning environment, as a means of communication, sharing, and exchange; • The introduction of ICT in classroom had a very positive approach that stimulated the active participation of teachers as it has rarely seen in the traditional technology courses aimed at school; • In the three pilot classes, the technology was intentionally directed at enhancing social relationships, teamwork, cooperation and the decentralisation of the role of the teacher. The results of this process remain to be investigated.
Barriers and enablers	
Additional information	
Expert	Leonardo Tosi, Giovanni Nulli – ANSAS-INDIRE
Further information	www.indire.it <i>Complementary data from the desk research</i> http://www.scuola-digitale.it/category/prog_part/ardesiotech/ http://mediarepository.indire.it/iko/uploads/allegati/LV41DIAB.pdf

Cl@ssi 2.0	
Timeframe	Start date: 2009 - End date: 2012
Objective	The target of this project is to equip all the teachers and students of primary and secondary schools with technological devices.
Short description	The project aims at innovating the learning environment using ICT and modification of the future of the classroom.
Context	
ICT policy context	It is part of the larger action plan: Digital school.
Rationale behind the initiative	The rationale is based on pedagogical change and design of a new approach in relationship with educational space organisation.
Scope	
Target audience	Students, teachers.
Number of schools	156 lower secondary, 136 primary, 142 secondary.
Age range and levels of education	11-15 years old.
Geographical coverage	National project.
Organisation and implementation	
Initiator	Ministry of Education.
Actors involved	19 Italian Universities have conducted coaching activities about the piloting of new ICT usage; Regional offices of the MoE (namely USR) which, on a regional basis, coordinated the observation activities; ANSAS and its regional offices coordinated the documentation activities and online learning communities.
Strategies for implementation	Cl@ssi 2.0 is a project that is addressed to a small number of classroom (500 in total: primary, lower secondary, secondary). It is a bottom-up project since each school that has taken part to the pilot had to present a plan of use of ICT.
Strategies for mainstreaming and up-scaling	No plans.
Equipment and infrastructure	
Number and type of devices	It's up to schools to decide the number and type of devices once they have received the budget from the Ministry of Education. However ANSAS has estimated that at least each school has one interactive whiteboard, and a laptop or a netbook (70% of schools opted for a netbook and 30% for a laptop).

Additional equipment and infrastructure development	
Ownership of equipment	The device is owned by the school and it is lent to the student.
Costs	
Financing model	The Ministry of Education funded each of the 156 lower secondary school with €30,000 at the beginning of the initiative. MoE did the same for the primary school level (146) and for the Upper Secondary school (136), funding €15,000 per classroom.
Direct costs	Only direct costs were admitted.
Indirect costs	The school funded other initiatives with its own funds.
Total costs	€4,680,000 the first tranche. €4,230,000 the second tranche.
Support	
Policy level support	The support team was composed by <ul style="list-style-type: none"> • Ministry (overall coordination); • Regional office of the MoE: regional coordination of activities of the school and Universities.
School level support	
Industry level support	On school basis.
Training	
Target audience, mode of delivery of training, training methods	Both on site and on line.
Focus	Design of the classroom activity with ICT (namely laptop, digital resource).
Duration	Overall project.
Main provider	ANSAS and researchers on the regional offices.
Outputs/Certification	Not included.
Evaluation	
Was the 1:1 initiative evaluated?	Still ongoing.
Focus	Modification of the learning environment; improvement of learning outcome by the students.
Organisation responsible for the evaluation	S. Paolo Foundation and Agnelli Foundation.
Method used	Collection of data in three school year pilot.
Impact	
Evidence of impact (including sustainability and up-scaling)	Some evaluation and results will be available at the end of June 2012.
Barriers and enablers	
Additional information	
Expert	Dott. Rossella Schietroma Uff V - Ministry of Education Rosella.schietroma@istruzione.it
Further information	http://www.istruzione.it/web/istruzione/piano_scuola_digitale/classi_2_0

Lithuania

Use of iPad tablet devices in education	
Timeframe	2011-03-01 – 2012-03-01.
Objective	The main objective of this initiative was to pilot the tablet devices in the everyday educational process. The aim was to identify and consider the challenges raised by mobile technologies.
Short description	The initiative started in 2010 when the Ministry of Education and Science (MoE) started the e-textbook initiative and the mobile devices started to be considered as the suitable technology to implement e-textbooks in general basic school. The very first idea was to try to implement e-reader devices, but after discussion with the stakeholders it was decided to pilot tablets instead of e-readers. More information in Lithuanian is available on the Centre of Information Technologies of Education (CITE) website: http://www.ipc.lt/?p=2265#more-2265 iPad tablets were purchased by CITE while implementing public procurement procedures. 90 pupils from 3 secondary schools have received the devices.
Context	
ICT policy context	The essential issue was to use tablets in order to widely implement electronic textbooks. It was also important to pilot pedagogic and organisational activities using tablets and e-textbooks. Besides this, it was planned to analyse the challenges raised by the new pedagogical approaches and examine organisational processes required by teachers and headmasters.
Rationale behind the initiative	Equipping schools, lower digital divide. A new organisation of teaching/learning process was piloted in schools since the learners brought the tablets together with them from classroom to classroom. Immediate feedback was given by the teachers if there were any problems with the use of the hardware and software. Numerous educational apps were used during the lessons, e.g. App Store. iBooks were also used: over 60 iBooks in Lithuanian language and literature were prepared before and during the project implementation. 3 secondary schools participated in the pilots: 2 classes from one school, and 1 class from two other schools. Every pupil from those classes has received an iPad tablet device.
Scope	
Target audience	Students, teachers, parents, schools administration, private publishers.
Number of schools	3 schools/1-2 classes/90 students.
Age range and levels of education	Lower secondary level of education, up to 13 years (30 persons). Higher secondary level: 16-17 years (30). Higher secondary level: 17-19 years (30).
Geographical coverage	Siauliai, Birzai, and Pasvalys regions.
Organisation and implementation	
Initiator	Ministry of Education and Science together with the industry partners (Omnitel – mobile technologies enterprise, and publishers: Sviesa and TEV).
Actors involved	Technologies were purchased by CITE. Training and evaluation was provided by Education Development Centre with the help of AVAD Baltic enterprise (Apple authorised distributor).
Strategies for implementation	Top-down and bottom-up strategies (school visions were analysed while providing tablets to particular schools); stakeholder consultations.
Strategies for mainstreaming and up-scaling	Lithuania has ambitions to continue this initiative: it is currently under plan a large-scale tablets implementation project from September 1st 2012 in 100 schools (about 5,000 students).
Equipment and infrastructure	
Number and type of devices	At the first stage iPads (100 devices) were provided as well as iOS software.
Additional equipment and infrastructure development	3G connection cards were provided by Omnitel enterprise.

Ownership of equipment	CITE owned the devices, and schools were provided with the tablets according to the hardware usage agreements between CITE and the schools. Siauliai and Birzai schools' pupils used the tablets both at school and at home, and Pasvalys region students used the tablets at school only.
Costs	
Financing model	MoE was the main funder of the initiative. Omnitel enterprise maintained 1G data per month per tablet. Sviesa and TEV publishers provided with all pilot students with e-textbooks in pdf format on all subjects except music and Siauliai school used International Bachelor's e-textbooks.
Direct costs	The cost of 90 iPads provided for pupils and 10 iPads - for teachers was about € 69.580,00
Indirect costs	
Total costs	
Support	
Policy level support	Ministry of Education and Science, Education Development Centre, Centre of Information Technologies of Education. Education Development Centre provided training for teachers and pupils.
School level support	
Industry level support	Omnitel enterprise maintains 1G data per month per tablet.
Training	
Target audience, mode of delivery of training, training methods	Teachers, students, and headmasters were involved in the pilot activities during three days.
Focus	Pedagogical and technical.
Duration	One day training was organised in April, one in September, and one in December 2011.
Main provider	Education Development Centre with the help of AVAD Baltic.
Outputs/Certification	No certification was provided since the project will be implemented further.
Evaluation	
Was the 1:1 initiative evaluated?	Yes
Focus	Analysis of students' outputs and motivation while using the tablets. Besides that, the teachers' opinion on development of teaching and learning methods was analysed.
Organisation responsible for the evaluation	Education Development Centre.
Method used	
Impact	
Evidence of impact (including sustainability and up-scaling)	<ul style="list-style-type: none"> The survey results showed that teachers used iPads seeking different goals, i.e. to provide more learning possibilities to students, to make teaching/learning process more differentiated and more interesting for students, to motivate them; to try to personalise learning by using tablets at home; to help developing knowledge practical application skills. On the other hand, iPads were rarely used to integrate several teaching subjects and to closely interconnect the learning topics with the everyday life. The respondents want to continue tablets integration into teaching/learning process in schools. The main reasons were as follows: students became more independent and more responsible for their own learning; tablets are convenient and mobile; tablets increased the students' motivation and their learning personalisation possibilities; they decreased copying expenses since all additional method material is available in digital form.

	<ul style="list-style-type: none"> • The headmasters noticed the positive point of view of parents on using tablets in schools. • Pilot teachers made presentations to the other schools' teachers during method events in their regions. • More information is available in the website of Education Development Centre http://www.upc.smm.lt/naujienos/ipad/susitikimas/iPad_apklauskos.pdf
Barriers and enablers	There is a problem mentioned in the survey: the pupils could not use interactive learning objects from the Lithuanian learning object repositories since those learning objects were created mostly using Flash animation technology, and this technology is not compliant with iPad software.
Additional information	
Expert	
Further information	http://www.upc.smm.lt/naujienos/ipad/susitikimas.php http://www.upc.smm.lt/naujienos/ipad2/ipad.php http://portals.emokykla.lt/Elektroniniai%20leidiniai/Puslapiai/Publikacija5050.aspx?ID=426 http://www.upc.smm.lt/naujienos/apple/renginys.php

Norway

Initiative	
Timeframe	From autumn 2006.
Objective	To equip all upper-secondary students with laptops.
Short description	From 2006, county school authorities in all parts of Norway have run projects aimed at equipping all students with personal laptops. These projects should partly be seen in relation to the new clause in the education law, which lays down the right to learning resources free of charge in primary and secondary education. Related to the laptop initiatives one should also mention the creation of a portal with free-of-charge learning resources called “National Digital Learning Arena” (NDLA).
Context	
ICT policy context	
Rationale behind the initiative	
Scope	
Target audience	All students in upper secondary education.
Number of schools	
Age range and levels of education	16–19. Upper secondary.
Geographical coverage	National.
Organisation and implementation	
Initiator	County authorities.
Actors involved	County authorities and local schools.
Strategies for implementation	
Strategies for mainstreaming and up-scaling	
Equipment and infrastructure	
Number and type of devices	Approximately 180,000 laptops.
Additional equipment and infrastructure development	
Ownership of equipment	
Costs	
Financing model	County authorities’ spending was partly covered by funds from the Ministry of Education aimed at providing all students with free-of-charge learning resources (both analogue and digital). Each student paid an annual leasing fee of about €100; this was the minimum study fund for which any student was eligible.
Direct costs	Rough estimate = €30m/year (which includes the students’ leasing fee).
Indirect costs	
Total costs	
Support	
Policy level support	
School level support	
Industry level support	
Training	
Target audience, mode of delivery of training, training methods	This varies a lot. There was no national initiative related to the laptop initiative.

Focus	Pedagogical focus: There were several scenarios which evolved from this national project, but little has been done to collect and share these scenarios.
Duration	
Main provider	
Outputs/Certification	
Evaluation	
Was the 1:1 initiative evaluated?	Yes
Focus	Focus on several levels (national and local). But no system of collection and sharing of these evaluations.
Organisation responsible for the evaluation	
Method used	
Impact	
Evidence of impact (including sustainability and up-scaling)	
Barriers and enablers	
Additional information	
Expert	Please contact Gunstein Egeber: gunstein.egeber@iktsenteret.no
Further information	

Portugal

e-escolinha	
Timeframe	September 2008 – February 2011.
Objective	<ul style="list-style-type: none"> To expand computer and Internet use in the first stages of education; To ensure that families have access to computers.
Short description	This initiative intended to provide primary level (6-10) students access to personal computers (Netbooks) with educational content. Those computers were named as “Magalhães”.
Context	
ICT policy context	The initiative is part of the national ICT programme (Educational Technology Plan – PTE).
Rationale behind the initiative	The initiative intended to equip students, narrow the digital divide and, progressively, introduce pedagogical change.
Scope	
Target audience	Students and families were the direct targets. There was a parallel initiative (“e-escola”) that also provided teachers and secondary school students with access to laptops at special prices and conditions.
Number of schools	600,000 PCs delivered (all learners).
Age range and levels of education	Primary level (age 6-10).
Geographical coverage	National coverage.
Organisation and implementation	
Initiator	Ministry of Education and Ministry of Public Works, Transports and Telecommunications.
Actors involved	The implementation was done through collaborative work between two sectors of the MoE (DGIDC, former Directorate-General of Innovation and Curricular Development, now Directorate-General of education and GEPE, former Cabinet of Statistics and Educational Planning, now Directorate-General of Statistics of Education and Science).
Strategies for implementation	A top-down initiative was implemented by the Government, with the support of several companies, universities, school boards and school’s associations training centres.
Strategies for mainstreaming and up-scaling	No.
Equipment and infrastructure	
Number and type of devices	Intel Classmate PC <ul style="list-style-type: none"> Atom N450 Intel processor; 1 GB DDR2 RAM memory; 160GB (minimum) hard drive; WSVGA 1024x600, com 32-bit colour graphic card; Integrated soundcard 2 integrated speakers and microphone; Integrated network card 10/100 Mbit/s interface RJ45. 802.11 b/g/n wireless protocol; Portuguese keyboard with track pad spill-resistant; 10.1 inch TFT screen, with native resolution WSVGA 1024x600; 3 USB 2.0 ports, computer boot capacity via USB; 7 hours autonomy battery (measured by benchmark BAPCo MobileMark2007); 1.5 kg (with battery and integrated handle); Free-fall resistant (tested within EN 60068-2-32 regulation); Dual boot: Microsoft Windows 7 / Linux Caixa Mágica; Microsoft Office 2007 / Open Office;

	<ul style="list-style-type: none"> • Antivirus; • Educational apps.
Additional equipment and infrastructure development	Some online platforms were developed (see last topic).
Ownership of equipment	The students and families owned the equipment.
Costs	
Financing model	The programme was partly financed by the Government with a small contribution from families, based on families' income.
Direct costs	Direct costs (paid value until 9 th April 2012): € 51,675,600.64 (VAT included).
Indirect costs	Legal advice: € 5,717.25 (VAT included). Research projects (referred in evaluation and impact section) on the use and impact of computers: €213,110.76 (amounts paid up to 9 th April 2012, VAT included).
Total costs	Direct costs: €55,700,000. Overhead: €337,200.
Support	
Policy level support	The MoE provided teacher support. All the content was available in general documentation, support guides, software (general and educational) as well as tips about non-official platforms and content.
School level support	Moodle platform "ICT at pre-school and primary school levels" and @escolinha online workshops were provided to schools and teachers.
Industry level support	Companies provided some level of technological support (under the warranty of the equipment).
Training	
Target audience, mode of delivery of training, training methods	Online workshops were available for teachers. Formal training (in presence) was provided by local school associations training centres.
Focus	The main focus of training was on pedagogical issues: on how to integrate both the equipment and ICT tools in teaching-learning processes.
Duration	Several training courses with 15 hours each were delivered, providing teachers with the opportunity to receive an ICT Competency Certification (one third of the teachers received this certification).
Main provider	Ministry of Education.
Outputs/Certification	ICT Competency Certification.
Evaluation	
Was the 1:1 initiative evaluated?	Yes
Focus	Two of the research projects are entitled "The computer between School and Family - a sociological perspective on its effects" intended to identify the sociological profile of users of "Magalhães" computers, to characterise their use by various actors, to know the various social and school effects of computer use and to discover the specificity of this computer compared to other computers. As planned, the final overall reports were delivered in December 2011. Another research project was entitled "Educational use of the Magalhães computer at primary level in the northern region of Portugal". Its objectives were: the characterisation of the usage of computers in classroom, school, home and community; the identification and description of forms of interaction among children with the computer in their everyday lives, the identification and characterisation of attitudes and needs of students, teachers and parents in individual use of the computer as well as the identification of the implications of its individual use in systems and in school support services and initial and in-service training of teachers on systems. The final report should be finalised by 31 August 2012.

