

# Developing a European Pioneer Teacher Community for School Innovation<sup>1</sup>

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**Abstract:** ULEARN is a project that aims to create a stable community of ‘pioneer teachers’ in Europe through a system that supports teachers’ lifelong learning, knowledge sharing and cooperation. Herein we call ‘pioneer teachers’ those who are keen to use ICT in the classroom and who can be seen as the early adopters of ICT-based innovation in education, already having had some experience in this field. They play a key role in the diffusion of innovation since the majority of teachers learn about new ideas from peers via interpersonal channels. To achieve our aims, U-LEARN.IT has been developed – a system that can be thought of as a virtual lifelong learning system of excellence for European pioneer teachers adopting ICT in education. It is based on the different needs of educational systems in European countries and involves three main functions: lifelong learning on ICT in education, the sharing of knowledge, information and materials, and cooperation within this community. As far as the pedagogical approach is concerned, the project focuses on lifelong cooperative learning supported by a networked infrastructure. The key pedagogical idea is that learning is the result of social interaction within a community of practice. The learning process is mainly based on asynchronous communication within a computer conferencing environment. The same environment supports cooperation among teachers and the sharing of knowledge, information and materials.

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<sup>1</sup>This project has been carried out with the support of the European Community. The content of this project does not necessarily reflect the position of the European Community, nor does it involve any responsibility on the part of the European Community.

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The original version of this chapter was revised: The copyright line was incorrect. This has been corrected. The Erratum to this chapter is available at DOI: [10.1007/978-0-387-35701-0\\_35](https://doi.org/10.1007/978-0-387-35701-0_35)

C. Dowling et al. (eds.), *Information and Communication Technology and the Teacher of the Future*  
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## 1. INTRODUCTION

The 'Report to UNESCO of the International Commission on Education for the Twenty-First Century' (UNESCO, 1996) identifies some strong tensions between society and school systems, such as conflicts between global and local realities, tradition and modernity, long and short terms, competition and concern for equality of opportunity, the extraordinary expansion of knowledge and the human capacity to assimilate it, spiritual and material values, etc.

The report of the French National Commission for UNESCO (Cornu, 2001) adds more elements to this picture, posing some questions raised by globalisation, which affect all areas of human activity and not just economics.

Closing the gap between school and society requires that the dynamics of school change become comparable to those of evolution in society. Up to now, school systems have been characterised by strong inertia. School should be rethought of as an evolving body, whose rapid modification is similar to that of society's. This implies that the school needs both to understand the evolution of the external world and to equip itself with a conceptual and structural repertoire, in order to match its aims to social evolution and to change.

The school system is a complex one and innovation should take into account all its components and the relationships between them, holistically. These include aims, curriculum areas, ways of learning, ICT pedagogical applications, school structure, resources and teachers.

While the 20th century school focused on teaching, the 21st century school may well focus on learning, and the teacher's role will change to reflect this. Consequently, teacher training processes will also need to change: teachers will become managers and facilitators of learning. To enhance children's learning, they will design, adapt, manage and evaluate learning environments.

This paper focuses on ULEARN, a project carried out in the framework of the European program 'e-learning'. The partnership involves:

- C.N.R. Istituto Tecnologie Didattiche, Italy (prime contractor)
- Uni-C Danmarks It-Center For Uddannelse Og Forskning, Denmark
- Ivlos Institute for Education, Universiteit Of Utrecht, The Netherlands
- The University Of Glasgow, UK
- Departament De Didactica Y Orgnizacion Educativa - Universidad De Barcelona , Spain

Following the recommendations formulated in the 'IFIP International Conference on 'the School of the Future' in Chile 2000 (Focus Group 2,

2000), which suggests defining measures to encourage the creation of teacher communities, ULEARN aims at creating a stable community of ‘pioneer teachers’ in Europe through a system which supports teachers’ lifelong learning.

The project’s main assumption is that teachers play a key role in ICT-based innovation in schools. According to Everett Roger’s theory of diffusion of innovation (Roger, 1995), members of a social system are classified on the basis of innovativeness in 5 categories: 1) innovators; 2) early adopters; 3) early majority; 4) late majority; 5) laggards.

Herein we define as ‘pioneer teachers’ those who are keen to use ICT in the classroom and already have some experience; these are teachers who can be seen as the early adopters of ICT innovation in education. They play a major role in the diffusion of innovation since the majority of teachers learn about new ideas mostly from peers via interpersonal channels.

In this paper a profile of the pioneer teacher is identified and a report is made of the measures taken to develop a community of these teachers at a European level.

## **2. A MODEL OF THE PIONEER TEACHER**

ULEARN is founded upon the following assumptions (ULEARN, 2002):

- in any educational context, there is a body of individuals who might be identified as *pioneers*;
- these persons are the main agents of innovation in their schools;
- their ability to carry out the role of pioneer can be enhanced by participation in a community of practice;
- this community can act at a pan-European level.

