

## Implementation and sustainability of a global ICT company's programme to help teachers integrate technology into learning and teaching in Germany, France and the UK

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This paper will discuss the implementation of the professional development programme “Intel® Teach” in Germany, the UK and France, as a public-private partnership. The programme is designed to help school teachers to effectively integrate technology into learning and teaching and to help students develop key “twenty-first century skills”. The implementation of the programme, which has so far involved over 400,000 teachers spread across the three countries since 2004, followed different models in the three countries, as a result of differing national education policies, systems and needs. Data from the external evaluation of the programme in Germany are used to examine the factors on a systemic level, which affected the implementation, effectiveness and sustainability of the programme. These factors are grouped into three categories: (1) concept transfer, (2) experience transfer and (3) establishing standards.

Exploring these factors provides a framework for analysing how the changing conditions in the three countries and the global trends in education will influence the further development of the programme. Recent developments in the programme will be discussed, including:

- open-source solutions
- integration of new features (including e-Portfolio);
- improved collaboration and sharing.

The paper will also address the introduction of new content and approaches that target specific current issues in teacher professional development, for example:

- project-based approaches;
- collaboration in the digital classroom;
- technology-based approaches to assessment;
- educational leadership.

The experience from the implementation of the programme through public-private partnerships in different countries shows how such collaborations can shape the educational landscape in a way that makes educational provision more effective and efficient, and of greater relevance and value to students.

**Keywords:** teacher professional development; technology integration; sustainability; public-private partnership

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## **Introduction**

Recent policy developments towards e-readiness and e-skills have confronted national education authorities with the question of how to effectively foster teachers' skills in integrating information and communication technologies (ICT) in teaching and learning processes. Education authorities attempted measures such as implementation of ICT-related policies, introduction of ICT certification for teachers and provision of pre-service and in-service training in the technical and pedagogical use of ICT. Despite these measures, recent evidence in international perspective showed that ICT teaching skills is one of the areas with the greatest need for professional development (OECD 2009). This finding reveals a necessity to gain a better understanding of the complex set of factors, which determine the long-term effects of programmes and initiatives aiming to enhance teachers' ICT competencies. Professional development literature categorises the factors which mediate the impact of programmes and initiatives, according to different criteria. Ottoson (1997) distinguishes between educational, innovating, predisposing, enabling and reinforcing factors affecting teachers' adoption and application of what they have learned during their professional development courses. A broader categorisation of the factors influencing the impact of professional development programmes places them into two main groups – individual (teacher) and school, programme and system factors (Smith and Gillespie 2007).

System-level policies and practices are considered to influence indirectly the effectiveness of teacher professional development to integrate technology (Darling-Hammond and McLaughlin 1995). Such policies and practices can promote and legitimise particular professional development programmes and their goals, as well as enhance or inhibit the ability of schools to support them (Smylie et al. 2001). Education authorities can positively affect the implementation and effectiveness of professional development by promoting professional learning, by ensuring consistency between system-level policies and school-level actions (Elmore and Burney 1999), by providing human, financial and material resources and by establishing supportive policies (Darling-Hammond and McLaughlin 1995; Youngs 2001).

National ICT strategies have already prioritised the use of technology in education in many countries (Adamali, Coffey, and Safdar 2006). However, the successful implementation of such strategies depends to a large extent on large-scale governmental efforts which are sustained over time (Voogt and Knezek 2009). In addition to policies, education authorities can influence technology professional development programmes in various ways, which are specific in every case. This is particularly true when such professional development programmes are implemented in public–private partnerships (PPP) – a model becoming more accepted and frequent as the technology industry takes a more proactive role in ICT integration in education.

Exploring the factors at educational system level which influence the successful implementation and sustainability of a particular professional development programme sheds light on the existing barriers and facilitators. This paper will discuss findings from the evaluation of the large-scale professional development programme aimed at integrating technology in the classroom “Intel® Teach – Advanced Online”, and particularly the identified system-level factors for its implementation and sustainability. Furthermore, the paper will review the current developments in the implementation of the programme in relation to the identified factors and educational contexts in Germany, France and the UK.