<p>Organisation responsible for the evaluation</p>	<p>The second stage of the programme was evaluated internally and externally. This assessment, covered the period from September 2009 to August 2011.</p> <p>For the internal evaluation in 2010, a survey among teachers on the use of these computers was published: "Report: Teacher survey on the use of Magalhães computer."</p> <p>The programme was again evaluated externally by three higher education institutions with which the Portuguese government signed contracts to provide service:</p> <ul style="list-style-type: none"> • University of the Azores-responsible for the research project " The Magellan computer between school and family in a primary school in Ponta Delgada: a sociological view on its effects"; • Polytechnic Institute of Leiria-responsible for the research project "The Magalhães computer between school and family in a School's Cluster of Leiria: a sociological view about its effects"; • University of Minho (Institute of Education)-responsible for the research project "Educational usage of Magalhães computer e in primary schools in northern Portugal" - project to be completed in August 2012.
<p>Method used</p>	<p>The methodology of investigation consists mostly of case studies.</p>
<p>Impact</p>	
<p>Evidence of impact (including sustainability and up-scaling)</p>	<p>The two studies on “Magalhães computer between home and school: a sociological perspective on the effects” showed that the laptop is used by children in various contexts, having been used especially in family contexts where a multitude of educational entertainment and communication uses were observed. The fact that these individual computers are portable allowed a significant flexibility in their use.</p> <p>The Magalhães computer was seen as a true personal computer by the child, having been the object of increasing use in the classroom.</p> <p>The contents that were mainly used were about writing, drawing, educational games, using online encyclopaedias and the Internet, used mainly for research purposes.</p> <p>In the context of the classroom, the computer is mostly used in language learning (Portuguese), especially for word processing, and also in the curriculum areas of Environmental Studies, Mathematics and Arts.</p> <p>The research project “Educational usage of Magalhães computer in primary schools in northern Portugal” has a time scale of three years, developing a dynamic research-action with the voluntary participation of teachers, classes and schools, framed by a research team within the educational research on ICT and experience in initial and in-service training of teachers.</p> <p>The project focuses on seven dimensions, four thematic and three regional organisations: i) using the Internet to support reading and writing of students with specific learning disabilities; ii) “Programming with Squeak is cool!”; iii) “Browse with technologies on the road to full training and the critical and creative thinking of children”; iv) “My own dictionary-My Dictionary”; v) “The Benedictine Monks and technology”; vi) “The educational use of the Magalhães computer in the regions of Amarante and Felgueiras”; and vii) “The educational use of Magalhães computer in the district of Bragança”.</p>
<p>Barriers and enablers</p>	
<p>Additional information</p>	
<p>Expert</p>	<p>Professor João Filipe de Matos from the Institute of Education of the University of Lisbon: http://www.ie.ul.pt/portal/page?_pageid=406,1301507&_dad=portal&_schema=PORTAL Email: jfmatos@ie.ul.pt</p>

	<p>Professor Pedro Silva project coordinator for “The Magellan computer between school and family in a Group of Schools in Leiria: a sociological view of their effects”. Polytechnic Institute of Leiria. Email: pedrosilva.ipl@gmail.com</p> <p>Professor Antonio Osorio project coordinator for «The educational use of the Magalhães computer in primary level in North Portugal», University of Minho. Email: ajosorio@ie.uminho.pt</p> <p>Professor Ana Diogo project coordinator for «The Magalhães Computer between school and family in a primary school in Ponta Delgada: a sociological view on the effects», University of the Azores. Email : adiogo@uac.pt</p>
Further information	<p>http://www.pte.gov.pt/pte/PT/Projectos/Projecto/Apresenta%C3%A7%C3%A3o/index.htm?proj=72</p> <p>https://www.portaldasescolas.pt/portal/server.pt/community/eescolinha-01iniciativa/271</p> <p>http://www.eescola.pt/e-escolinha/oquee.aspx</p> <p>http://erte.dgicd.min-edu.pt/index.php?section=11</p> <p>http://www.microsoft-iniciativamagalhaes.com/</p> <p>http://www.gepe.min-edu.pt/</p> <p>http://pigafetta.ie.uminho.pt/</p> <p>http://barometro.com.pt/archives/502</p>

Slovakia

Notebook for Every Pupil	
Timeframe	Trstená – since the academic year 2007/2008; Bošany – since the academic year 2008/2009; Abramovce – since the academic year 2009/2010; Košice – since the academic year 2009/2010.
Objective	The goal of the project was to implement 1:1 in schools in Slovakia and gather feedback for other projects.
Short description	1:1 initiative in elementary and secondary schools.
Context	
ICT policy context	It was an isolated project without broader initiative.
Rationale behind the initiative	The rationale was to experiment on pedagogical change with the 1:1.
Scope	
Target audience	Student, teachers, parents, communities.
Number of schools	Six schools.
Age range and levels of education	The youngest class: Trstená in its 2nd grade in 2007/2008; the oldest class: Bošany in its 9th grade in 2011/2012, Abramovce 2nd grade.
Geographical coverage	Selected locations outside of the capital.
Organisation and implementation	
Initiator	Microsoft.
Actors involved	Microsoft academic programme manager, teachers and headmasters of the schools, commercial partners.
Strategies for implementation	Bottom-up strategy.
Strategies for mainstreaming and up-scaling	Not present.
Equipment and infrastructure	
Number and type of devices	15x Asus EEE netbook, 60xLenovo S10 netbooks.
Additional equipment and infrastructure development	Mouse, SD card.
Ownership of equipment	School or students, we experimented with this.
Costs	
Financing model	Funded by private partners.
Direct costs	€30,000
Indirect costs	€15,000
Total costs	€45,000
Support	
Policy level support	Local authorities.
School level support	Workshops for teachers.
Industry level support	
Training	
Target audience, mode of delivery of training, training methods	
Focus	
Duration	
Main provider	
Outputs/Certification	

Evaluation	
Was the 1:1 initiative evaluated?	Yes
Focus	Impact of the project on all relevant actors.
Organisation responsible for the evaluation	External – Faculty of Education, Comenius University.
Method used	Cognitive tests, scale questionnaires and individual interviews with pupils, interviews and focus groups with teachers, questionnaires for parents.
Impact	
Evidence of impact (sustainability and up-scaling)	
Barriers and enablers	
Additional information	
Expert	Radomír Masaryk, PhD., Researcher (dzimejl@gmail.com)
Further information	www.NotebookPreKazdehoZiaka.sk

Spain

Escuela 2.0	
Timeframe	From 2009 to 2013.
Objective	Modernise schools and the ways that students learn, teachers teach and schools are organised. Education is centred on the achievement of the key competences through the active role of students with the aid of the right technology.
Short description	<i>Escuela 2.0</i> is a project focused on the integration of ICT in schools based on the use of one netbook per student in the context of classrooms equipped (with IWBs) and connected (broadband WiFi, intranet and Internet).
Context	
ICT policy context	It is the national programme of ICT in schools. Embraces and cooperates with already existing 1 to 1 regional programmes; some Autonomous Communities have decided to rename it according to those existing projects (Escuela TIC 2.0, Educat 1x1, etc.).
Rationale behind the initiative	The 1:1 model technologies and pedagogies, at the time being, are judged the most suitable to face the challenges of learning and teaching in a changing knowledge society where ICT can facilitate students' acquisition of key competences.
Scope	
Target audience	Students in 5th grade receive a netbook that they keep until the 8th grade. This is done for four years, therefore students from 5th to 8th grade end up participating in the project. (Some Autonomous Communities have changed this general pattern). Teachers get one laptop and training opportunities. The school receives equipment such as IWBs and classroom connectivity.
Number of schools	27,041 classrooms. 634,549 students. (These figures refer to the status of the project <i>Escuela 2.0</i> as of May 31st, 2011).
Age range and levels of education	Students from 5th to 8th grade.
Geographical coverage	National (except the Autonomous Communities of Madrid and Valencia).
Organisation and implementation	
Initiator	Ministry of Education and the Autonomous Communities.
Actors involved	Ministry of Education and the Autonomous Communities are responsible for the project. There has been an important contribution from university researchers in the evaluation.
Strategies for implementation	Since the Spanish education system allows for limited economic autonomy for schools the implementation follows a top-down approach where education authorities, national and regional, establish the main guidelines and take charge of deployment and teacher training, etc.
Strategies for mainstreaming and up-scaling	<i>Escuela 2.0</i> is the national mainstream programme, nevertheless in its conception it took into consideration previous projects carried out regionally, in general of a smaller scope.
Equipment and infrastructure	
Number and type of devices	634,549 netbooks (Windows, Linux or dual boot depending on the preferences of each Autonomous Community). Educational software can be accessed through the national repository AGREGA. Some Autonomous Communities provide some educational software in the equipment, like those with customised Linus distributions.
Additional equipment and infrastructure development	27,041 classrooms equipped with IWBs and WiFi connectivity. Infrastructure (HD and SW) for the national online repository of educational content AGREGA. Production of digital contents.
Ownership of equipment	The students keep the netbook for four school years, and will own it afterwards.

Costs	
Financing model	Call for tenders through public funding.
Direct costs	
Indirect costs	
Total costs	50% share of the co-funding of <i>Escuela 2.0</i> from the budget of the Ministry of Education during calendar years 2009, 2010 and 2011: 293,648,808 Euros. Total cost of the programme for these three years should roughly correspond to less than twice this figure since the Autonomous Communities share 50% of the cost of the programme for year 2011. This was done on a voluntary basis due to budgetary restrictions in regional governments.
Support	
Policy level support	Ministry of Education and the Autonomous communities provided online and in- person training. They also provided the logistic support for deployment in cooperation with industry.
School level support	ICT school coordinators at school are responsible for all aspects of the integration of ICT in the school. More specific training, for example in the use of the IWB, was sometimes provided at school.
Industry level support	Hardware companies provide standard support as sellers of equipment. One major communication company offers a “homework ADSL tariff” (tarifa deberes) negotiated as part of the programme.
Training	
Target audience, mode of delivery of training, training methods	160,111 (figure refers to the status of the project <i>Escuela 2.0</i> as of May 31st, 2011) teachers have participated in training activities since 2009, mainly online courses. Also two large conferences (of around 500 teachers participating at each) for teachers were held during 2010 and 2011 with an emphasis on showcasing teaching practices.
Focus	Courses are classified along two dimensions: expertise in the use of ICT (beginners or experts) and content (centred on tools or in methodologies). They address all sorts of topics related to the use of ICT in the school.
Duration	On line courses’ average duration is two months and they account from 40 to 100 hours of training each. Registration in the courses is voluntary.
Main provider	Ministry of Education and the Autonomous Communities.
Outputs/Certification	Teachers who complete a course get an official certificate with a number of credits depending on the course that counts towards their professional records.
Evaluation	
Was the 1:1 initiative evaluated?	The most comprehensive evaluation corresponds to an ongoing study that will be completed in 2013. It is carried out by the Universidad de La Laguna, the first deliverable (in Spanish) is: “¿Qué opina el profesorado sobre el Programa <i>Escuela 2.0</i> ? Un análisis por comunidades autónomas” http://www.ite.educacion.es/w3/3congresoe20/Informe_Escuela20-Prof2011.pdf
Focus	The evaluations focuses on: <ul style="list-style-type: none"> Teachers views regarding their professional practices and impact within <i>Escuela 2.0</i>. Results are broken down according to regions and educational level (primary and secondary); The impact of <i>Escuela 2.0</i> in methodological and organisational practices.
Organisation responsible for the evaluation	Universidad De La Laguna in cooperation with other eight universities (seven from Spain, one from Portugal).
Method used	The methodology of the study combines statistical surveys and in depth case studies.
Impact	
Evidence of impact (including sustainability)	Quantitative follow up on the deployment of equipment and teacher training on a monthly basis is carried out.

and up-scaling)	The afore-mentioned evaluation study addresses the impact on teacher's methodological and school organisational practices.
Barriers and enablers	
Additional information	
Expert	Agustín Muñoz Núñez – Ministry of Education.
Further information	http://www.educacion.gob.es/dctm/aula2010/modernizacion/escuela-2-0.pdf?documentId=0901e72b800b1731 http://www.ite.educacion.es/es/escuela-20 http://www.ite.educacion.es/images/stories/ii_congreso_e20/docs/e_20_feb2011.pdf

Sweden

Note: The initiative described below is only one example of a variety of projects currently running in Sweden. All 1:1 initiatives in Sweden are organised locally (at municipal or school level). There are more than 180 schools/ municipalities that run such projects from just one class to the whole municipality level. The total number of municipalities in Sweden is 293.

En-till-En				
Timeframe	2008 – 2010.			
Objective	To develop new teaching and learning practices, enhance motivation of students and teachers and to increase students' achievements and results.			
Short description	A three year project starting with two schools closely followed by a researcher who reported annually in order to learn from the participating pilot schools when expanding to 1:1 for all students in grades 7–9. During the launch phase all teachers became familiarised with the technology; during the implementation and institutionalisation phase support for professional development was offered and in parallel the initiative was expanded to more schools.			
Context				
ICT policy context	Municipal initiative.			
Rationale behind the initiative	Pedagogical change and a move towards a 21st century-school.			
Scope				
Target audience	All students and teachers in grades 7–9, 60 teachers and 500 students.			
Number of schools	All in the target group.			
Age range and levels of education	Lower secondary age 13–15.			
Geographical coverage	Municipal. All areas.			
Organisation and implementation				
Initiator	Head of the school administration locally.			
Actors involved	The municipal school administration, vendors.			
Strategies for implementation	The project was anchored among local politicians and is based on a long term strategy starting with an ICT in Teaching Implementation Plan (laptops to all teachers, ICT in-service training for teachers, especially trained ICT-teachers, etc.).			
Strategies for mainstreaming and up-scaling	The project has been mainstreamed to all schools with lower secondary education.			
Equipment and infrastructure				
Number and type of devices	MacBooks, high speed wireless Internet connection (no filters or log ins).			
Additional equipment and infrastructure development				
Ownership of equipment				
Costs				
Financing model		Department and Education	Childcare	School
	Year 1	75%		25%
	Year 2	50%		50%
	Year 3	25%		75%
	Year 4 and forward	0%		100%

Direct costs	Annual leasing contracts.
Indirect costs	Reduced costs for local ICT support.
Total costs	
Support	
Policy level support	The main initiative and support came from the local authorities and the headmasters, which proved to be very important for the outcome of the project.
School level support	In service teacher training provided by both the hardware manufacturer (part of the purchasing deal) and the local school authorities.
Industry level support	Included in leasing contract.
Training	
Target audience, mode of delivery of training, training methods	In-service training for teachers, workshops and training on demand.
Focus	1 st year: technical and software training. 2 nd and 3 rd year pedagogical issues, mainly regarding different ways of knowledge creation.
Duration	Recurrent during the three year period, most frequent in the beginning.
Main provider	Local "ICT trainers" (former teachers who were trained).
Outputs/Certification	All teachers undertook stage 3 (out of 5) of the PIM training programme (pedagogical media training programme) provided by the ministry.
Evaluation	
Was the 1:1 initiative evaluated?	Yes
Focus	Three reports were produced covering all objectives and important actors.
Organisation responsible for the evaluation	Martin Tallvid at the University of Gothenburg. Falkenberg also participates in UnosUno, a research initiative financed by a number of 1:1 municipalities/schools at Örebro University.
Method used	Classroom observations, interviews with teachers, students and headmasters, annual surveys.
Impact	
Evidence of impact (including sustainability and up-scaling)	Successful implementation, increased motivation, the development of teaching practices, no significant results considering grades.
Barriers and enablers	
Additional information	
Expert	Martin Tallvid, researcher. Arja Holmstedt-Svensson, head of Falkenbergs school administration.
Further information	http://www.falkenberg.se/kommunen/forvaltningar/barnochutbildning/entillen/entillen.4.6c1b68111133b0f17c380001302.html