A pioneer teacher may be characterized by:

***i. Pedagogical expertise.*** The pioneer teacher is first and foremost an accomplished teacher, one who can practise, demonstrate, advise and train others in pedagogy in the context of current developments in learning and teaching.

***ii. Collaboration and co-ordination.*** He/she can participate in, initiate and co-ordinate collaborative activities within the institution, or with other institutions.

***iii. Monitoring and evaluation.*** He/she can monitor and evaluate educational developments within his/her institution and contribute to organisational change, and can critically reflect upon his/her own professional practice and development.

In the context of ULEARN, the concept of the ICT pioneer teacher has been defined: on the basis of a matrix initially proposed by Martin (ULEARN, 2002), describing the pioneer teacher competencies and levels of mastery, all partners<sup>2</sup> have worked co-operatively to refine the concept herein presented.

### **3. THE ICT PIONEER TEACHER**

The ICT pioneer is a sub-type of the pioneer teacher characterized by the following aspects (ULEARN, 2002).

#### **3.1 Effectiveness in pedagogical implementation of ICT**

The ICT pioneer teacher demonstrates effective pedagogical implementation of ICT. This effectiveness will have been developed through personal experimentation, involvement in collaborative activities with other ICT-using teachers, or participation in continuing professional development: often a combination of these routes has been followed. ICT usage is characterised by appropriate and creative application, which is not necessarily complicated or 'high-tech'. Often the simplest uses of ICT are the most effective in enhancing learning because they are rooted in templates of learning activity with which teachers and students are already familiar. The ICT pioneer teacher will also be aware of the ICT skills of his/her students, and know how much further they can be taken before difficulties begin to interfere with the intended learning. In his/her own use of ICT in enhancing his/her teaching, then, the ICT pioneer teacher already forms a role-model for other teachers, for they will see that what he/she does is successful in enhancing learning without being complex or arcane. The ICT pioneer teacher is also aware of ICT applications and courseware that are available and most appropriate for his/her curriculum area, as well as the sources of information regarding pedagogical use of ICT. Such sources will include official agencies, interest groups, publishers and other suppliers, and online sources.

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<sup>2</sup> Partners involved in the definition of 'pioneer teacher': W. Admiraal, S. Bocconi, J. Dixon, U. Gjorling, I. Lam, A. Martin, V. Midoro, M. Morales, L. Poulsen, F. Pozzi, J. Sancho, A. Thomson.

### **3.2 Advising on use of ICT**

The ICT pioneer teacher trains other teachers in ICT skills and advises them (sometimes formally in in-service settings, but often in informal situations) in appropriate and effective use of ICT in the classroom. The ability to teach colleagues successfully is achieved by a minority of teachers who can adapt their teaching styles so as to impart new skills to colleagues without threatening their self-perception as leaders in the classroom. Teachers' awareness of the ICT pioneer as a good teacher is an important foundation for their willingness to ask for and to listen to advice. A second foundational element is that the ICT pioneer does not challenge colleagues' mastery of their own subject specialisations. He/she only offers guidance on how ICT might be employed by them in the context of their own objectives and styles, and the final decision on the adoption of any ICT enhancement is for the subject teacher rather than the ICT pioneer. The process of advising will be two-sided and follow a conversational model. The implementation of ICT by those who have taken advice will be supported appropriately by the ICT pioneer, and may at times take the form of collaborative teaching. The role of the ICT pioneer here is to respond to requests for advice.

### **3.3 Collaboration and co-ordination of ICT activities**

The ICT pioneer teacher is happy to get involved and collaborate with colleagues within the same institution, as well as with those in other institutions. For some teachers, collaborative activity is problematic, either because it challenges the model of a single teacher commanding the classroom, or because it obliges them to admit that there are areas where others might have more expertise; there is also the fear that "I will do most of the work and the others will reap the benefits." However, most teachers who have participated in successful collaborative ventures attest to the value of such activity. They are also aware of the significance of collaboration as a mode of learning. The ICT pioneer teacher may participate in an ICT-focused collaboration, or provide an ICT perspective to a collaborative project involving a range of other inputs. The ICT pioneer teacher will also be able, where appropriate, to co-ordinate collaborative activities, and if necessary to provide a leadership element. This will require a range of skills, including project planning and social interaction. It will also include the use of a range of ICT-based means of collaboration. This activity may well be formalised, with the ICT pioneer teacher being given responsibility for monitoring and co-ordinating ICT within a department or other administrative unit, or even, for a small or medium-sized institution, across

the whole institution, earning the title of 'ICT Co-ordinator' or something similar. This job will be defined in educational terms, and will be distinct from that of an ICT support technician.

### **3.4 Monitoring and evaluation of ICT Activities**

The ICT pioneer teacher is willing and able to monitor and evaluate ICT developments within his/her institution. In a secondary school, this may begin within a department, but an ICT pioneer teacher might well be given cross-institutional responsibility for ICT co-ordination, which could involve developing a whole-institution picture of ICT developments. The skills of monitoring and evaluating are partly organisational, partly administrative, but also involve more personal qualities such as respect for others and mutual trust, and the ability to evaluate without being judgemental: these are qualities which take time and experience to develop. But as well as being able to monitor and evaluate the activities of others, the ICT pioneer teacher must also be able to monitor and reflect upon his/her own development, as a user of ICT in an educational context, and also as one who aspires to being identified, by colleagues and managers, as a specialist in this area.