### **Intel Teach – Advanced Online**

The teacher professional development programme “Intel Teach – Advanced Online” is one of the projects designed and implemented within the Intel® Education Initiative of Intel Corporation for the advancement of education through technology. Along with environment and community development, education is one of the focus areas of the company’s social responsibility actions and engagement with social issues. As a technology company, Intel’s success rests on the availability of skilled workers, a healthy technology ecosystem and knowledgeable customers. Therefore, Intel strategically invests in improving education globally, partnering with educators, governments, and other companies to develop a range of transformative programmes and technology solutions. Intel has over 200 programmes in 70 countries that provide professional development for teachers, support student achievement in science, technology, engineering and math, and enable access to relevant digitised content.

One of the main components of the initiative is the Intel® Teach<sup>1</sup> Programme – a programme for professional development aimed at training classroom teachers to effectively integrate technology in instruction to enhance student learning. The programme was developed in collaboration with Ministries of Education and educational institutions. Since 1999 it is provided to elementary and secondary school teachers around the world and encompasses a portfolio of courses targeting different aspects of integrating technology in classroom teaching.

“Intel Teach – Advanced Online” is one of the offerings within the Intel® Teach Programme, developed in Germany in 2004 in co-operation with the Academy for Teacher Training and School Management in Dillingen – a teacher training centre run by the Ministry of Education in Bavaria (Ganz and Reinmann 2007). The professional development programme was developed following the successful implementation of a basic course for technology use for teaching and learning offered within the Intel Teach programme in Germany.

The implementation of the advanced programme was organised through individual arrangements with the ministries of education in every Federal State in Germany. This led to different models and intensity of teacher participation in the programme. However, the main structure and the content were delivered in the same format across states. The programme was subsequently localised, and a new version of the programme supported by a Moodle-based online platform was implemented in England, France, Ireland, Israel, Italy, Jordan, Spain and Sweden.

Intel Teach – Advanced Online is based on a blended learning format of face-to-face meetings and individual and collaborative learning. The programme is organised through an online platform, designed to support and drive all steps in the process and to enable self-paced on-the-job professional development. The delivery is organised through “train-the-trainer” approach, in which senior trainers are trained in advance and subsequently guide and support regional mentors (master teachers), who train and assist the participating teachers in the programme. Supported by the mentor, the participants form teams and choose a pedagogical approach or technology tool to learn about. Subsequently, the participating teachers work collaboratively to develop a unit plan, implement it in their classroom practice, evaluate and enhance it for further use.

## **Evaluation**

In the period from 2005 to 2008, the programme “Intel Teach – Advanced Online” in Germany was externally evaluated by the Institute for Media and Educational Technology in the University of Augsburg. The first phase of the evaluation aimed to determine the direct effects of the training. The evaluation findings are reported in detail elsewhere (Ganz and Reinmann 2007). Overall they show that the programme had a positive impact on teachers’ skills to integrate technology in the classroom, on their attitudes towards technology-enhanced and student-centred learning and on their practices of technology use. According to the self-assessment of the participating teachers, the programme improved their technical and methodological competencies for using digital technology in instruction. As a result of their participation in the programme, teachers reported that they had a lot of new ideas to use digital media in teaching and that they increased their confidence to use new media in the classroom, and their appreciation for self-evaluation and collaboration.

Regarding the effect of the programme on students, teachers reported improvements in students’ skills for using digital media in terms of handling applications and using technology to reach the class objectives, and increase students’ use of digital media for individual learning at home. It was indicated that using technology in class had a positive effect on students’ motivation and collaboration, and on students’ active, self-regulated learning in terms of generating more own ideas to reach the objectives of the lesson and raising questions.