Turkey

Fatih Project	
Timeframe	February 2011 - June 2013.
Objective	This project aims to provide ICT equipment to classes in order to achieve ICT-supported teaching by the end of 2013, referring to the goals set out in the Strategy Document for the Information Society, the Development Report, the Strategy Plan of our Ministry and the ICT Policy Report that describes all the activities of Turkey in the process of becoming an information society and drawn up within the scope of the e-transformation of Turkey. Nearly 42,000 schools and 15.7 million students will be able to use these tablets by 2013 onwards (source: http://bit.ly/11iayc1).
Short description	Turkey has initiated the <i>Fatih Project</i> , aimed at enabling equal opportunities in education and improving technology in Turkish schools for the efficient usage of ICT tools in learning-teaching processes. This target is to be achieved by providing tablets and LCD Smart Boards in all 620,000 pre-schools, primary and secondary classrooms.
Context	
ICT policy context	The <i>Fatih Project</i> is embedded in the national policy of the Ministry's ICT policy and the educational plan.
Rationale behind the initiative	Lifelong learning approach; development of the proper structures in which all individuals can improve themselves through e-learning, and development of e-content; all students who graduate from secondary education should have the ability to use the basic information and communication technologies; one in three individuals in society should benefit from e-education facilities through effective use of the internet; providing equal opportunities to everybody in learning and use of information and communication technologies; one in two individuals in society should be an Internet user; the Internet should be made available to society.
Scope	
Target audience	Students, teachers, heads of schools.
Number of schools	The pilot phase of the project has been completed and is being expanded in 2013. 3,362 schools and 66,289 teachers are actively involved in the project (latest figures: May 2013).
Age range and levels of education	5th level students aged 10-11 in primary education. 9th level students aged 14-15 in secondary education.
Geographical coverage	Pilot schools have been chosen from seven different regions, but all schools in Turkey will be covered by the end of 2013.
Organisation and implementation	
Initiator	Ministry of Education and Ministry of Transportation.
Actors involved	Ministry of Education, Directorate of Innovation and Educational Technologies is responsible for the design, implementation, support/training and evaluation.
Strategies for implementation	All actors at different levels of education are involved in the project. The goal was declared in the Strategy of Information Society prepared by the State Planning Organisation (2006-2010) as follows: "Information and Communication Technologies will be one of the main instruments of the education process and teachers and students will be enabled to use these technologies effectively".
Strategies for mainstreaming and up-scaling	Yes. Feedback needed from the pilot schools. Depending on the result, it will be expanded all across the country.

Equipment and infrastructure	
Number and type of devices	Samsung and General Mobile Tablets have been provided to schools (Latest figures in May 2013): - 49,000 tablets for schools including related software purchased. - 84,921 interactive whiteboard given to all schools in the country.
Additional equipment and infrastructure development	Smart boards (a different version for Turkish schools) have been provided to all chosen classrooms. <i>** Complementary data from the desk research</i> Source: http://www.unescobkk.org/fileadmin/user_upload/ict/Workshops/amfie2012/presentations/MELIH_GEZER.pdf <ul style="list-style-type: none"> • E-contents (EBA - Interactive Education portal http://eba.meb.gov.tr); • Every school: Multipurpose printer, Overhead projector; • Every classroom: IWB, Wired Internet connection.
Ownership of equipment	The school owns the tablets under the control of the Ministry.
Costs	
Financing model	Ministry of Transportation.
Direct costs	
Indirect costs	
Total costs	Not exactly known.
Support	
Policy level support	Ministry of Transportation. TUBITAK (Scientific Research Studies Center). Ministry of Economy.
School level support	Pedagogical support from schools.
Industry level support	Technical support was provided to produce these tablets in Turkey. It was called technological innovation.
Training	
Target audience, mode of delivery of training, training methods	Teachers and students are the target audience. Training has been provided to teachers in the frame of the project.
Focus	Usage of technology in education and equal opportunities were the main focuses.
Duration	Every teacher had one week of training.
Main provider	Ministry of Education.
Outputs/Certification	Teachers receive a certificate.
Evaluation and Impact	
Was the 1:1 initiative evaluated?	The evaluation phase has not finished as it is in the pilot phase.
Focus	
Organisation responsible for the evaluation	
Method used	
Impact	
Evidence of impact (including sustainability and up-scaling)	
Barriers and enablers	
Additional information	
Expert	Mahmut TUNCEL. General Directorate of Educational Technologies and Innovation.
Further information	For further information see the national website of the project http://fatihprojesi.meb.gov.tr/tr/index.php

The UK

Achieving through Innovation	
Timeframe	September 2004 - July 2012.
Objective	To further educational standards through the effective use of ICT across the Borough of Newham. In addition to raising attainment in KS2 results, the project also aims to ease pupils' transition, between primary and secondary school.
Short description	An eight-year project involving around 4,200 year 5 and 6 pupils in thirty primary schools across the London Borough of Newham. Its aim was to use ICT to support learning and teaching, both in school and at home, with the ambition of raising pupils' attainment.
Context	
ICT policy context	Department for Education and Skills (DfES) Pathfinder projects.
Rationale behind the initiative	Newham's bid was based on a desire to raise standards KS2 – specifically in years 5 and 6.
Scope	
Target audience	Students and teachers.
Number of schools	30 schools/142 classrooms/4200 learners.
Age range and levels of education	KS2 - Year 5 and Year 6.
Geographical coverage	London Borough of Newham.
Organisation and implementation	
Initiator	DfES
Actors involved	RM Education delivered a managed service for the project which included technical and educational support. As a DFE pathfinder initiative, the Local Authority (LA) spent two years designing and developing the project, including testing ideas with the market, prior to taking it to the procurement stage.
Strategies for implementation	Schools who wanted to be a part of the project had to submit a bid to the LA, which were carefully scrutinised by key members of the LA team. These bids were reduced to the affordable number of 30. Regular consultations were held with schools in order to keep them informed of the processes involved in getting the project up and running.
Strategies for mainstreaming and up-scaling	The funding was for an eight-year period and it has not been possible to secure adequate funding to extend or expand the project.
Equipment and infrastructure	
Number and type of devices	2004 - 2008: 4200 CL51 for pupils, 142 tablets for teachers. 2008 - 2012: (Devices refreshed) 4,200 Mobile One for pupils, 142 laptops for teachers. Laptops run on Windows XP.
Additional equipment and infrastructure development	2004-2008: mono printers (x1 per class), 1 colour printer (x1 per school), Sony projector (x1 per class), interactive whiteboard (x1 per class). 2008-2012: (equipment refreshed) Brother mono printers (x1 per class), 1 Epson colour printer (x1 per school), projector (x1 per class). In addition to the above-x2 wireless access points installed in each classroom, one server per site provided in order to run equipment on a separate network from the rest of the school.
Ownership of equipment	Devices owned by Local Authority.
Costs	
Financing model	PFI initiative, public-private partnership.
Direct costs	Procured as a managed service; see total costs.

Indirect costs	Procured as a managed service; see total costs.
Total costs	Total price including hardware, refresh, software, managed service/support, educational consultant training and support, helpdesk - £20,158,000 (NPV) for an eight year contract across 30 schools.
Support	
Policy level support	Two specialist consultants, appointed by DFE, worked with each of the LA's involved in the pathfinders, assisting with design and development and providing procurement advice.
School level support	Each school appointed a project coordinator and a Learning Outcome Mentor (LOM) to work and liaise with the service provider and the LA.
Industry level support	RM Helpdesk, x2 technicians. x2 Educational Consultants. Operations Manager & Service Delivery Manager.
Training	
Target audience, mode of delivery of training, training methods	Training was available to all teachers and support staff. A range of delivery methods were offered - 1:1, in-class, small group, centrally based, VLE.
Focus	Main focus of training was using the software to enhance teaching and learning in the core subjects, using the equipment to address different learning styles and abilities.
Duration	Training was tailored to the specific needs of each school as such they may have been half hour sessions after school, during teachers PPA time, during a lesson so that teachers learned at the same time as pupils. Training for support staff was delivered during school time and in the main sessions ran for no more than an hour at a time. The frequency of training varied from school to school. Regular sessions were also run at the LA training centre on a termly basis.
Main provider	RM Educational Consultants delivered all training sessions.
Outputs/Certification	Teachers were expected to incorporate what they had learned into their teaching and learning practice.
Evaluation	
Was the 1:1 initiative evaluated?	Yes: SATs data report 2009 – 2010 and SDU Evaluation report- Sept 2011.
Focus	Impact of the project on raising attainment mainly in core subjects.
Organisation responsible for the evaluation	LA School Improvement Partners.
Method used	
Impact	
Evidence of impact (including sustainability and up-scaling)	
Barriers and enablers	
Additional information	
Expert	Paul Stratton – implementation. Amanda Wilson - impact on teaching and learning.
Further information	http://www.rm.com/lea/CaseStudies/Article.asp?cref=MCASE641797

Dudley DGfL3 Personal Device Scheme	
Timeframe	February 2011, ongoing through to January 2021.
Objective	The objectives are to improve pupil educational outcomes by: <ul style="list-style-type: none"> • Increasing access to online educational resources; • Promoting anytime, anywhere access through the provision of a personal device; • Improving ICT skills and confidence through increased usage;

	<ul style="list-style-type: none"> Facilitating the use of the devices to create and share content; Raising standards across the curriculum. <p>The total target is all 40,000 Dudley pupils but this depends on individual schools participating and the take up by parents.</p>
Short description	The initiative provides personal computing devices (netbook, tablet PC, laptop) to students at very low cost through monthly parental contributions. Devices can be used in school or at home to access a wide variety of educational resources. The devices are leased for a two or three year duration and then returned to the provider. Schools can decide to implement the scheme and then parents individually elect to participate or not.
Context	
ICT policy context	There is currently no national programme.
Rationale behind the initiative	Although the “digital divide” is narrowing in terms of households with digital access vs. those that do not, there are still a significant number of households where digital access will be available through a single device that may not always be available for learners to use. This means that access will not be predictable or consistent. The ability for a learner to continue their learning beyond the school day is developing changes in pedagogy in the classroom and helps tailor learning to individual pupils. It also enables learners to become teachers. By equipping learners with a personal device, access can be guaranteed at any time in or out of school, promoting ubiquitous access to learning.
Scope	
Target audience	School students.
Number of schools	Currently, six schools and ~430 learners. Scheme is in its first year of operation – over time, more schools will engage with a total potential of 108 schools and 40,000 learners.
Age range and levels of education	Age range 4-18, primary and secondary.
Geographical coverage	Local: with the Metropolitan Borough of Dudley, West Midlands, UK.
Organisation and implementation	
Initiator	Local Authority: Dudley Metropolitan Borough Council.
Actors involved	Customer: Dudley Metropolitan Borough Council. Specified scheme requirements. Managed Service Provider: RM Education plc. Designed scheme operation, implemented and operated scheme on behalf of Council. Provided implementation and support services.
Strategies for implementation	The school is the main initiator. Schools need to feel ready to embrace this change and need to have undertaken some processes before expanding the initiative. Both staff and pupils need to be comfortable using mobile devices and having them available. The infrastructure within the school needs to be robust and flexible enough to cope with the number and range of devices. School staff needs to be confident to enable and encourage learners to use devices.
Strategies for mainstreaming and up-scaling	RM Education plc. intends to offer a scheme of this nature more widely across the UK education market. The lessons learned from the initial scheme in Dudley will be pivotal in designing a scheme which is easy to use and accessible.
Equipment and infrastructure	
Number and type of devices	Each school can choose from a range of four devices; RM Mini Book (Intel Classmate), RM Mini Tablet (Intel Classmate convertible tablet), RM Light book (thin_light laptop) Samsung NC110 netbook. 430 devices supplied to date mostly RM mini Tablets. The device range is reviewed regularly (twice a year). The devices can all be Windows 7 Starter Edition or Ubuntu Linux. The school choose and most have opted for Linux to date. Each device is preconfigured to connect to the school wireless network and has a range of open source applications installed.

Additional equipment and infrastructure development	Each school participating in the scheme needs a Juniper managed wireless network configured to provide guest access for the scheme devices. 80% of Dudley schools already have this and in some cases more access points are required for the increase in number of devices. The device software images have been configured and a device remote management system has been developed.
Ownership of equipment	The devices are leased and legal title of the devices remains with the leasing company throughout. Devices are returned to the company at the end of the two or three year rental period.
Costs	
Financing model	The initiative is funded largely by parental contributions. Parents make a contribution of around £15/month (depending on device choice). Schools may elect to support the scheme through their own funding, making the scheme more accessible for those families where it would be difficult to make a contribution at this level.
Direct costs	Devices range in price from £255 to £490 each.
Indirect costs	An indicative figure would be £2000-£3000 for an early adopter, this includes direct in-class support for pupils and teachers (4-8) days initially, then regular support, creation of some resources to start the engagement process and time to review and evaluate. This cost would fall as more schools engaged. Delivery of this type of initiative needs to be led by an educationalist, and early adopter schools will need more support. It is also important to provide staff with access to the resources.
Total costs	40,000 devices at £336 each = £13.44M. 108 schools supported at £3,000 each = £324k. Total = £13.76M.
Support	
Policy level support	There have been a number of Government initiatives to provide access and connectivity to students but these have often been targeted and consequently not all pupils have benefitted from the initiative. Dudley MBC recognised the impact of these initiatives and felt that it would only have real impact when all learners had access to a device. We have previously run projects using Palm devices which gave us considerable knowledge and understanding around these issues. Consequently Dudley MBC made it a requirement that such a scheme be provided through the Authority's chosen managed service provider. The decision to join the scheme is taken at school level; they then work with parents to share the value and benefits of the scheme.
School level support	Early adopters need considerably more support; they will identify the issues with provision, what needs to be changed technically and operationally and what the service should include. They also need some materials and resources available before they start so they know there is a purpose to using the devices other than just surfing the internet. The commitment and engagement of the school senior leader is vital. It is also important that school staff is prepared for this initiative, it will change the way they work, their expectations of pupils and they must have confidence in the whole operation. Pupils also need to be engaged, discussions about the type of device, what they will use it for, rules when using etc. are all important to the smooth running of such a scheme. Online support and training help extend the work in school and workshops enable others to learn from practitioners.
Industry level support	Helpdesk for parents and schools provided 12 hours per day seven days per week. School network support provided ten hours per day five days per week.
Training	
Target audience, mode of delivery of training, training methods	The target audience is pupils and students initially from age 7years although some schools are expressing a wish to do this from age 5years. Experience shows us that in-class support with teachers is the most productive option, moving from

	the 'trainer' leading the lesson to the classroom teacher taking the lead. Once the initial intensive training has taken place there is an ongoing need to share experience and to challenge teachers to take on more. The school needs to provide time for this to grow. Sharing experience will also help especially when there is a strong core of schools established.
Focus	There is no single focus for training, the pedagogy has to change – teachers cannot continue to do what they have always done. They need some technical training to deal with simple issues but the service provided should be robust. They may also need some ideas for organising their work and to deliver a truly personalised curriculum for each learner.
Duration	Training needs to be ongoing, intense to start with then more as required.
Main provider	Dudley MBC and RM Education plc.
Outputs/Certification	None
Evaluation	
Was the 1:1 initiative evaluated?	The scheme has been in operation since Spring 2011 and it is too early to perform a full evaluation, although there is early anecdotal evidence that this is having a positive impact.
Focus	
Organisation responsible for the evaluation	
Method used	
Impact	
Evidence of impact (including sustainability and up-scaling)	
Barriers and enablers	
Additional information	
Expert	Shirley Hackett - Education Lead Officer / EIA Dudley Grid for Learning Westox House Trinity Road Dudley - DY1 1JQ Phone +44 1384 814270 Email shirley.hackett@dudley.gov.uk
Further information	http://www.dudley.gov.uk/education-and-learning/dudley-grid-for-learning/

Learning2Go Project by Wolverhampton City	
Timeframe	2003 – ongoing. The fourth phase is currently running with a further expansion of 1:1 provision of 1,500 devices.
Objective	The main objective of the project is pedagogical with a focus on the students' learning. Students are supposed to receive educational resources with which they engage inside and outside of the classroom and provide new ways of approaching learning by themselves. Furthermore, there is the hope that the visual and interactive style of learning improves motivation and engagement. However, issues such as closing the digital divide are also addressed by the project and cases of parents signing up to IT courses as a result of their son/daughter bringing home an IT device are cited by the organisers.
Short description	The initiative is a longstanding project organised by Wolverhampton City Council starting in 2003. It has received substantial national attention and has been replicated by schools across the country. The aim of the project was to give students access to anywhere, anytime learning to help give them a greater desire to learn and raise standards. Students were given handheld PDAs to support their learning. The devices were funded jointly by the school and parents, were wireless enabled and had in-built imaging capabilities.

