



# Study of the impact of technology in primary schools

Executive summary





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## 1. ICT SUCCESS IN EUROPE'S PRIMARY SCHOOLS

The Study of the impact of technology in primary schools (STEPS) provides the most detailed picture yet of national ICT strategies and their impact in primary schools in the 27 countries of the European Union, as well as in Liechtenstein, Iceland and Norway.

Funded by the European Commission, this landmark study of ICT in Europe's 209,000 primary schools was undertaken by European Schoolnet (EUN) and empirica GmbH.

The study includes an analysis of interviews with 18,000 primary school teachers and head teachers, a review of relevant research in Europe (amounting to 60 research studies published in 22 countries), a survey of policy makers in 30 Ministries of Education on national ICT policies, 25 case studies of good practice and 30 country briefs.

The study presents baseline data on 30 national primary education systems and their ICT strategies, and investigates the impact of ICT in three key areas of the education system: learners and learning, teachers and teaching and the school as a whole.

### FINDINGS

The evidence shows that ICT related strategies at national, regional and local level have resulted in:

- Increased access to and use of ICT in primary schools;
- ICT-supported learning and ICT-enabled wider educational goals;
- Higher levels of teacher and learner motivation, leading to competence development and an engagement with lifelong learning;
- First steps towards systemic change and modernisation of planning.

The report highlights four related areas of concern:

- Providing equal access to ICT for smaller primary schools;
- Providing adequate pedagogical training for teachers and head teachers;
- Collaborating and sharing knowledge between teachers and schools;
- Releasing the potential of ICT to underpin a wide range of pedagogies, improved learning outcomes and new forms of assessment.

Findings from STEPS relate to the education system, research, and the impact of ICT on learners, teachers and schools.

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## EDUCATION SYSTEMS

Analysis of interviews with 18,000 primary school teachers and head teachers led to the identification of five clusters of countries as regards access and use of ICT: front-runners, enthusiasts, inhibited, mixed and outliers. The survey of Ministries of Education revealed that national ICT policies usually aim to improve infrastructure and teachers' digital competence, but are less frequently focused on the supply of digital learning resources, pedagogical reform or leadership. Digital competence features in the primary school curriculum in 22 countries, either integrated across subjects or taught as a separate subject called ICT. In most countries ICT is part of general education policy and there is also a specific ICT policy for all schools, but not a specific policy for ICT in primary schools. Hardware provision is often a national or municipality responsibility, whereas maintenance, technical and pedagogical support are not. While primary schools have increasing autonomy as public sector services become decentralised, responsibilities can be unclear within the systems, posing challenges to individual schools.

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## RESEARCH ON THE IMPACT OF ICT

Most of the countries surveyed carry out research on the impact of ICT. The evidence on the impact of ICT differs in terms of impact areas addressed and research methods used. Overall, most evidence concerns the impact of ICT on teachers, followed by learners and schools. Studies on the impact of ICT on learning concentrate on the perception of learners and teachers in how far ICT supports the learning process and wider educational goals. Evidence on the impact of ICT on teachers focuses on teacher training programmes, including skills, competencies and perceptions of teachers, and teachers' use of ICT as a tool for preparation and planning. Less is known about changes in pedagogical practices. Evidence on the impact of ICT on schools from the 60 studies reviewed is dispersed and patchy. There is hardly any evidence in areas such as internal or external school collaboration, and the interdisciplinary and innovative use of ICT within projects. Assessing the impact of ICT based on teachers' perceptions is the prevailing approach taken in national studies as opposed to the assessment of ICT based on student outcomes in tests.

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## THE IMPACT OF ICT ON LEARNERS

For children, a range of knowledge, skills and competencies – both traditional and '21<sup>st</sup> century' e.g. creativity, learning to learn – are acquired through the use of ICT, including mathematics and science, language (first and second), and digital and social skills. Teachers interviewed in the quantitative survey note a positive impact on learners' basic skill acquisition (reading, writing, calculation). Research echoes these findings and demonstrates further that ICT also has a positive impact on wider educational goals such as students' attendance, behaviour, motivation, attitudes, confidence and engagement. Technology enables finer differentiation and personalisation as shown by the research and it can support improved learning outcomes for disadvantaged learners. The research also highlights a discrepancy between children's more frequent and often more varied use of ICT outside school and their under-use of ICT at school. Active and enquiry-based tasks with ICT are highly motivating for children, but are not sufficiently offered to children in schools. Policy-



makers report that virtual learning environments are becoming more widespread but research indicates that they are used more for administration than for learning. Analysis of the case studies reveals that ICT-based assessment systems used in primary schools give more sophisticated feedback on learning to teachers, parents and pupils than traditional methods.