During the second phase of the evaluation, the Institute for Media and Educational Technology in the University of Augsburg conducted research to determine the external factors influencing the success of the programme and its sustainability. The sustainability of the programme was examined through case studies of 16 schools in four Federal states in Germany (Häuptle, Florian, and Reinmann 2008). Target population were teachers in the schools who participated in the programme ( $n=40$ ), teachers who did not participate in the programme ( $n=24$ ) and headteachers ( $n=15$ ). The chosen federal states represented different policies of federal education authorities regarding the use of mentors for the implementation of the programme. Thus, states supporting (Bavaria, Thuringen) and not supporting (Rheinland-Pfalz and Hamburg) regional and region-wide mentorship concepts were included.

In order to explore how the education policy of a federal state in Germany and the implementation approach of the senior trainers influence the sustainability of the programme, the evaluators conducted group discussions with 12 senior trainers. Further findings from questionnaires filled in by the senior trainers during the evaluative period 2006 were also included. The results and implications from the qualitative analysis of the collected data were validated in discussion with nine senior trainers within a workshop in October 2007 and in written commentaries by five senior trainers. The report from the evaluation, including a detailed description of the method and all findings regarding school-level and system-level factors, is available online in the German language (Häuptle, Florian, and Reinmann 2008). The current paper focuses on the results concerning the system-level factors and how they relate to the implementation of the programme in the context of other education systems.

### **System-level factors influencing the implementation and sustainability of the programme**

The findings from the external evaluation provide evidence for the system-level facilitators and barriers to the sustainable implementation of the programme Intel Teach – Advanced Online. Factors at the level of the school system were grouped into three categories: (1) concept transfer, or dissemination and transfer of the professional development; (2) experience transfer, or learning from experience and lessons learned; and (3) establishment of standards.

#### ***Factors supporting the dissemination and transfer of professional development***

According to Häuptle, Florian, and Reinmann (2008), system-level sustainability of a professional development programme is demonstrated by the extent to which the professional development concept is accepted and implemented by different schools in an administrative region. The implementation of the programme is facilitated when the authorities provide support for it, integrate it in the structure of professional development and are directly engaged in its promotion.

According to the senior trainers, educational policy developments in the federal states can both benefit and hinder the dissemination of professional development. Factors for the sustainable implementation of the programme in this group are related to educational policy developments, the mechanisms for reaching teachers and for motivating them to participate in the professional development offering, as well as communicating the objectives and nature of the programme effectively (Table 1). As an example, curricula provide for the integration of digital media in subject teaching, and increase the openness and readiness of teachers to participate in the programme. In some federal states, the policies allowed greater autonomy for schools, which was used by senior trainers to align the professional development programme to increase personal skills and promote teaching standards and school development.

External influence in the form of evaluation and standards positively affected the dissemination and transfer of the professional development programme. In the federal states where the quality of teaching and of the school was assessed through external evaluation, the consequent recommendations for improvement were incorporated into the content offered by the advanced programme. At the same time, the programme included content relevant to some national educational standards, and the implementation of the education standards presented an incentive for taking part in the programme.

One of the impeding factors for the sustainability of the programme was the low value associates with the classroom use of digital media in school policies. In such cases, after the end of a media project the related activities and innovations are discontinued. In some cases authorities preferred customised professional development offerings, whereas the programme “Intel Teach – Advanced Online” was considered as supplemental.

Further factors on the level of the school system were related to the mechanisms for reaching schools and teachers. Informing teachers about the offering of “Intel Teach – Advanced Online” and stimulating their interest in participating in the programme were improved when senior trainers provided clear information on how the programme could fulfil a task prescribed by education policies. Such positive influence was also observed when the programme was offered in flexible formats,

Table 1. Factors with positive and negative effect on the dissemination and transfer of the professional development programme Intel Teach – Advanced Online in Germany.