Context	
ICT policy context	It is not currently part of a national ICT policy context but originated from a BECTA pilot scheme in 2002. BECTA was the government agency leading the national drive to ensure the effective and innovative use of technology throughout learning.
Rationale behind the initiative	<p><i>Pedagogical Change:</i></p> <ul style="list-style-type: none"> • The project's pedagogical focus lies on the students learning rather than the teaching process or the classroom dynamic; • The project aims to provide students with up to date technologies which allow them to engage more with their learning process. <p><i>Developing Student ICT Skills:</i></p> <ul style="list-style-type: none"> • It also aims to provide students with the skills that allow them to effectively operate within the 21st century digital age society. <p><i>Narrower Digital Divide:</i></p> <ul style="list-style-type: none"> • Increasing the presence of technology in low-income households is also an area of focus for the project. Indirectly parents are addressed by increasing their exposure to technology and thereby improving parents' ICT skills.
Scope	
Target audience	Students, teachers, parents.
Number of schools	
Age range and levels of education	Depending on school, both primary and secondary.
Geographical coverage	Local area: Wolverhampton.
Organisation and implementation	
Initiator	Wolverhampton City Council.
Actors involved	<ul style="list-style-type: none"> • Wolverhampton City Council: responsible for design and coordination; • Schools: responsible for the implementation of the project; • E-learning Foundation: assists with the funding of the devices; • Handheld Learning Foundation: provides advice, consists of a range of technology companies; • The following companies are supporting the project by providing software or other content for the devices: Big Bus, Espresso, Grid Club, Kar2ouche, Handheld Learning, Oxford University Press, Steljes (SMART UK), Sums On Line, Go Know; • BECTA: responsible for the evaluation of the project.
Strategies for implementation	Bottom-up: Although initiated from the top the implementation of the project very much depends on each school adopting it.
Strategies for mainstreaming and up-scaling	The project is expanded continuously as new schools become interested. It is currently in its fourth phase.
Equipment and infrastructure	
Number and type of devices	A range of different devices. In the beginning phases, 2003-2007 Windows Mobile Handheld Devices were distributed. These were dubbed EDAs (Educational Digital Assistant) instead of PDAs (Personal Digital Assistant). In the current phase of the projects different devices are utilised. iPods, smartphones, netbooks to name some examples.
Additional equipment and infrastructure development	No additional equipment provided but advice on necessary infrastructure offered.
Ownership of equipment	Students/parents.

Costs	
Financing model	In the initial phase of the project the costs of the project were paid by the school and if students wanted to keep their device parents had to make a small contribution to them. In subsequent phases a joint funding approach was taken in which the parents contributed a small monthly amount over two years. The exact parameters of this funding model depend however on the individual school.
Direct costs	Depends on school.
Indirect costs	Depends on school.
Total costs	Depends on school.
Support	
Policy level support	Support was provided by the e-learning team at Wolverhampton City Council.
School level support	Depends on school.
Industry level support	Partners of the project were Microsoft and Fujitsu Siemens.
Training	
Target audience, mode of delivery of training, training methods	Depends on school.
Focus	Depends on school.
Duration	Depends on school.
Main provider	-
Outputs/Certification	-
Evaluation	
Was the 1:1 initiative evaluated?	Yes
Focus	A student survey was conducted about how the devices impact on the students.
Organisation responsible for the evaluation	BECTA.
Method used	
Impact	
Evidence of impact (including sustainability and up-scaling)	<p>Below are summaries of some of the key findings from a survey conducted for BECTA to evaluate the project:</p> <ul style="list-style-type: none"> • Learners clearly associate the use of handheld devices with learning, in school and out of school. Moreover they see the devices as supporting effective learning. This perception is not dependent on level of use and persists over time; it is not a novelty effect; • Level of use is not associated with overall attainment level. Some high-level users achieved beyond their predicted levels or grades in end-of-key-stage assessments; others did not. Similarly, some low-level users exceeded their predicted attainment levels or grades, and others did not; • Unskilled low users do not work out how to operate the devices, nor do they seek out tuition, for example from technicians or other learners; they are more likely to become dependent on others to achieve the minimum level of use required. There is a need to identify these learners and provide support to make sure they know how to operate the device competently; • Attributes of the device associated with effective learning and valued by students include that it: facilitates individual, co-operative and interactive work in class; enables the sharing of ideas and responses and the building of knowledge; increases participation in whole-class settings; enables learners to revisit areas for consolidation and reflection out of the classroom – this helps to increase understanding; provides opportunities for autonomy and independence.

Barriers and enablers	
Additional information	
Expert	Wolverhampton City Council: Learning2Go@wolverhamptoncyp.org.uk
Further information	http://www.learning2go.org/ http://www.is-toolkit.com/knowledge_library/KI-Learning2GoProject.html http://www.dc10plus.net/projects/Project337 https://engage.lpplus.net/schools/eastpark-inf/L2G/default.aspx

iPad at Longfield Academy⁶	
Timeframe	2009–2012.
Objective	The iPad at Longfield Academy pilot intended to provide: <ul style="list-style-type: none"> • A cutting edge learning experience including access to technology in every lesson and at home; • Every student with their own learning device; • Exciting and engaging lessons; • Every student using technology to improve their learning wherever they are.
Short description	The Longfield Academy in Kent is a new build comprehensive school of 960 students covering Years 7 to 13 (11-18 chronological ages). The school has a strong vision for ICT and intends to provide every student with their own learning device to improve learning. Evaluation study of iPad use at Longfield Academy finds that with the majority of pupils now having the devices, there has been a significant and very positive impact on learning, as well as significant and still developing changes in pedagogy. Students are very positive about the devices and the impact they have on their motivation, ability to research, communicate and collaborate, while staff increasingly exploit the range of educational Apps made available. While some technical issues have been identified, these are dealt with through excellent project management. The outcomes at Longfield clearly demonstrate the value of the iPad as an educational tool.
Context	
ICT policy context	The Longfield Academy for Arts and Sciences is among a few schools offering iPads to all its learners and staff – and, even more unusual, there's no IT company behind the decision, solely based on consulting the school community – learners, staff and parents. Longfield's decision had been based on a vision for learning that required mobile technology – with massive potential savings on printing and publications – and that the school had been working closely with the e-Learning Foundation to make sure that no learners were excluded. (Source: http://www.agent4change.net/bett-week/news/1364-ipads-changing-the-game-for-learning-at-longfield.html)
Rationale behind the initiative	The introduction of iPads throughout Longfield Academy provided an excellent opportunity for a small scale research study of the initial impact of the iPad on learning and teaching throughout the school and the social and technical issues arising. There is also scope for a more significant longitudinal study of these aspects.
Scope	
Target audience	Students, teachers.
Number of schools	1 comprehensive secondary school.
Age range and levels of education	Years 7 to 13 (11-18 chronological ages), secondary schools.
Geographical coverage	Local.

⁶ All data and figures related to this initiative were collected solely through desktop research.

Organisation and implementation	
Initiator	Longfield Academy and 9ine Consulting.
Actors involved	The implementation has been led at senior management level through an iLearning Group led by the Principal. This has overseen the vision and taking of a strategic overview of the iPad for learning. The group comprised staff with a range of responsibilities, experience and confidence, meeting regularly and minuted with appropriate actions and deadlines.
Strategies for implementation	Bottom-up initiative, started by public-private partnership, the Longfield Academy and the 9ine Consulting.
Strategies for mainstreaming and up-scaling	N/A
Equipment and infrastructure	
Number and type of devices	726 units (students) representing 76% of the pupils enrolled (as at March 2012). Additionally, a further 100 students have iPads not supplied by the school (BYOD).
Additional equipment and infrastructure development	Working with 9ine Consulting, the school has been able to provide high quality cabled and wireless networking to support 400 iMac workstations located in three ICT suites, three plaza spaces and the post-16 learning area together with teacher MacBooks and staff and pupil iPads.
Ownership of equipment	N/A
Costs	
Financing model	The iPads were provided through a leasing scheme. The iPad2s cost around £16 per month over three years and the cash comes from a mix of voluntary parental contributions, school funding and e-Learning Foundation mediated support.
Direct costs	
Indirect costs	
Total costs	
Support	
Policy level support	Not only it has been embraced by all the teachers, but the programme was also strongly supported by parents. More than 90% of families contributed and a small grant from the e-Learning Foundation has meant that it really is 100% inclusive.
School level support	The pilot was the result of a big vision from the school's senior management team, with the iPads being properly integrated with all the other technology in use across the school.
Industry level support	
Training	
Target audience, mode of delivery of training, training methods	Considerable initial and ongoing training and professional development has been provided.
Focus	
Duration	
Main provider	-
Outputs/Certification	-
Evaluation	
Was the 1:1 initiative evaluated?	yes
Focus	Focus was on changes in teaching and learning styles, impact on standards and on pupil's attitudes to learning with the devices, together with any whole-school technical and management issues arising.
Organisation responsible for the evaluation	NAACE (ICT Association) and 9ineConsulting.

Method used	Data were gathered via questionnaire surveys of staff, students and parents. This was further supported by a structured site visit involving interviews and lessons observation to clarify issues identified in the questionnaire responses.
Impact	
Evidence of impact (including sustainability and up-scaling)	<p>The evaluation study (started in 2011) reviewed the impact on learning and teaching of the introduction of iPad devices at Longfield Academy, Kent. It finds that:</p> <ul style="list-style-type: none"> - with the majority of pupils now having the devices, there has been a significant and very positive impact on learning, as well as significant and still developing changes in pedagogy; - Students are very positive about the devices and the impact they have on their motivation, ability to research, communicate and collaborate, while staff increasingly exploit the range of educational Apps made available; - While some technical issues have been identified, these are dealt with through excellent project management. The outcomes at Longfield clearly demonstrate the value of the iPad as an educational tool.
Barriers and enablers	<p>In a presentation to schools and industry in March 2012, the Principal of the Longfield Academy highlighted a number of key lessons learnt from the project experience, including:</p> <ul style="list-style-type: none"> • Develop a clear vision and strategy for your 1:1 scheme; • Define your learning culture; • Define and create your user experience and support model; • Work with a traffic light and reporting system; • Evaluate your existing position; • Know how many staff and students already own, in this case, an iOS device; • Get everyone involved –don't let a perception grow that it is a 'done deal', even if it is; • Get devices in teachers and learners hand as soon as possible; • Record and share your experiences. <p>All point should be developed into a robust structural framework appropriate to the individual school.</p>
Additional information	
Expert	
Further information	http://www.naace.co.uk/publications/longfieldipadresearch http://www.youtube.com/LongfieldAcademy2012 http://www.agent4change.net/bett-week/news/1364-ipads-changing-the-game-for-learning-at-longfield.html http://www.emergingedtech.com/2012/07/study-finds-benefits-in-use-of-ipad-as-educational-tool/

The iPad Scotland⁷	
Timeframe	March – Summer 2012.
Objective	<p>The iPad Scotland pilot focused on four main themes related to the use of mobile devices as personal tools for teaching and learning. These were:</p> <ul style="list-style-type: none"> • How tablet devices impact on teaching and learning; • The leadership and management issues associated with the deployment of mobile devices in schools and local authorities; • Parental engagement with learning when students use mobile technologies as personal devices; • Professional development and learning for teachers introducing personal mobile devices into the curriculum.

⁷ All data and figures related to this initiative were collected solely through desktop research.

Short description	The iPad Scotland pilot was part of an exploratory programme launched by the Scottish Government to assess whether pupils across the Region would benefit from having access to portable technology like the iPad. The pilot involved eight primary and secondary schools and six local authorities across Scotland and approximately 365 students had access to an iPad device.
Context	
ICT policy context	This pilot project followed the announcement in May 2012 by the Cabinet Secretary for Education and Lifelong Learning in Scotland (Mr. Michael Russell) of a series of pilots to assess the issues associated with personal ownership of technologies for learning. The evaluation of this pilot study is expected to contribute to the evidence base which Scotland is looking for to develop in this important aspect of education.
Rationale behind the initiative	This initiative was carried out involving 8 individual educational locations in Scotland that differ significantly in terms of demographics, infrastructure, the approach of the Local Authority and readiness to implement the use of tablet technology for learning and teaching. The schools in the sample were selected via recommendations from their Local Authority. Whilst the sample included a wide range of variation in key factors likely to influence the adoption and successful use of mobile technology, it does not necessarily represent all schools across Scotland.
Scope	
Target audience	Students, teachers.
Number of schools	8 schools, approximately 365 devices (students).
Age range and levels of education	3 secondary and 5 primary schools spread across six local authorities.
Geographical coverage	Regional.
Organisation and implementation	
Initiator	Scottish Government and local educational authorities.
Actors involved	Local authorities across the region invited schools to participate in the pilot study.
Strategies for implementation	Three kinds of usages emerged: 1. Some deployed class sets of the technology where devices were retained in the school and issued to students for particular lessons or purposes; 2. Other schools allocated machines to individual students for use across lessons but they were not allowed to take the equipment home; 3. A third group of schools adopted the most personalised approach and gave students the device for the duration of the pilot for use in school and at home.
Strategies for mainstreaming and up-scaling	N/A
Equipment and infrastructure	
Number and type of devices	2nd generation iPads but some schools used 1st generation devices which lack the camera feature. The approximate number of iPads in pilot is 365
Additional equipment and infrastructure development	N/A
Ownership of equipment	Personal ownership by students inside and outside school (hybrid model also adopted in some cases).
Costs	
Financing model	Schools purchase or borrow iPad devices for the duration of the pilot, although some schools purchased their own or used existing stock.
Direct costs	
Indirect costs	

Total costs	
Support	
Policy level support	Local authorities support schools in purchasing or borrowing iPad.
School level support	
Industry level support	Technical support was provided by XMA Ltd ³ who was responsible for most of the installation and infrastructure issues associated with the initial deployment of the iPad in school and subsequent support issues. XMA provided an online and face-to-face support service for schools during the study.
Training	
Target audience, mode of delivery of training, training methods	Teachers and students. Teachers from the pilot schools were invited to attend several 'recall' days organised by Connected Flow to share ideas and undertake workshop training, although attendance at these events was variable. In addition, some more formalised training on the use of the device, the key approach has been to give the device to both the teachers and to the students and to allow them to learn through exploration and in collaborative dialogue.
Focus	To support teachers' pedagogical needs and requirements.
Duration	
Main provider	Connected Flow Ltd ⁴ led by Fraser Speirs and colleagues at Cedars School.
Outputs/Certification	N/A
Evaluation	
Was the 1:1 initiative evaluated?	Yes
Focus	To establish the frequency of technology use, both at home and at school, and to identify attitudes towards technology, and particularly mobile technologies.
Organisation responsible for the evaluation	University of Hull, Faculty of Education.
Method used	Quantitative (online surveys) and qualitative approaches (interviews, focus groups and analysis of documents). Data was subsequently analysed to produce descriptive statistics and graphs from the survey instruments, and rich narrative accounts derived from the interview and documentary.
Impact	
Evidence of impact (including sustainability and up-scaling)	<ul style="list-style-type: none"> • The ownership of a personal mobile device, like the iPad, facilitates many of the pedagogical aspirations set out in Scotland's Curriculum for Excellence framework; • The adoption of mobile technologies on a personal basis significantly increases access to technology for students, both inside and beyond school, with many attendant benefits for learning which include greater motivation, engagement, parental involvement, and understanding of complex ideas; • Personal 'ownership' of the device is seen as the single most important factor for successful use of this technology; • Teachers are equally engaged by the use of a device like the iPad which has a low learning curve enabling them to use it immediately as a teaching tool and a learning tool for themselves; • The use of the device is contributing to significant changes in the way teachers approach their professional role as educators and is changing the way they see themselves and their pedagogy; • Parents also appear to become more engaged with the school and their child's learning when the iPad travels home with the student.
Additional information	
Expert	
Further information	http://www2.hull.ac.uk/ifl/ipadresearchinschools.aspx http://www.janhylen.se/wp-content/uploads/2013/01/Skottland.pdf