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## THE IMPACT OF ICT ON TEACHERS

A remarkable 75% of Europe's primary teachers use computers in class and are positive about their benefits, as revealed by the quantitative survey of 18,000 primary school teachers and head teachers. Teachers find that ICT supports in equal measure a range of learning and teaching styles: from passive activities (exercises, practice) to more active constructivist learning (self-directed learning, collaborative work). Nevertheless, there is evidence from the research that ICT is pedagogically under-used, teachers generally using ICT less inside and more outside the classroom, e.g. for administration, organisation and planning. ICT can promote new pedagogical approaches only if fully integrated into subject lessons. However, teachers tend to lack the pedagogical vision to integrate ICT effectively in teaching. All 30 countries are investing in teachers' digital competence development, but many teachers entering the profession have little formal training in using ICT. As the research shows, much continuing professional development lacks a pedagogical dimension and is not matched to needs. Reliable technical and inspiring pedagogical support for teachers is often missing.

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## THE IMPACT OF ICT ON SCHOOLS

Almost all primary schools have computers, with on average eight internet computers per 100 pupils and at least 88 percent in each country having internet access, as the quantitative analysis of interviews with head teachers and teachers shows. However, there are variations across and within countries, and smaller primary schools can be disadvantaged, as shown in the case studies. Research indicates that ICT integration into subjects, teaching and classrooms is the key to changing teaching practices, and the school leader's support is crucial. However, policy-makers find that school ICT plans tend to concentrate on infrastructure, rather than on how ICT can enhance teaching and learning. The case studies illustrate how ICT improves administration and access to information: learner records are easily maintained, exchanged and updated with ICT, and information is more accessible to parents and carers through online access. They also show the importance of a whole school collaborative approach to ICT integration, especially in countries where schools have significant autonomy, involving both school leaders and enthusiastic teachers, supported by practical guidelines.

## RECOMMENDATIONS

The report concludes with recommendations to policy-makers, schools and researchers.

Ministries of Education are urged to increase, improve and diversify teacher education and support head teachers as leaders of change; to build ICT into general educational policies,



emphasising the pedagogical dimension; and to ensure access to high quality equipment and digital learning resources.

Primary schools should capitalise on learners' ICT competence, strengthen the pedagogical use of ICT, develop an open knowledge-sharing culture with external stakeholders, and exploit the potential of ICT as a catalyst for change and tool through which to fulfil educational goals.

Research should exploit innovative methods to assess ICT impact and shift the research focus towards the learner and the school. It is recommended to establish a long term and continuous monitoring system at European level on the impact of ICT in schools, by developing a toolkit for indicator use by schools, researchers and policy-makers, to achieve greater consistency across countries.

## BACKGROUND AND METHODOLOGY

STEPS ran from January 2008 and July 2009 and, with the help of a team of National Correspondents, compiled evidence from five different sources, using an analytical framework built around four levels: system, school, teachers and learners. Each source offers a different perspective on ICT in primary schools in the 30 countries:

- A policy maker survey providing an overview of ICT initiatives in primary education in the 30 countries resulting in the identification of over 70 policies and strategies;
- Quantitative data from interviews with a representative sample of over 18,000 primary school teachers and head teachers;
- Reviews of 60 research studies published in 22 countries, producing the most detailed picture yet in terms of research into ICT in primary education in Europe;
- A survey of teachers across Europe, giving a qualitative grassroots insight into the impact of national strategies in schools and the identification of good practices;
- 25 case studies of best practice, based on visits to schools exemplifying the impact of strategies, including lesson observations and interviews with teachers and pupils.

The results were analysed in five papers and a synthesis report containing the overall findings and recommendations. 30 country briefs were produced, giving a succinct overview of the STEPS results for each country.