Factors influencing the dissemination and transfer of professional development		
	Positive	Negative
Factors related to educational policy developments	<ul style="list-style-type: none"> <li>● Digital media is a component of the curriculum and syllabus</li> <li>● Greater school autonomy</li> <li>● External evaluation for quality development</li> <li>● Establishment of educational standards</li> </ul>	<ul style="list-style-type: none"> <li>● Policies place low value on the use of digital media in teaching</li> <li>● High workload due to restructuring of the work</li> <li>● Preference for customised offerings</li> </ul>
Factors related to reaching the target population	<ul style="list-style-type: none"> <li>● Demand due to obligation for professional development Alignment of the programme with the objectives for professional development of the education authorities</li> <li>● Flexibility in implementation</li> <li>● Mentors integrate different functions</li> <li>● Informing teachers through various channels</li> <li>● Appealing to teachers not interested in technology</li> <li>● Activating positive experiences</li> </ul>	<ul style="list-style-type: none"> <li>● Objectives of the programme do not represent current school policy of the education authorities</li> </ul>
Factors related to the programme presentation	<ul style="list-style-type: none"> <li>● Stimulate interest with presentation of specific content: teaching scenarios; connecting content to the current interest of teachers; introducing the online platform</li> <li>● Sufficient preparation and support of the school mentors for their role</li> </ul>	<ul style="list-style-type: none"> <li>● The frequency and place of information meetings is regulated by demand</li> <li>● Insufficient staff to organise programme presentations</li> <li>● Absence of mentors</li> </ul>

allowing for different arrangements with educational authorities and for structuring of the introductory events and communication with schools. Using different channels to inform teachers about the programme was also found to be advantageous, especially when the offering was presented through official communications of the education authorities and professional development institutes, such as direct mail, newsletters and portals, through public relation releases and information events.

Additional positive impact was attributed to effective ways to approach teachers who were not interested in using technology in class. Reaching this group of teachers could be accomplished through indirect pressure through teaching quality control, such as school evaluation practices. Another method was for senior trainers to clearly communicate the goals of the programme and the advantages of participation, removing the negative attitudes towards technology. In some cases, senior trainers integrated different functions, such as working on education standards, being in charge of school ICT equipment or media adviser, or being school principals or teachers, which facilitated establishing contact with teachers and increasing their receptiveness and acceptance of the programme. According to senior trainers, willingness to participate in the advanced course was affected for some teachers by prior positive experiences with ICT basic courses, and by recommendation from other teachers.

Another set of factors influencing the dissemination and transfer of the professional development programme was related to the structuring of the information events, during which the programme was introduced to school mentors and teachers. Such information meetings were effective when the benefits of participating in the programme were exemplified with specific teaching scenarios and demonstration of the online platform, and when the content was related to currently interesting topics for teachers, e.g. how the programme supports teachers in the implementation of school policies regarding education standards, media competencies, self-evaluation and others. An important feature within the successful meetings was the preparation of school mentors to present the programme. A lack of support by senior trainers and a lack of school mentors limited the potential of information meetings to motivate teachers to participate in professional development courses.

### ***Factors supporting learning from experience and lessons learned***

In the context of experience transfer within Intel Teach – Advanced Online, sharing of practices between schools, however, was not supported in the federal states due to the school-based implementation of the programme. An annual symposium in Dillingen and further meetings of the senior trainers at education fairs (Didacta Systems) facilitated the exchange of experiences and ideas, and made it possible to discuss how to take things forward.

### ***Factors supporting the establishment of standards***

The last set of factors on system level is related to the establishment of standards, which refers to the systematic implementation of professional development requirements and technology integration policies within and across federal states. Due to the differences

in federal policies and conditions in schools, the establishment of standards could not be an influence to improve the sustainability of the programme.

The outlined factors on the level of the school system bear the specific characteristics of the federal state structure of the education system in Germany. Thus, the influence of different policies and mentor support on the implementation of the programme could be observed. In comparison, the delivery of the programme in France and the UK demonstrates different approaches to offering the same concept for professional development to teachers.

### **Implementation of the programme in different contexts: the role of system-level factors**

“Intel Teach – Advanced Online” was developed originally in Germany with the aim of being implemented in the country. The consequent introduction of the programme to other national states through public–private partnerships required more than simply localising the model and content for the different national contexts, but also tailoring the delivery mode according to the specifics of the education systems and the cooperation partners involved.