	<p>http://www.holyrood.com/2012/05/ipad-pilot-sciennes-primary-michael-russell-education-scotland/ http://classroom-aid.com/2012/11/22/ipad-scotland-final-evaluation-report-october-2012/</p>
--	--

Europe

Acer-European Schoolnet Educational Netbook Pilot	
Timeframe	From January 2010 to the end of the school year 2011.
Objective	To implement 1:1 pedagogies and to study the best ways to support schools and teachers in their endeavours with netbooks.
Short description	The Educational Netbook Pilot ran in parallel in six countries: France, Germany, Italy, Spain, Turkey and UK. The name <i>1:1 pedagogy</i> highlights the fact that the learners have access to netbooks to all times, taking advantage of a blended learning approach alternating online and offline activities. Also the teachers were equipped.
Context	
ICT policy context	Depending on the national/regional policy context, synergies were sought where possible, e.g. Italian Scuola 2.0; Fatih-programme in Turkey; <i>Escuela 2.0</i> in Spain and Teachers' professional development course ran by the MoE.
Rationale behind the initiative	The Netbook pilot explore how the introduction of netbooks and 1:1 pedagogy in schools can have an impact on the processes involved in teaching and learning, both inside and outside of school, in order to better understand the local drivers and barriers.
Scope	
Target audience	Teachers, students, school heads, ICT coordinators.
Number of schools	The Netbook Pilot involved 124 schools in six countries and it had a total of 245 classes of learners equipped with netbooks.
Age range and levels of education	Secondary education.
Geographical coverage	France, Italy, Germany, UK, Turkey, Spain.
Organisation and implementation	
Initiator	Acer, European Schoolnet.
Actors involved	National and local educational authorities who helped selects pilot schools in six countries.
Strategies for implementation	Each participating school was asked to create a netbook team consisting of 3 to 5 subject teachers teaching the class, an ICT coordinator and a member of the senior leadership team. Each school had a freedom to select school subjects as they wished. The netbook team was asked to plan and implement the use of netbooks for teaching and learning according to their national and local curricula.
Strategies for mainstreaming and up-scaling	After the Pilot period, the netbooks became the property of the school. Each establishment was responsible for their mainstreaming activities. Different strategies emerged, e.g. the same group of teachers continued using netbooks with a new cohort of students, schools designated the netbooks as a mobile lab, and some opted for new netbooks.
Equipment and infrastructure	
Number and type of devices	7087 netbooks (students), 1059 notebooks (teachers) and one desktop computer were provided to schools.
Additional equipment and infrastructure development	<ul style="list-style-type: none"> • Access to a national pedagogical coordinator to support pedagogical activities; • Access to a multilingual resources portal; • An online teachers' community to develop and share ideas across pilot countries.
Ownership of equipment	After the pilot, the equipment became the property of the schools.

Costs	
Financing model	The activities in the Netbook Pilot have been funded by Acer, who provided the participating schools with Acer 10" netbooks and 11" Acer notebooks for teachers. Acer also funded the organisation of activities, pedagogical coordination, the netbook website and the evaluation delivered by European Schoolnet.
Direct costs	
Indirect costs	A number of schools took up infrastructure updates in order to have wireless access in various parts of the school, to have sufficient bandwidth, etc.
Total costs	
Support	
Policy level support	The participating schools were identified with the help of the national or regional Educational Authority.
School level support	The schools provided teachers teaching the netbook class, IT support persons and the support of the management team.
Industry level support	Acer funded the Netbook pilot and the organisation of all the activities.
Training	
Target audience, mode of delivery of training, training methods	Online 1:1 pedagogical scenario is one of the support mechanisms for teachers involved in the Netbook Pilot; additionally, each participating school had been asked to form a netbook team of teachers which would include at least a person able to give IT support and advice with netbooks. Activities and support on the national level varied from country to country, for example, the MoE in Spain provided an online professional development course to all participating teachers (140h).
Focus	The idea behind the netbook team was to get teachers with different level of ICT skills to work together in order to share their knowledge and therefore support peer-learning opportunities with the organisation.
Duration	
Main provider	European Schoolnet, schools.
Outputs/Certification	Schools received a certificate indicating their participation in the Educational Netbook Pilot.
Evaluation	
Was the 1:1 initiative evaluated?	Yes.
Focus	<p>The aim of the evaluation report is to use to describe the main trends arising from the data across pilot countries.</p> <p>In particular the evaluation of the pilot aimed at understanding and documenting how learners and teachers use netbooks in various educational contexts, as well as how parents perceived the use of netbooks in school and out of school.</p> <p>The evaluation is focused on how learners and teachers use netbooks:</p> <ul style="list-style-type: none"> • In school and out of schools; • Individually and collaboratively; • For educational use and leisure use. <p>Three different evaluations were conducted: the first one targeted parents of the netbooks students (April 2011), the second one the netbook students (May 2011) and the third on the netbook teachers, school heads and school ICT coordinators (June-July 2011). The surveys were conducted online in six different languages. Additionally, a pre-pilot evaluation was conducted.</p>
Organisation responsible for the evaluation	European Schoolnet.
Method used	Use of descriptive statistics.

Impact	
Evidence of impact (including sustainability and up-scaling)	<ul style="list-style-type: none"> • The capacity of ICT devices such as netbooks to boost learners' motivation, a good classroom atmosphere, and more independent and individualised learning brings added value to everyday work in school; • The fact that students have the ownership of netbooks and can use them after the school day offers possibilities to extend learning opportunities and educational activities outside official school hours; • Netbooks also seem to work as a bridge facilitating parents' involvement in their child's education; • 1:1 pedagogy empowers and supports teachers in their classrooms practices; • Empowering teachers can be helped by facilitating teachers' exchange and professional cooperation both within the school and across schools. An important element in empowering teachers is the offering of formal and informal opportunities for professional development, e.g. in-service training, netbooks teams, on-line communities, informal dialogue with teachers colleagues, as well as good examples of practices; • Helping to build teachers' confidence in integrating ICTs into teaching and learning is one of the cornerstones of the success of 1:1 pedagogy and its drive for pedagogical change.
Barriers and enablers	
Additional information	
Expert	Project manager and main investigator Dr. Riina Vuorikari.
Further information	http://www.netbooks.eun.org/web/acer/evaluation

Annex 3: Other ICT Initiatives

Beside the 1:1 initiatives previously analysed, other ICT initiatives were identified as part of the study. However, it was decided to group these projects in a separate section, as they belong to different categories, which are not comparable within the core analysis already carried out.

These initiatives can be clustered into four categories:

- Large-scale projects not fitting exactly with the definition of "1:1 initiatives", but still providing a large amount of students with mobile technological devices and additional equipment (netbooks, laptops, interactive whiteboards, etc.);
- Smaller-scale 1:1 initiatives providing interesting insights into opportunities and challenges;
- Initiatives only focused on teacher's training aiming at strengthening their professional skills;
- Initiatives aiming at developing free access to digital education in and outside schools targeting not only students in schools but also families.

Czech Republic

EU peníze školám/ EU money to schools	
Timeframe	2010-2012
Objective	To support various innovative curricular approaches in different areas of teaching: MST, financial literacy, reading and information literacy, foreign language teaching, inclusive education, usage of ICT in all subjects.
Short description	A special grant initiative adopted in May 2010 -EU money to schools- is managed by the MoE and it is addressed only to primary and secondary elementary schools (excluding schools in the capital city). Schools apply for a grant directly to MoE and use it for different purposes supporting innovative curricular approaches in different areas of teaching.
Context	
ICT policy context	This grant programme is not specifically aimed at ICT but it is the largest grant initiative in the last few years enabling all schools to get financial support. It is expected that approximately 2/3 of the whole budget distributed in 2010–2012 will be invested in ICT equipment such as netbooks and IWB technologies. Examples of supported areas within ICT are: digitalization of textbooks, e-learning, further teacher training, modernization of schools' equipment – purchase of DVDs, cameras, netbooks, notebooks, computers, software programmes, IWBs, etc.
Rationale behind the initiative	A wide grant initiative supporting various innovative curricular approaches in different areas of teaching.
Scope	
Target audience	The programme covers all educational institutions, but the purchase of ICT equipment is aimed mainly at primary and secondary schools.
Number of schools	About 4,000 schools can participate (about 30,000 classes, 600,000 pupils)
Age range and levels of education	6-18. Primary and secondary schools.
Geographical coverage	National (excluding capital city Prague).
Organisation and implementation	
Initiator	The Ministry of Education, Youth and Sport is the initiator of the initiative, within the framework of the Operational Programme “Education for Competitiveness”.
Actors involved	Managed by the Ministry of Education.
Strategies for implementation	Schools have to come with a project and apply for a grant for ICT used in teaching.
Strategies for mainstreaming and up-scaling	Support of ICT in education is one the priority areas of the initiative and 1:1 is one of possible innovative teaching approaches that can be supported. It is up to each school to decide what kind of ICT equipment to purchase and how to use it.
Equipment and infrastructure	
Number and type of devices	It is up to schools.
Additional equipment and infrastructure development	DVDs, cameras, netbooks, notebooks, computers, software programs, IWBs, etc.
Ownership of equipment	
Costs	
Financing model	Schools can apply for financial support from the national grant programme EU Money for schools to use grants from European Union to implement and support ICT. The total budget of the whole grant initiative is 4,5 billion CZK for primary schools and 1,5 billion CZK for secondary schools. The results are not

	available yet so it is not possible to say which part of the budget goes to ICT equipment, or especially to 1:1 initiative.
Direct costs	
Indirect costs	
Total costs	Planning initiatives “EU peníze školám” – 4.5 bn CZK.
Support	
Policy level support	Ministry: Website support http://www.eupenizeskolam.cz/ Free phone number: 00420800228229 , e-mail: esf@msmt.cz
School level support	Seminars for teachers (regional – supported by institution NIDV - www.nidv.cz) http://www.msmt.cz/strukturalni-fondy/eu-penize-skolam/workshopy-nidv-pro-zadatele-oblasti-podpory-1-5
Industry level support	
Training	
Target audience, mode of delivery of training, training methods	Schools can also apply for a grant covering training provided to teachers - e.g. usage of IWBs, school software, etc.
Focus	
Duration	
Main provider	
Outputs/Certification	
Evaluation	
Was the 1:1 initiative evaluated?	The programme is in progress.
Focus	
Organisation responsible for the evaluation	MoE and initiative Skola21 - http://skola21.rvp.cz/informace/vyuziti-aplikace-profil-skola21-v-projektu-eu-penize-strednim-skolam
Method used	
Impact	
Evidence of impact (including sustainability and up-scaling)	
Barriers and enablers	
Additional information	
Expert	Petr Chalůš – petr.chalus@naep.cz
Further information	http://www.eupenizeskolam.cz/

Cyprus

Computers for Pre-primary, Primary Schools, Secondary General and Secondary Technical and Vocational, and Special Education Schools	
Timeframe	<ul style="list-style-type: none"> Action 1: October - December 2009 (Phase 1) December 2010 - September 2011 (Phase 2); Action 2: April - September 2011; Action 3: December 2010; Action 4: December 2006 - January 2012; Action 5: October 2007 (Phase 1) February 2011 (Phase 2).
Objective	To provide students and educators of all public schools access to advanced ICT infrastructure and equipment, in order to utilise them in their classrooms, within an innovative teaching and learning process. (see also Context - Rationale).
Short description	<ul style="list-style-type: none"> Action 1: Laptops for Pre-primary, Primary Schools, Secondary General and Secondary Technical and Vocational, and Special Education Schools. <ul style="list-style-type: none"> All of the above schools were equipped with a number of laptops depending on the size of each school (one for each pre-primary school and special education school), to provide educators of all subjects of the curriculum with a tool they can use in classrooms with students (Internet access, use of e-content, presentations, educational software etc.). Action 2: Laptops for Secondary General Schools. <ul style="list-style-type: none"> All Secondary General Schools were equipped with a number of laptops depending on the size of each school to provide educators primarily of Mathematics and Biology (subjects that have information technology use embedded in their new curriculum) and also for Science and Chemistry and other subjects of the curriculum with a tool they can use in classrooms with students (Internet access, use of e-content, presentations, educational software etc). Action 3: Laptops for <i>Technology of Electrical Applications and Installations</i> Subject in Secondary Technical and Vocational Schools. <ul style="list-style-type: none"> 7 Secondary Technical and Vocational Schools, that offer the above subject, were equipped with 10 laptops each along with specialized software ("<i>Electrical2 OM</i>"). Action 4: Desktop Computers for Pre-primary, Primary Schools, Secondary General and Secondary Technical and Vocational and Special Education Schools. <ul style="list-style-type: none"> All of the above schools were equipped with a number of desktop computers depending on the size of each school. Action 5: Apple (iMac) Computers for the <i>Graphic Design</i> Subject in Secondary Technical and Vocational Schools. <ul style="list-style-type: none"> For utilisation by educators of <i>Graphic Design</i> Subject, in their labs.
Context	
ICT policy context	This initiative is embedded in the Ministry's ICT integration programme plan in education. The aim of this programme is to effectively use Information and Communication Technologies (ICTs) in the educational process and to enhance the digital literacy of students and teachers. All teachers in Cyprus to use ICT towards innovative teaching and learning in order to achieve the goals of the national curriculum. These actions are taken towards achieving one of the core objectives of this programme: to provide schools with advanced ICT infrastructure and equipment.
Rationale behind the initiative	Teachers (of all subjects) and students to have access to advanced ICT infrastructure and equipment in their school classrooms. The Ministry distributed laptops, desktops and other ICT equipment to schools

	in order to facilitate the integration of ICT in all subjects and to eliminate obstacles constraining access and offer equal opportunities to the students irrespective of their background or level of need, within the framework of the Educational Reform Programme and the top priorities of the Cyprus educational system: the shaping of a democratic and humanistic school.
Scope	
Target audience	<ul style="list-style-type: none"> • Action 1: Students and Educators of all Pre Primary, Secondary General and Secondary Technical and Vocational and Special Education Schools; • Action 2: Students and Educators of all Secondary General Schools; • Action 3: Students of 7 Secondary Technical and Vocational Schools who attend the <i>Electrical Applications and Installations</i> Subject; • Action 4: Students and Educators of all Pre Primary, Secondary General and Secondary Technical and Vocational and Special Education Schools; • Action 5: Students of 5 Secondary Technical and Vocational Schools who attend the <i>Graphic Design</i> Subject.
Number of schools	<ul style="list-style-type: none"> • Action 1: 718 schools; • Action 2: 115 schools; • Action 3: 7 schools; • Action 4: 741 schools; • Action 5: 5 schools.
Age range and levels of education	<ul style="list-style-type: none"> • Action 1: 4 – 18 years old (students); • Action 2: 12 – 18 years old (students); • Action 3: 17 – 18 years old (students); • Action 4: 4 – 18 years old (students); • Action 5: 17 – 18 years old (students).
Geographical coverage	<ul style="list-style-type: none"> • Action 1: National (public schools); • Action 2: National (public schools); • Action 3: 2 Nicosia District, 2 Limassol District, 1 Larnaca District, 1 Paphos District, 1 Famagusta District (public schools); • Action 4: National (public schools); • Action 5: 1 Nicosia District, 2 Limassol District, 1 Larnaca District, 1 Paphos District, (public schools).
Organisation and implementation	
Initiator	Ministry of Education and Culture of Cyprus (MoEC).
Actors involved	Two ICT Projects MoEC teams were involved in the process: the ICT Infrastructure and Equipment Team and the ICT Contracts Monitoring Team, coordinated by their Inspectors, and supervised by the MoEC's ICT Projects General Coordinator.
Strategies for implementation	Top-down initiative.
Strategies for mainstreaming and up-scaling	These actions are targeting all public schools of Cyprus and are embedded in the Ministry's ICT integration programme plan in education.
Equipment and infrastructure	
Number and type of devices	<ul style="list-style-type: none"> • Action 1: LAPTOPS (HP6730b, HP4520): 1,844. • Action 2: LAPTOPS (HP4520): 1,277. • Action 3: LAPTOPS (HP4720): 70. • Action 4: DESKTOP PC (ARROW PC, OMICRON PC, HP DC7900, HP ELITE 8000, HP ELITE 8200): 16,750. • Action 5: iMac MC508GR, IMAC, iMac MA876GR/A : 71.
Additional equipment and infrastructure development	<ul style="list-style-type: none"> • Action 4: Structured cabling, projectors, printers.
Ownership of equipment	School.

Costs	
Financing model	The initiative was funded 100% by national funds. The equipment was acquired through public tenders.
Direct costs	<ul style="list-style-type: none"> Action 1: € 1,094,877.35. Action 2: € 723,484.35. Action 3: € 38,031.00. Action 4: € 10,910,707.00. Action 5: € 103,168.52.
Indirect costs	
Total costs	The total budget of the project is estimated at € 12,870,268.22
Support	
Policy level support	Support was provided by the ICT Infrastructure and Equipment Team and the ICT Contracts Monitoring Team.
School level support	Support is provided by the ICT teachers and the School ICT Counsellors.
Industry level support	Technical Support provided by the equipment suppliers (as per the terms of the contract).
Training	
Target audience, mode of delivery of training, training methods	See the MOEC-CPI initiative for teacher training on ICT.
Focus	
Duration	
Main provider	
Outputs/Certification	
Evaluation	
Was the 1:1 initiative evaluated?	N/A
Focus	
Organisation responsible for the evaluation	
Method used	
Impact	
Evidence of impact (including sustainability and up-scaling)	
Barriers and enablers	
Additional information	
Expert	<p>Andreas Trakoshis, Inspector of Design & Technology, General Secondary Education, ICT Infrastructure and Equipment Team Coordinator a.trakoshis@cytanet.com.cy</p> <p>Ninos Josephides, Inspector of Design & Technology, General Secondary Education, ICT Contracts Monitoring Team Coordinator njosephides@cytanet.com.cy</p>
Further information	

ICT equipment for teacher working groups for content development for the New Curricula	
Timeframe	September 2011
Objective	To reinforce working groups in their work.
Short description	The Cyprus educational system undergoes an educational reform with the national curriculum being revised. During this process, about 100 teachers are members of working groups and under the guidance of a scientific counsellor they develop content for the new curriculum. All these teachers are provided

	with a laptop in order to have full support for their work (development and implementation).
Context	
ICT policy context	All teachers and teacher trainers in Cyprus to use ICT towards innovative teaching and learning in order to achieve the goals of the national curriculum.
Rationale behind the initiative	Teachers and teacher trainers to have their own personal computer so as to promote innovative teaching and learning.
Scope	
Target audience	Teacher trainers and education counsellors in Cyprus of all levels of education.
Number of schools	Independent of schools - Number of educators: 100.
Age range and levels of education	22 – 60 years old of all levels of education.
Geographical coverage	National
Organisation and implementation	
Initiator	Ministry of Education and Culture of Cyprus.
Actors involved	The Ministry of Education and Culture and the Cyprus Pedagogical Institute (CPI) which implements the design of the Ministry.
Strategies for implementation	Top-down initiative.
Strategies for mainstreaming and up-scaling	The working group outcomes will be available for all teachers.
Equipment and infrastructure	
Number and type of devices	100 personal laptops with Windows operating system and Office applications.
Additional equipment and infrastructure development	An online portal for the hosting of the material.
Ownership of equipment	By the CPI.
Costs	
Financing model	The initiative was funded 100% by national funds. The equipment was acquired through public tenders.
Direct costs	About €60,000.
Indirect costs	
Total costs	About €60,000.
Support	
Policy level support	This initiative was supported by the Director General and the Minister of Education and Culture.
School level support	
Industry level support	Technical Support provided by the equipment suppliers (as per the terms of the contract).
Training	
Target audience, mode of delivery of training, training methods	N/A
Focus	
Duration	
Main provider	
Outputs/Certification	
Evaluation	
Was the 1:1 initiative evaluated?	N/A
Focus	

Organisation responsible for the evaluation	
Method used	
Impact	
Evidence of impact (including sustainability and up-scaling)	
Barriers and enablers	
Additional information	
Expert	Athina Michaelidou, Director, Cyprus Pedagogical Institute (CPI) athmich@cyearn.pi.ac.cy Kyriakos Kyriakou, Ministry of Education and Culture kyriakou.k@cyearn.pi.ac.cy
Further information	

Teachers training in ICT	
Timeframe	August 2004 – December 2009.
Objective	The training aimed to promote teachers' ICT literacy and at the same time the development of an initial understanding of the use of ICT in education as a tool for learning. About 95% of all teachers of all levels of education attended the programme (10,140 teachers: 5,910 from secondary education and 4,230 from primary education). The training programmes were offered centrally by the Cyprus Pedagogical Institute and were co-funded by the European Social Fund. There were 6 different courses from which teachers could choose based on their level of competence and background.
Short description	All teachers in Cyprus were able to attend a training programme of either 50 or 70 hours of training on ICT skills (2004-2009). The teachers who successfully attended the programme were sponsored with the amount of €500 (average) and the strong recommendation to buy their own personal computer.
Context	
ICT policy context	All teachers in Cyprus to have basic ICT skills (Lisbon Strategy towards a digital society).
Rationale behind the initiative	Teachers to have their own personal computer so as to practice and develop their own ICT skills.
Scope	
Target audience	All teachers in Cyprus of all levels of education.
Number of schools	10,140 teachers: 5,910 from secondary education and 4,230 from primary education.
Age range and levels of education	22 – 60 years old of all levels of education.
Geographical coverage	National.
Organisation and implementation	
Initiator	Cyprus Ministry of Education and Culture.
Actors involved	The Cyprus Pedagogical Institute designed the initiative under the European Social Fund co-funding programme of "Use of ICT in Life Long Learning" for teachers of secondary education whereas the initiative for teachers of primary education was under a national loan by the European Investment Bank and the Council of Europe Development Bank. The whole project was agreed with the Ministry Departments of Primary and Secondary Education as well as the Teacher Unions. The delivery of the training was done by trainers extracted from

	a trainers' pool (that satisfied certain criteria and went through a short training from the CPI). The evaluation of the project was done by an external evaluator who undertook the job through a call for tenders.
Strategies for implementation	The training was a top-down initiative. It was important that all stakeholders, thus there were meetings with teacher unions and departments of education, reached a final agreement. At the same time there were negotiations with the funding organisations to satisfy certain guidelines and restrictions.
Strategies for mainstreaming and up-scaling	The initiative was a nationwide programme and 95% of the Cyprus teachers participated.
Equipment and infrastructure	
Number and type of devices	There was a sponsorship of about €500 with the recommendation to buy a personal computer (no specifications were given).
Additional equipment and infrastructure development	Online platforms were developed for the administration of the project (e.g. online registration), online learning environments and portals for educational material. For the delivery of the trainings school computer labs were used.
Ownership of equipment	By the learner.
Costs	
Financing model	The initiative was co-funded by the ESF by 50% and by national funds (50%) for the secondary school teachers. For the primary school teachers the initiative was funded by national funds (through loans from the EIB and CEB).
Direct costs	About 5 million euros were given for the sponsorship of buying a personal computer and about 8 million euros for the delivery of the training programmes.
Indirect costs	About 2 million euros were given for the development of online platforms, dissemination, evaluation and other indirect costs.
Total costs	The total budget of the project was around 15 million euros.
Support	
Policy level support	There was administrative support by the ESF representatives in Cyprus. Policy was supported by the Director General and the Minister of Education and Culture, as well as from the department at the Ministry of Finance responsible for structural funds.
School level support	Support for the use of the school computer labs (equipment and premises).
Industry level support	Through call for tenders for the development of online platforms and portals.
Training	
Target audience, mode of delivery of training, training methods	The target audience was all teachers in Cyprus. The training was delivered centrally in computer labs where all the trainees had access to a computer.
Focus	Main focus of the training was the acquisition of basic ICT skills and an initial understanding of the use of ICT in education as a tool for teaching and learning.
Duration	The training was offered in the period of August 2004-December 2009. A training course (there were 6 different ones) was delivered in 50 or 70 hours. During a year there were 3 phases of training courses (Spring, Summer and Fall).
Main provider	The Cyprus Pedagogical Institute.
Outputs/Certification	The participants were required to deliver a project with the completion of their training in order to receive a certification and the sponsorship. In the case of the secondary education teachers, they had to undertake the ECDL exams (a requirement from the ESF).
Evaluation	
Was the 1:1 initiative evaluated?	Yes
Focus	The focus was the success of the training programmes. At the same time there was an evaluation for the impact in the teaching practices with 20 case studies.

Organisation responsible for the evaluation	External evaluation by a consortium in both cases (through a call of tenders).
Method used	
Impact	
Evidence of impact (including sustainability and up-scaling)	Overall impact was very satisfactory. From the evaluation the average satisfaction (in a scale 1-5 where 1 was unsatisfied and 5 very satisfied) was 4.58 from primary school teachers and 4.27 from secondary school teachers. The impact on the teaching practices needs further investigation since the programme's main focus was the basic ICT skills.
Barriers and enablers	
Additional information	
Expert	Anastasia Economou, Head of the Educational Technology Department at the Cyprus Pedagogical Institute anasta@cyearn.pi.ac.cy
Further information	http://www.pi.ac.cy

“One student one laptop”	
Timeframe	September 2011 – June 2013.
Objective	The project aims to the students ownership of their own device which they can bring to school every day, use it at home and have parents involved in their children's learning.
Short description	A pilot project that started as an initiative from a primary school in a rural area of Cyprus. The school principal with the support of the parents' association and the community council asked from the Ministry the support to have laptop computers for all the school students. There were various policy issues to handle so the project started with the implementation as a two year pilot project for one class only, in order to record issues that can lead to an effective exploitation of the project.
Context	
ICT policy context	Students to have access to technology and develop skills in the digital society.
Rationale behind the initiative	To record good practices, difficulties and conditions for innovative learning in the 21st century (learning in and outside the classroom, parents' involvement, online and offline learning etc.).
Scope	
Target audience	Students of the 3rd grade of Kolossi 1st primary school.
Number of schools	1 school, 25 students, 1 teacher.
Age range and levels of education	8 year olds.
Geographical coverage	Kolossi 1st primary school.
Organisation and implementation	
Initiator	The school and the community.
Actors involved	The Cyprus Pedagogical Institute designed and coordinates the initiative after he school request. The school inspector was also involved and supports the implementation.
Strategies for implementation	The project was a bottom-up initiative, started by the community and the school principal. The parents' association was involved from the beginning and agreed in co-financing the laptop (the other part was financed by the community council). The Cyprus Pedagogical Institute designed the project and managed all the necessary permissions by the Director General and Minister of Education and Culture as well as the Department of Primary Education.
Strategies for mainstreaming and up-scaling	The goal of the first up-scale is to gradually target the rest of the school. The mainstreaming of the project could serve as one of many indicators for the possibility to come to a proposal to sponsor all students of 2nd grade of primary

	school with their personal laptop (in addition to the initiative already targeting the 2nd grade students of secondary school -see the relevant template file).
Equipment and infrastructure	
Number and type of devices	25 personal laptops with Windows operating system, Office, Inspiration and some other educational software.
Additional equipment and infrastructure development	Online learning platform for students and parents (on Moodle). School DLP and interactive whiteboard. Digital cameras and recorders (from the CPI for the purpose of the project).
Ownership of equipment	By the learners.
Costs	
Financing model	The laptops were bought from the parents with the sponsorship of the Village Community.
Direct costs	About €15,000.
Indirect costs	About €5,000.
Total costs	The total budget of the project is estimated at about €20,000.
Support	
Policy level support	The parents' association and the community council. Policy was supported by the Director General and the Minister of Education and Culture, as well as the school inspector.
School level support	Support from the school principal and the other teachers as well as the parents and the village authorities and community.
Industry level support	Through call for tenders for the provision of equipment and technical support for the equipment.
Training	
Target audience, mode of delivery of training, training methods	Training of the school teachers through presentations, workshops and lesson observations. Training of parents through presentations, workshops and lesson observations (on the 1:1 initiative, on safe use of ICT, on using Moodle etc.)
Focus	Main focus of the training is the innovative use of ICT in teaching and learning in order to satisfy the goals of the national curriculum. At the same time the use of online learning environments for both students and parents.
Duration	Initial training was about 5 hours but there are ongoing activities that can take about 2-3 hours each.
Main provider	The Cyprus Pedagogical Institute.
Outputs/Certification	The teacher keeps a reflection diary and she keeps all the material developed on the online platform.
Evaluation	
Was the 1:1 initiative evaluated?	At this time some observations took place, questionnaires for students and parents, an interview with the teacher and focus group discussions with the parents and students. The results are to be analysed whereas a final evaluation is planned as well.
Focus	The focus of the first phase of the project will be the impact of the program on the students', parents' and teachers' attitudes towards ICT. On the second phase the focus will be on the kind of learning that is taking place.
Organisation responsible for the evaluation	The Cyprus Pedagogical Institute.
Method used	
Impact	
Evidence of impact (including sustainability and up-scaling)	Still pending.
Barriers and enablers	

Additional information	
Expert	Anastasia Economou, Head of the Educational Technology Department at the Cyprus Pedagogical Institute anasta@cyearn.pi.ac.cy
Further information	http://elearn.pi.ac.cy/kolossi

Teacher coaches for school-based training and support for the implementation of ICT in the learning process	
Timeframe	September 2008 – June 2012.
Objective	The project aims to create a positive culture of the use of ICT among teachers in schools by giving them resources and support the time they actually need it. At the same time it aims at a more in-depth training for teachers in the use of ICT in the learning process with a participatory model of developing teacher coaches. The need for this project derived from the fact that teachers' implementation of ICT in their teaching practice is limited (an observation derived from 20 cases studies).
Short description	A pilot project for 3 years, during which 100 teachers (50 from primary and 50 from secondary education) had an initial training and are being supported by facilitators (from the Cyprus Pedagogical Institute) so as to support teachers in their school to implement ICT in the learning process. These teacher coaches were given a personal laptop and a projector. The aim is to have at least one teacher coach in each school with their personal laptop to use for training and teaching and learning purposes.
Context	
ICT policy context	All teachers in Cyprus to use ICT towards innovative teaching and learning in order to achieve the goals of the national curriculum.
Rationale behind the initiative	Teachers to have their own personal computer so as to promote innovative teaching and learning.
Scope	
Target audience	All teachers in Cyprus of all levels of education.
Number of schools	100 schools and 100 teachers equipped.
Age range and levels of education	22 – 60 years old of all levels of education.
Geographical coverage	National.
Organisation and implementation	
Initiator	Cyprus Ministry of Education and Culture.
Actors involved	The Cyprus Pedagogical Institute designed the initiative under the European Social Fund co-funding programme "Use of ICT in Life Long Learning".
Strategies for implementation	The training was a top-down initiative. It was important for all stakeholders, thus there were meetings with teacher unions and departments of education, who reached a final agreement. At the same time there were negotiations with the funding organisations to satisfy certain guidelines and restrictions.
Strategies for mainstreaming and up-scaling	The programme is going to be evaluated at the end of this school year with the aim to have proposals for expanding the project with at least one teacher coach with his/her own equipment in each school.
Equipment and infrastructure	
Number and type of devices	100 personal laptops with Windows operating system, Office, Inspiration and some other educational software. 100 portable video projectors (DLPs).
Additional equipment and infrastructure development	Online platform for the training of the coaches (using Moodle), a portal with supportive material, and Elluminate for synchronous meetings.
Ownership of equipment	By the teacher coach.