#### **France**

In France, the training of teachers is highly decentralised in regional academies but the organisational and administrative framework is set nationally. The project “Pairform@nce”, within which the concept of the professional development programme “Intel Teach – Advanced Online” was implemented in France is driven nationally by the Department for teaching curriculum, teacher training and digital development in education. The project combines different partners and currently includes all 30 academies – regional structures of the Ministry of Education in charge of implementing national directives and policies. The objectives of the programme are in reference to the IT certificate C2i level 2 (C2i2e) for teachers, which aims to validate the professional skills required by all teachers to perform the pedagogical, educational and societal aspects of their job. For the implementation of the programme, Intel provided the royalty-free programme, and has facilitated the linking with the different national and European partners.

The implementation of the programme in France is fully integrated in the national and regional education policies and structures, through the authority of the regional teacher training academies. The dissemination and transfer of the professional development concept and the transfer of experiences is facilitated by the support provided by the central education authorities. Thus, the training is implemented on a remote and dedicated national virtual environment for learning featuring a wide range of training courses, educational resources, information and discussion tools. The content of the resources is developed in the “Factory” by volunteer teachers under the education authorities, based on needs identified by inspectors and school principals. The reference of the programme to the national IT standards for teachers and the support for the delivery of the programme are major factors for the current successful implementation of “Pairform@nce” on a large scale in France (Soury-Lavergne et al. 2010). The plan is to expand Pairform@nce usage to other disciplines where IT is not more than a tool.

### **United Kingdom**

In the UK, at the time that Intel Teach was implemented, the Government's e-strategy aimed to transform the management and interaction capacities of educational institutions for the benefit of learners and parents (Becta 2007). Schools are controlled for use of the technology, trainee teachers are required to pass a test in ICT literacy, whereas practicing teachers are expected to improve their own ICT skills to the same level. The Intel Teach – Advanced Online programme is implemented in the UK in partnership with the Specialist Schools and Academies Trust (SSAT) – an independent, charitable trust with a network of over 5600 schools and organisations. The trust works with head teachers, teachers and students for developing and sharing new and effective teaching and learning practice, with the object to raise standards and levels of achievement of schools. The programme was offered under the name “iCPD Online” through SSAT, which determines the way of dissemination, transfer of experiences and reference to standards. The total number of teachers trained under iCPD online is just over 36,000.

The programme has now developed in the UK and the SSAT have decided to implement the iCPD tool into their developing leaders training. This model is quite different and allows teachers to be more autonomous in their usage of the tool but still maintains the benefits of peer reviewing and submitting content online. This has been implemented in the latest cohort of developing leaders from September 2010 and at the end of the 2010/11 the SSAT and Intel can evaluate the model and its outcome.

The UK has benefited from this open approach to the implementation of Intel Teach Advanced Online and has been able to make it integral to other programmes which could be a more sustainable model.

The different models of public–private partnership in the three countries, the level of integration of the programme in the education policies and structures and the amount and type of support by education authorities, but also the current conditions and trends, determine to a large extent the new developments and changes in the programme's design and delivery.

### **Current developments**

The programme is currently being expanded and transformed into an offering with increased flexibility and is taking into account the preferences of education authorities, as well as factors at the level of the education system, which affect the implementation and sustainability. Some of the new features of the programme enable better collaboration with education authorities, organisations and other companies. A major change is the development towards open-source solutions and flexibility of the new platform of Intel Teach – Advanced Online, which is a customised application built on the Moodle 1.9 platform. The codebase is written in PHP and supports the MySQL or PostgreSQL databases, using Moodle's standard database abstraction layer. The new platform also enables the integration of external software. Thus, local education authorities can provide teachers with all training opportunities available in the region through a single platform or integrate the programme with other trainings to meet specific needs. This is particularly useful in the context of the different policies and requirements in every Federal state in Germany and for the implementation of the programme in France through regional education authorities.