Costs	
Financing model	The initiative started with the co-funding from the ESF by 50% and by national funds (50%) for the secondary school teachers. For the primary school teachers the initiative started with the funding from national funds (through loans from the EIB and CEB). The project continues with the funding from national funds.
Direct costs	About €120,000.
Indirect costs	About €100,000 for the development of online platforms, supportive material, dissemination, evaluation and other indirect costs.
Total costs	The total budget of the project is estimated at about €220,000.
Support	
Policy level support	There was administrative support by the ESF representatives in Cyprus. Policy was supported by the Director General and the Minister of Education and Culture, as well as from the department at the Ministry of Finance responsible for structural funds.
School level support	Support from the school principals in order to develop a strategic plan for the school (each school year) for the use of ICT in their schools.
Industry level support	Through call for tenders for the provision of equipment and technical support for the equipment the first year of the project.
Training	
Target audience, mode of delivery of training, training methods	The target audience for teacher coaches was teachers that had already attended a training course or participated in a project on ICT from the CPI. These teachers attended another training programme by the CPI and during each year of the project they are asked to participate in trainings that are offered once a month (average). At the same time they have school visits by the CPI facilitators for support and training activities. The project also aims at all the teachers of the school unit where the teacher coach delivers training activities, such as presentations, workshops, co-teaching, good practices, etc.
Focus	The training is focused on the innovative use of ICT in teaching and learning in order to satisfy the goals of the national curriculum.
Duration	The training is being offered for the period of September 2008 – June 2012. The initial training of the teacher coaches had a duration of 70 hours. Each year the coaches participate in training activities that are offered once a month (average) while they have continuous support from the CPI facilitators.
Main provider	The Cyprus Pedagogical Institute.
Outputs/Certification	The participants are required in the beginning of the school year to develop a strategic plan (in collaboration with the school principal) for the use of ICT in their school, and a first draft of the activities in order to achieve this plan. The activities reports and reflections are submitted through an online platform (on Moodle).
Evaluation	
Was the 1:1 initiative evaluated?	The evaluation is planned for the end of this school year.
Focus	The focus will be the impact of the programme on the school culture towards ICT and on the effective use of ICT by school teachers.
Organisation responsible for the evaluation	By the Cyprus Pedagogical Institute in collaboration with a research assistant.
Method used	
Impact	
Evidence of impact (including sustainability and up-scaling)	Still pending.
Barriers and enablers	

Additional information	
Expert	Anastasia Economou, Head of the Educational Technology Department at the Cyprus Pedagogical Institute anasta@cyearn.pi.ac.cy
Further information	http://www.pi.ac.cy

Slovenia

Portable eClass	
Timeframe	September 2011 – June 2012.
Objective	<p>All the technology, including laptops, access to the Internet, virtual classroom and interactive materials will be at disposal of one unit of the second grade pupils (60) at Srečko Kosovel Primary School. Control units will meet all the above mentioned things only occasionally.</p> <p>Continuous presence of learning technology changes the way of teaching and the pupil's approach towards learning. The role of the pupil gets actively creative. The mobility itself enables learning that is independent from space and place and increases the flow of information. New ways of teaching attract children as they experience the contents emotionally and with all senses, which enable more durable memorizing of the acquired knowledge.</p> <p>Although the use of computers is individual, it offers the possibility of cooperation between pupils as well as knowledge connection. Problem solution enables the pupil's cooperation at detecting facts and exchanging of results. With the aid of IT the teacher follows the pupil's progress and adapts work for each individual. With the introduction of new technologies the teachers are offered a responsible role of transferring knowledge to pupils as in this way teachers create the conditions for the pupils to acquire important operating strategies in the future.</p>
Short description	The purpose of the project e-Classroom is to verify the opportunities that a constant presence of information and communication technology offers in the classroom and at home as well.
Context	
ICT policy context	Initiative is the part of the Slovenian national ICT project E-Schooling.
Rationale behind the initiative	<p>The results of the project are supposed to show important differences between the two mentioned ways of teaching.</p> <p>We suppose to decrease pedagogical changes and equipping school with portable computers.</p>
Scope	
Target audience	Second grade pupils (7 years old) and teachers.
Number of schools	1 school, classroom (25 pupils).
Age range and levels of education	7 years old, second grade of primary school education.
Geographical coverage	Local
Organisation and implementation	
Initiator	Industry (INTEL corporation), Ministry of Education.
Actors involved	INTEL corporation gave the initiative and donation of 25 portable computers; Ministry of Education looked for schools which were interested to participate in project and our school was chosen. AVTERA d.o.o. (Slovenian company) was chosen as a support company. Evaluation is being held by The National Education Institute of the Republic of Slovenia.
Strategies for implementation	Bottom-up: teachers, school ICT advisor, E-schooling advisors, member of The National Education Institute.
Strategies for mainstreaming and up-scaling	At the moment plans are to spread the project from one school year up to three and to implement tablets from one class to at least two classes.
Equipment and infrastructure	
Number and type of devices	25 INTEL ClassMate with Software.
Additional equipment and infrastructure	None

development	
Ownership of equipment	School
Costs	
Financing model	Donation of INTEL corporation.
Direct costs	€12,000
Indirect costs	About €5,000
Total costs	€17,000
Support	
Policy level support	Ministry of Education supports the project itself, AVTERA d.o.o. gives technological support, and ICT advisors give pedagogical support.
School level support	School ICT advisor gives technical, pedagogical and organisational support (e.g. learning management system, workshops).
Industry level support	AVTERA d.o.o. – technological support
Training	
Target audience, mode of delivery of training, training methods	Teachers and pupils of our school, workplace and distance training. Methods: collaborative workshops, tutorials.
Focus	Pedagogical, technical, organisational.
Duration	All over the school-year, occasionally, weekend sessions.
Main provider	School ICT advisors.
Outputs/Certification	None.
Evaluation	
Was the 1:1 initiative evaluated?	Yes, during the project and at the end of school-year.
Focus	<ul style="list-style-type: none"> • pupils activity to achieve the aims; • team communication and pupils interaction; • increased collaboration with parents.
Organisation responsible for the evaluation	Internal - school itself, external - The National Education Institute of the Republic of Slovenia
Method used	
Impact	
Evidence of impact (including sustainability and u-pscaling)	Changes in teaching practice among teachers and achievement of objectives with ICT. Pupils are more familiar with computers, more skilful in using computers and able to quickly find information on the Internet.
Barriers and enablers	
Additional information	
Expert	Miranda Novak, miranda.novak@guest.arnes.si Dalibor Čotar, dalibor.cotar@guest.arnes.si
Further information	None at the moment.

LEARNING WITH NETBOOKS (NETBOOK CLASS)	
Timeframe	First year: school year 2010/11: preparation of the project (plan of work, teacher education). Second year: school year 2011/12: classroom work. Third year: school year 2012/13: evaluation of the project and achievements.
Objective	<u>The objectives of the project:</u> 1. Curriculum: identifying the curriculum aims in which ICT can be a meaningful support in the learning/teaching process; 2. Evaluation: finding benefits for students' achievements in learning using ICT; 3. Developing digital literacy in students and teachers; 4. School organisation: to establish rules for the use of computers in the classroom.

Short description	The project was developed in cooperation with the Ministry of Education (mag. Borut Čampelj) and National Education Institute (mag. Nives Kreuh).
Context	
ICT policy context	The initiative is a part of the national ICT programme (introducing ICT in learning/teaching process - E-schooling) and also part of the national revised curriculum that contains digital literacy as one of the key competences in all subjects.
Rationale behind the initiative	<p>This project is a continuation of previous projects introducing ICT in teaching and learning at Gymnasium Jožeta Plečnika Ljubljana (first step was the usage of classroom computer; second step was the usage of mobile ICT classroom and third was our netbook class).</p> <p>Most teachers working in this class have previous experience in use of ICT and were aware of pedagogical change. They decided to be a part of this project by themselves. They also had the opportunity to attend teacher training done by E-Schooling (national project for ICT education of the teachers).</p> <p>Every classroom had a computer and an overhead projector even before starting this project and the mobile ICT classroom is still available for all other teachers and students.</p> <p>As a consequence of increased use of ICT, every student got his/her own netbook in this pilot project class.</p>
Scope	
Target audience	Students and teachers.
Number of schools	1 classroom, 1 school.
Age range and levels of education	Students are 16 to 17 years old and are part of secondary education (15-18 years old).
Geographical coverage	The pilot project is a local initiative.
Organisation and implementation	
Initiator	The main initiator of the initiative was the Ministry of Education and National Education Institute (mag. Nives Kreuh).
Actors involved	<p>The initiative: mag. Borut Čampelj, mag. Nives Kreuh.</p> <p>Teacher training: E-Schooling (mag. Nives Kreuh).</p> <p>Project plan: Simona Granfol (teacher and ICT project manager at Gimnazija Jožeta Plečnika Ljubljana).</p> <p>Evaluation: Simona Granfol, Barbara Brečko (advisor).</p>
Strategies for implementation	The implementation strategies are bottom-up: teachers of all subjects suggested the use of ICT at their teaching/learning process; if wanted they could have assistance and consultation of E-schooling project.
Strategies for mainstreaming and up-scaling	The plans will be made after having results of the evaluation.
Equipment and infrastructure	
Number and type of devices	33 devices for 33 students in the classroom: type Netbook Acer one 722, processor dual core AMD, RAM: 2GB, screen 11, 6 inch, cost 291, 60 EUR, software: Windows 7, Microsoft office.
Additional equipment and infrastructure development	Also teachers got the same devices as students; other infrastructure already existed.
Ownership of equipment	Equipment is owned by the school.
Costs	
Financing model	The initiative is financed by the school. The devices bought the school at regular public tender for all the schools. The education of the teachers is offered free by E-schooling project to all schools.
Direct costs	Cost of devices: 291, 60 EUR, 1/2 paid by the school, 1/2 paid by the Ministry of Education.

Indirect costs	The School Project Team does not receive any payments.
Total costs	approx. 6,600 EUR.
Support	
Policy level support	Education of the teachers: E-schooling
School level support	Teachers have technical support at school level: maintainer of the educational technology and teacher of informatics; pedagogical, organisational and educational: organised by School Project Team.
Industry level support	None.
Training	
Target audience, mode of delivery of training, training methods	Teachers attended training specific for their subject organised by E-schooling. Mode of delivery of training: on the workplace, outside the school, at distance. Training methods: collaborative and tutorials).
Focus	Focus of the training was as well pedagogical as technical and was individual formed for every teacher according to his needs and already existing knowledge.
Duration	Individual adjusted for each teacher and regular as teachers meeting at the school (once a month).
Main provider	E-schooling.
Outputs/Certification	Participants received a certification after some training.
Evaluation	
Was the 1:1 initiative evaluated?	In progress.
Focus	Evaluation: <ul style="list-style-type: none"> - Digital reading; - ICT knowledge; - Classroom activities; - Learning outcomes (not yet).
Organisation responsible for the evaluation	Internal evaluation (Simona Granfol), external evaluation on the next step.
Method used	
Impact	
Evidence of impact (including sustainability and up-scaling)	
Barriers and enablers	
Additional information	
Expert	Information at policy level: mag. Borut Čampelj and mag. Nives Kreuh. Information at project level (organisation, education and evaluation): Simona Granfol, head of the pilot project at Gimnazija Jožeta Plečnika Ljubljana.
Further information	

Spain

ATRIA	
Timeframe	Working since the beginning of school year 2010-2011.
Objective	The overall objective was focused on the creation of a space where teachers, students and families could find what digital bookstores have to offer in an orderly and efficient way.
Short description	Atria is the platform that the Catalan Government (Spain) launched to provide access to digital learning resources to the educative community in Catalonia (schools, teachers, students, parents, publishers...).
Context	
ICT policy context	Initiative part of the eduCAT project.
Rationale behind the initiative	This project aimed to encourage the education community to have free access to digital education resources in order to avoid digital divide. Moreover it aims to improving pedagogical models and efficiency impact.
Scope	
Target audience	All the educational community: 145,000 students, 34,000 teachers, 16 bookstores, 41 publishers integrated in the catalogue, digital learning resources for 6,3 € Million.
Number of schools	611 schools.
Age range and levels of education	Students from 10-14 years old.
Geographical coverage	Regional coverage/region of Catalonia.
Organisation and implementation	
Initiator	Government of Catalonia.
Actors involved	Government of Catalonia, Aventura, Microsoft.
Strategies for implementation	Top-down strategy, Government makes the decision of implementing the initiative to digitalize the education sector and involving all the agents to get into it (schools, publishers...).
Strategies for mainstreaming and up-scaling	Aventura has developed a solution to implement in the other territories not only within Spain but also at international level.
Equipment and infrastructure	
Number and type of devices	Hosting of the solution by Aventura, web access to Atria for users (schools, teachers, students, parents, bookstores, publishers).
Additional equipment and infrastructure development	
Ownership of equipment	
Costs	
Financing model	The Catalonia's Government provides funding for "Digital Backpack".
Direct costs	Average cost "Digital Backpack": 37 EUR.
Indirect costs	
Total costs	Developing and maintenance of the solution: 1,5 million€ in 2 years' time.
Support	
Policy level support	Banking entity to support purchases through virtual bank accounts. VLE providers support to guarantee interoperability. Bookstores/Publishers support to update catalogues.
School level support	Possibility of managing the purchase of digital resources directly from school or at individual level from students/parents.
Industry level support	Helpdesk provided by Aventura.

Training	
Target audience, mode of delivery of training, training methods	Basic ICT training are provided to all teachers in the Catalan Education. Educative community (12 territorial services, open sessions to all users within the community).
Focus	Manage of the platform (access to catalogue, purchases, and access to resources...).
Duration	
Main provider	Aventia.
Outputs/Certification	No
Evaluation	
Was the 1:1 initiative evaluated?	Yes
Focus	Efficiency impact: digital resources 43€/student year .
Organisation responsible for the evaluation	Government and Aventia.
Method used	
Impact	
Evidence of impact (including sustainability and up-scaling)	
Barriers and enablers	
Additional information	
Expert	
Further information	http://www.aventia.com

Switzerland

iPhone Project at the Projektschule Goldau	
Timeframe	2009-2011
Objective	<p>The overall objective of the project was to explore the impact smartphones could have on learning environments and behaviours. The specific questions to be explored are the following:</p> <ul style="list-style-type: none"> • Does a personal smartphone help students attain the goals set out by the curriculum of the Kanton Schwyz? • How does a personal smartphone impact the daily processes at school? • How does a personal smartphone change the students' perception of computers, the Internet and mobile technologies? • Is it possible to promote learning outside of a school context by means of using smartphones within the school context? • What are useful scenarios for smartphone use in the classroom? • To what extent can computers be replaced by smartphones in schools? • Which organisational and technical concepts prove successful when adopting personal smartphone use in the school?
Short description	<p>During the school year 2009/2010 all 17 pupils of a pilot class (5th grade) at the "Projektschule Goldau" (Switzerland) received a personal smartphone (Apple iPhone 3G) which they were allowed to take home and use outside of school after a short introductory phase.</p> <p>With a smartphone, students had a tool for reading, writing, calculating, drawing, taking pictures, listening to and recording music and sounds, making phone calls and surfing and communicating on the Internet anytime and anywhere. The students used the smartphone in and out of school and thereby learned to use it as part of their personal learning environment.</p> <p>The project was led by the Institute for Media and School (IMS) of the University for Teacher Education Central Switzerland - Schwyz. It was partly funded by Swisscom, so there were no costs for the school, the parents or the students.</p>
Context	
ICT policy context	The project wasn't part of any wider ICT policy context. It was initiated by the PHZ Schwyz as an experimental research project.
Rationale behind the initiative	<p>Overall, the rationale lied in the contradictory trends of increased smartphone ownership amongst young people, the rise in the number of uses for a smartphone and the limited use of these in schools. This pointed to a huge lost potential of utilizing technology effectively for young people.</p> <p><i>Equipping Schools:</i></p> <ul style="list-style-type: none"> • The pilot was designed to explore effective organisational and technological processes when adopting smartphone technology at schools. <p><i>Pedagogical Change:</i></p> <ul style="list-style-type: none"> • The pilot wanted to explore the impact a personal smartphone had on student learning and conceptualizations of technology. There was a strong focus on how learning outside of school could be improved using the smartphone. • There was also an emphasis on finding out for what activities and areas in the classroom the smartphone could be a valuable asset to improve learning.
Scope	
Target audience	Students, teachers, school administrators.
Number of schools	1 school, 1 class, 17 students.
Age range and levels of education	Primary School, 5th grade.