Another development includes expanding the open education resources available to teachers, to meet their specific needs for professional development. A new offering of free, just-in-time courses – Intel® Teach Elements, target specific learning concepts, such as project-based learning, assessment of twenty-first century skills, or collaboration with Web 2.0 tools. Additional resources are provided to teachers for self-directed learning and classroom use, such as MS Office courses, different tools and the learning resources on skool™ Interactive Learning and Teaching Technology programme.

The new programme also provides an improved environment for collaboration between teachers through the collaboration features of Moodle, the integration with external platforms for communication and collaboration, such as Live@edu in Germany, and through the added functionality of e-Portfolio. A key new feature is the concept of e-Portfolio and, for this purpose, the new platform can be bundled with the Mahara e-Portfolio application, which adds resource sharing and additional social networking elements to the platform. Mahara is an open source system comprising electronic portfolio, weblog, resume builder and social networking system, which connects users and creates online communities. A different ePortfolio system is integrated with the programme in the UK, within the Virtual Leadership & Innovation Academy on the SSAT online platform. This “Active Portfolio” will be driven by a dynamic profile, smart use of meta-data and automatically harvested evidence of achievement.

After a revision of the significance of collaboration between teachers and the influence of tutors, a different concept is implemented in the new version of the programme – peer coaching. It is expected that this additional support will enhance teachers’ acquisition of competencies and skills, according to their individual needs. This can also be addressed by the introduction of e-Portfolios as part of the professional development, as a mechanism to identify gaps, track development and find peers with relevant knowledge and skills for coaching and collaboration. Further possibilities for interaction between teachers and for forming a virtual community of practice or community of professional learning will contribute to the impact of the programme on teaching practices and on the sustainability of the programme.

## **Conclusion**

It has been shown that there are various factors on the level of the education system to be considered, which influence the effectiveness and sustainability of a professional development programme for technology integration. The different models of implementation of Intel Teach – Advanced Online in Germany, England and France are linked to different expectations for the reach and scaling of the programme, according to the national policies and standards, and the support by education authorities. Some of the challenges for the current and future implementation of the programme are how to align the programme to changing policies and standards, and target hot issues in national education systems with flexible content and modes of implementation. These challenges are partly addressed in the new version of the programme, organised through a Moodle-based online platform, which offers more flexibility and improved capacity for online visibility and for reaching and engaging teachers. The development towards open-source solutions in this case reflects the preference of education authorities for cheaper, more flexible and easy to customise training system. Additionally, linking the programme to other initiatives, school and

teacher networks can increase the alternatives for communicating the content and objectives of the programme and for dissemination.

Identifying the factors which contribute to or impede the effectiveness and sustainability of a professional development programme allows for planning to strengthen the beneficial conditions and to avoid some negative conditions. Understanding such factors can contribute to improving the programme and achieving a greater impact both on the level of the individual schools and on the of the educational system level.

It has been identified that the countries involved would like to see the platform develop as a general collaboration tool for their professional development provision. Particularly in France, but also in Germany and the UK, the tool was seen as a necessary way to communicate with their peers. The challenge is to see how other activities can be introduced into the platform as teachers do not want to have multiple platforms for such collaboration, but a central place where they can collaborate and share best practice. Intel hopes to develop the platform despite systemic challenges, to promote the platform as a social media tool and a place for the development of twenty-first century skills among teachers and the consequent positive impact on the teaching and learning experience.

## Note

1. The Intel Teach<sup>®</sup> Advanced Online programme discussed in this paper forms part of Intel's Intel Teach programme which is a worldwide teacher training initiative. The objectives behind it are improving teacher effectiveness through professional development, helping teachers integrate technology into their lessons and promoting students' problem-solving, critical thinking, and collaboration skills. Worldwide, the Intel Teach programme has trained more than 9 million teachers in over 60 countries. Intel Teach is part of Intel's corporate responsibility strategy which is run by their Corporate Affairs department which works solely on non-profit initiatives.

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