Geographical coverage	Local area: Goldau village.
Organisation and implementation	
Initiator	Institute for Media and School (IMS) of the University for Teacher Education Central Switzerland – Schwyz; Prof. Dr. Beat Döbeli Honegger.
Actors involved	<ul style="list-style-type: none"> • The Institute for Media and School of the University for Teacher Education Central Switzerland was responsible for the development and organisation of the project. The institute was also responsible for evaluating and publishing the findings of the project; • Swisscom (Telecoms Company) supported the project by providing the iPhones and data connections free of charge for the school so that there were no costs for the school, students and parents; • The Project School Goldau was part of the Primary School Goldau and worked closely together with the University for Teacher Education Central Switzerland. It provided the framework for experimental approaches to teaching which could be observed and evaluated by the researchers and students of the University. The project was coordinated and led at the school by the class teacher Christian Neff.
Strategies for implementation	Top-down: The project did not originate from the school but rather from the University for Teacher Education Central Switzerland. It was also organised by the University rather than the school.
Strategies for mainstreaming and up-scaling	The project was followed-up with a new pilot called “Digitaler Alltag” (roughly “Everyday digital work life”) which now includes three classes at the Project School Goldau, and has expanded its scope to the use of tablets and other handheld devices such as iPods (iPod touch). However there are currently no plans for mainstreaming the project mainly due to cost issues.
Equipment and infrastructure	
Number and type of devices	17 Apple iPhone 3G models provided by Swisscom.
Additional equipment and infrastructure development	N/A
Ownership of equipment	The iPhones remain in the ownership of Swisscom.
Costs	
Financing model	The project was funded by the Institute for Media and School (IMS) of the University for Teacher Education Central Switzerland – Schwyz and Swisscom who provided the iPhones and data connections.
Direct costs	No information available.
Indirect costs	No information available.
Total costs	No information available.
Support	
Policy level support	No information available.
School level support	No information available.
Industry level support	No information available.
Training	
Target audience, mode of delivery of training, training methods	<i>Student training:</i> Before the students were allowed to take the smartphones home they developed together with their teacher a contract outlining the responsible use of the smartphone. This was a contract designed by the students under the coordination of Christian Neff the class teacher. In the process of creating this contract the students received or even developed their own training of responsible smartphone use.
Focus	<p>Pedagogical: The students learned about responsible and sensible use of the smartphone</p> <p>Technical: The students were instructed on how to synchronize their smartphone using a computer and to ensure their smartphone was charged before coming to</p>

	school.
Duration	N/A
Main provider	School - class teacher.
Outputs/Certification	N/A
Evaluation	
Was the 1:1 initiative evaluated?	Yes
Focus	General observations about how the smartphones were utilised at school and what problems and opportunities raised.
Organisation responsible for the evaluation	Institute for Media and School (IMS) of the University for Teacher Education Central Switzerland and the Project School Goldau.
Method used	The evaluation of the project was conducted in the form of regular observations by the school teaching and university research staff and student surveys. The findings were published regularly on a dedicated blog as well as published in academic journals and presented at conferences. The project was also widely reported about in the local, national, and international media
Impact	
Evidence of impact (including sustainability and up-scaling)	<p>An extensive amount of findings were published. Following is a selection of key points from those:</p> <ul style="list-style-type: none"> • The smartphones very quickly lost their novelty amongst the students and therefore did not distract from other areas of focus during the lessons; • The smartphones were only put to use in about 10% - 15% of school time; • The media functions of the smartphone proved to be the most useful feature in the classroom, being utilised for video and sound recording purposes; • During regular class students most commonly used the smartphones for taking notes, making digital copies and proving they had done the homework; • In most cases it was the students who found new and more effective ways of using the smartphones in the classroom, for example by finding a new app. This indicates that the students increasingly viewed the smartphones not as entertainment technology but as a tool for learning and working; • The smartphones were only limitedly used for traditional communication purposes (both private and school). For example 10 out of 17 students said they only rarely used the phone to contact someone (teacher or other students) for help with their homework. The most common form of communication used was email; • In response to what smartphones were used for during students' private time, 15 out of 17 said for learning purposes.
Barriers and enablers	Administrative difficulties for teachers were registered such as explaining to the class how to do certain things on the smartphones without being able to project things on to a screen. At a later stage new technology was purchased which allowed the projection of the smartphone screen.
Additional information	
Expert	<p>Prof. Dr. Beat Döbeli Honegger of the Institute for Media and School (IMS) of the University for Teacher Education Central Switzerland – Schwyz;</p> <ul style="list-style-type: none"> • Zaystrasse 42, 6410 Goldau • Tel.: 041 859 05 86 • Email: beat.doebeli@phz.ch
Further information	<p>http://www.projektschule-goldau.ch/das-iphone-projekt http://www.moleap.net/single.php?id=68 http://beat.doebe.li/projects/lenzburg11/ http://www.projektschule-goldau.ch/das-iphone-projekt/publikationen</p>

Netbook Pilot at Guttannen Primary School	
Timeframe	September 2010 – ongoing.
Objective	<p>The main objective is to test the usefulness of netbooks for educational purposes, especially in classroom settings. More specific objectives include the development of ICT skills amongst students, highlighting the opportunities offered by open-source and other free software in order to improve accessibility to ICT after the students leave school, the promotion of group work (by using the netbooks).</p> <p>Throughout the project further objectives have become apparent. For example, the school has experimented with providing lessons via Skype to students not able to attend school due to heavy snowfalls in the region.</p>
Short description	<p>The project began in 2010 as cooperation between the Bern College of Education (PH Bern) and the Guttannen Primary School and is still ongoing. It originated out of professional development sessions at the PH Bern and a survey of the research literature which suggested 1:1 ICT systems as the way forward for schools wanting to implement the use of ICT in the classroom. The project consists of two classes in which all students have been provided with a netbook to use in and outside of class. The netbooks are utilised in the classroom and at home but are stored in the school during weekends and holidays for maintenance purposes. Insights into effective or ineffective netbook use are recorded on a blog (http://netbookprojekt.blogspot.co.uk) and a team of researchers from the PH Bern regularly visits the school for evaluation purposes.</p>
Context	
ICT policy context	The pilot has similar goals as another pilot project at a school in Goldau in which all students of one class were provided with iPhones (2009-2011). It is not linked into a national ICT framework.
Rationale behind the initiative	<p><i>Equipping Schools:</i></p> <ul style="list-style-type: none"> The pilot is designed to explore the opportunities and problems that a 1:1 netbook programme can offer schools. <p><i>Pedagogical Change:</i></p> <ul style="list-style-type: none"> The school wants to increase its use of group work as a teaching method. They believe that netbook use can in fact facilitate such methods. The school has used the netbooks to provide learning opportunities to students who cannot attend school due to heavy snowfall in the area. <p><i>Lower Digital Divide:</i></p> <ul style="list-style-type: none"> The use of open source and other free software is designed to promote the use of such software by students when they leave the school. The increased awareness of inexpensive options of ICT use is designed to increase accessibility for families which might not consider buying a computer.
Scope	
Target audience	Students, teachers, parents, remote communities.
Number of schools	1 school, 2 classes, 13 students.
Age range and levels of education	Primary School, 5th and 6th grade.
Geographical coverage	Local area: Guttannen village in the Alps; remote area, during winter students sometimes have difficulties accessing the school.
Organisation and implementation	
Initiator	ICT teacher Urs Zuberbuehler of Guttannen School and College of Education Bern (PH Bern).
Actors involved	<ul style="list-style-type: none"> PH Bern provides advice and monitors the progress of the project at the

	<p>school. They regularly send a team of researchers to evaluate the project and provide technical assistance.</p> <ul style="list-style-type: none"> ICT teacher Urs Zuberbuehler of Guttannen School runs the project and writes reports about findings on the project blog. He is responsible for maintaining the hard – and software, experimenting with new teaching methods using the netbooks, and providing support to students and parents.
Strategies for implementation	Bottom-up: This is a bottom-up approach which has not been initiated by the local authority or the federal government. The project is designed to provide insights for other schools thinking about adopting a 1:1 ICT strategy.
Strategies for mainstreaming and up-scaling	So far the school has not indicated an expansion of the programme but it hopes that the insights gained from the pilot and published on the blog will allow other schools to successfully adopt a 1:1 ICT strategy.
Equipment and infrastructure	
Number and type of devices	13 HP 2133 Netbooks initially running Windows XP, later upgraded to Windows 7. Except for specialized educational software the school has installed a range of open source software such as open office or VLC media player.
Additional equipment and infrastructure development	Wireless Internet infrastructure at the school.
Ownership of equipment	The netbooks are owned by the school but can be bought by the parents.
Costs	
Financing model	The netbooks were financed through the regular school budget. The existing infrastructure (desktop computers and accessories) was sold via eBay.
Direct costs	All netbooks were purchased as used equipment. The purchase price in summer 2010 was on average 180 € per netbook. The Bern College of Education (PH Bern) has incurred the costs for the access point and technical support.
Indirect costs	
Total costs	About €2,400
Support	
Policy level support	From its beginning the project had the full moral support of the local authorities.
School level support	Technical support such as the establishment of the wireless network was provided by the Bern College of Education (PH Bern).
Industry level support	None
Training	
Target audience, mode of delivery of training, training methods	No special training provided for students except during regular class time. The class is mostly run by the teacher responsible for the project so little need to train other members of staff.
Focus	Technical: The project leader assists with technological problems the students encounter. He is assisted by a technician from the PH Bern on an irregular basis.
Duration	Twice yearly participation in training/meeting at the Bern College of Education (PH Bern).
Main provider	School, PH Bern
Outputs/Certification	No
Evaluation	
Was the 1:1 initiative evaluated?	Yes
Focus	<ul style="list-style-type: none"> A student survey was conducted about how the netbooks were used and any problems associated with them; A self-evaluation of the project is provided by the project leader on the blog.
Organisation responsible for the evaluation	School.
Method used	

Impact	
Evidence of impact (including sustainability and up-scaling)	<ul style="list-style-type: none"> • Evidence from student survey: <ul style="list-style-type: none"> ○ Student responses were generally positive with an average mark of about 87 out of 100 (100 = very positive); ○ Students found most use for the netbooks in language classes; ○ In the classroom students mostly used specialized learning software while at home most of the time on the netbook was used to learn vocabulary and write texts. • Insights from self-evaluation on the blog: <ul style="list-style-type: none"> ○ Time consuming technological issues due to mixed set of hardware as some students bring in their own laptop; ○ Overall success of students acting responsible with netbooks but applied sanction of taking away the netbook if using them irresponsibly causes follow-on problems in class when the whole class is asked to use the netbook. Requires time-consuming alternative task; ○ Definite benefits of netbooks over laptops (some students bring in their own laptop) due to size and weight. A netbook on the desk still allows students to have a textbook and a notepad out. With a laptop the desk becomes very cramped; ○ Lessons via Skype can be a success if technology is improved but should only be used in exceptional circumstances; ○ Enormous space savings in the classroom when desktop computers or thin clients are removed.
Barriers and enablers	Barriers: individual comments of students however indicate frustration with technological problems as well as a “desire” to return to a more traditional form of learning.
Additional information	
Expert	<ul style="list-style-type: none"> • Urs Zuberbühler (ICT-V, Lehrer 5./6. Klasse): primarschule.guttannen@gmail.com • Prof. Dr. Werner Hartmann (Director of the Institute of Education Media at the PH Bern): werner.hartmann@phbern.ch
Further information	http://netbookprojekt.blogspot.com http://www.kibs.ch/Unterstuetzung/1to1_Guttannen http://guttannen.kibs.ch/projekte/netbook-pilotprojekt-mit-ph-bern.html

The UK

HOME ACCESS PROGRAMME	
Timeframe	2008-2010 (national rollout of the Home Access programme announced by the Prime Minister in January 2010).
Objective	Based on the government's aspiration that all school-age learners should have access to a computer and connectivity at home.
Short description	The programme targeted the most disadvantaged families so that their children could have access to appropriate technology to support their learning at home. Context: Home: 91% of children from high income families have home access to Internet, only 67% in deprived families. Over 1 million children have no access. UK research shows: having a computer at home associates with a 2 grade improvement in formal exams, parental engagement a significant factor in improving pupil attainment.
Context	
ICT policy context	
Rationale behind the initiative	
Scope	
Target audience	Students, families. The programme aimed to benefit more than 270,000 households that currently lack access by March 2011. The pilot: over 12,000 grants were awarded to eligible families.
Number of schools	
Age range and levels of education	Years 3 to 9 inclusive.
Geographical coverage	National
Organisation and implementation	
Initiator	Minister of State for Schools and Learners.
Actors involved	The Home Access programme worked with local authorities, schools, colleges and tertiary sector organisations to ensure that families were provided with the support and guidance they needed to realize the benefits of having access to technology at home.
Strategies for implementation	
Strategies for mainstreaming and up-scaling	
Equipment and infrastructure	
Number and type of devices	
Additional equipment and infrastructure development	
Ownership of equipment	
Costs	
Financing model	Government money on those most in need, encouraging those not entitled to government help to self-purchase.
Direct costs	
Indirect costs	
Total costs	
Support	
Policy level support	
School level support	

Industry level support	
Training	
Targeted audience, mode of delivery of training, training methods	
Focus	Engage more parents in their child's learning.
Duration	
Main provider	
Outputs/Certification	
Evaluation	
Was the 1:1 initiative evaluated?	Yes.
Focus	
Organisation responsible for the evaluation	
Method used	
Impact	
Evidence of impact (including sustainability and up-scaling)	Background evidence: recent evidence suggested that having home access to a computer could help learners achieve a two grade improvement in one subject at GCSE, i.e., a pupil who would have got a D, could, through the effective home use of technology, now get a B at GCSE.
Barriers and enablers	
Additional Information	
Expert	
Further information	http://schools.becta.org.uk/

European Commission

EUR 26004 – Joint Research Centre – Institute for Prospective Technological Studies

Title: Overview and Analysis of 1:1 Learning Initiatives in Europe

Authors: Anja Balanskat, Diana Bannister, Benjamin Hertz, Ester Sigillò, Riina Vuorikari

Luxembourg: Publications Office of the European Union

2013 – 162 pp. – 21.0 x 29.7 cm

EUR – Scientific and Technical Research series – ISSN 1831-9424 (online)

ISBN 978-92-79-30548-1 (pdf)

doi:10.2791/20333

Abstract

This report presents the analysis of 31 recent 1:1 learning initiatives, which equip students of a given school, class or age group with a portable computer device. Overall, the analysed initiatives involve approximately 47,000 schools and 17,480,000 students in primary and secondary education across 19 European countries. Based on desk research (analysis of country reports on 1:1 initiatives and a literature review), in-depth expert interviews and stakeholder consultation in an expert workshop, the implementation strategies, the financing models and the pedagogical frameworks of these initiatives are analysed. Policy options for mainstreaming 1:1 initiatives that focus on the notion of 1:1 learning rather than 1:1 devices and successfully promote technological, pedagogical and organizational innovation are also proposed, contributing to the Europe 2020 strategy to modernize Education and Training across Europe.

As the Commission's in-house science service, the Joint Research Centre's mission is to provide EU policies with independent, evidence-based scientific and technical support throughout the whole policy cycle.

Working in close cooperation with policy Directorates-General, the JRC addresses key societal challenges while stimulating innovation through developing new standards, methods and tools, and sharing and transferring its know-how to the Member States and international community.

Key policy areas include: environment and climate change; energy and transport; agriculture and food security; health and consumer protection; information society and digital agenda; safety and security including nuclear; all supported through a cross-cutting and multi-disciplinary approach.