### **3.5 Perspective and awareness of current trends**

The ICT pioneer teacher has the quality of perspective, the ability to stand back and view the landscape from a distance, and see how the foreground relates to the background. He/she will be aware of current trends in ICT and its application in education, and will be able to place these in the broader context of movements in the areas of ICT and education. He/she will also seek to evaluate the implications of new technologies for his/her teaching, and, where appropriate, adopt them and adapt them to his/her needs. This will make the ICT pioneer teacher a valuable contributor to strategic discussions and to policy formation within the institution.

### **3.6 Competence in using ICT**

The ICT pioneer teacher demonstrates familiarity, confidence, knowledge, understanding and skill in the use of ICT hardware and applications. This skill may have been developed through personal interest in the use of ICT in the classroom, personal use of ICT at home, or attendance at a course, either for personal interest or as continuing professional development. Often, skills have been developed through a combination of all these. Some teachers will become very highly skilled in particular aspects of ICT use, such as programming, web page construction, desktop publishing

or electronics. For some, this specialization can become their only ICT interest; such a teacher may be identified in the staff room as a ‘techie’ or ‘geek’, perhaps useful on occasions when technical skill is required, but not perceived as a model to emulate (such teachers will often leave teaching in order to pursue their ICT specialization). The ICT pioneer teacher, on the other hand, may also have some very highly developed skills, but also displays a broad competence and ease with the range of ICT equipment and applications encountered within the institution. He/she would be willing to offer guidance on simple hardware or software problems, but would be aware of his/her limitations and know at what point to refer to expertise elsewhere (e.g. technician or external specialist). For the ICT pioneer teacher, ICT expertise is a means to greater effectiveness as a teacher rather than an end in itself, and this effectiveness includes preparation and administrative activity as well as the use of ICT in the classroom. We should not overlook the fact, however, that the ICT pioneer teacher enjoys using ICT, will probably have a personal computer at home, and may include ICT use amongst his/her leisure interests.

#### **4. THE PROFESSIONAL DEVELOPMENT MATRIX OF THE ICT PIONEER TEACHER**

Drawing on the qualities outlined above, it is possible to develop a matrix for representing the professional development of the ICT pioneer teacher. In constructing the matrix, two hypotheses are adopted:

- that all six of the qualities listed are necessary to the formation and maturation of the ICT pioneer teacher; and
- that progression in each of the qualities is possible, and that it can be mapped in broadly comparable stages.

The assumption is also made that the matrix is no more than a window opening onto an individual’s professional development: there is much that has come before, and much that will come after. Individuals do not enter the window’s frame as *tabulae rasae*, nor do they leave it as ‘completed’ professionals.

In stating that progression is possible in each quality, however, we should not assume that easily defined thresholds can be postulated; the difference between the levels may be fuzzy at the edges, and may only be discernible well into each stage.

## **4.1 Matrix functions**

The matrix enables the starting point to be fixed (following a needs analysis process), the subsequent professional development of any individual to be mapped, and a professional development profile to be generated at any point in time. This will enable the individual to formulate and modify at intervals a personal development plan, and to maintain a professional development file and portfolio, in which the dynamic of his/her development as a professional may be encapsulated. On the basis of an initial needs analysis and subsequent personal development planning, each individual can select courses and collaborative and sharing activities appropriate to his/her strengths, needs, and intentions.

The elaboration of the curriculum for the professional development of ICT pioneer teachers is made clearer and more consistent through the process of mapping onto the matrix. This process will enable identification of the level at which courses are targeted, and the extent of coverage of the desirable characteristics, and therefore the applicability of the course to any particular individual. In this way the matrix provides a form of mediation between the needs of teachers and the repertoire of courses available. Note that while courses need not necessarily be derived directly from the matrix, they should be mappable onto it. This would suggest that any course should only map onto one level of the matrix, although the content may straddle more than one of the characteristics.

The matrix enables certification thresholds to be defined in terms of the broad definitions of levels. This will facilitate the process of mapping on of local certification standards, and help to achieve consistency in defining the level of applicability of any course, which is necessary for the development and maintenance of a pan-European certification scheme. It will also facilitate the mapping on of the requirements of national certification structures, so that pan-European courses or national courses derived from pan-European models or from national courses in other states may become accepted for purposes of achievement of professional qualifications or recognition of the right to practise.

The general definition of levels will assist in the clarification of developmental progress. A question arises here. Should a teacher be required to achieve all elements at the aspirant level before moving on, and similarly at the practitioner level, or should a certain level of 'peaking' be permitted whereby a teacher may move rapidly ahead in some characteristics while leaving others relatively undeveloped? This is an important issue, since the ICT pioneer teacher has been conceived here in holistic terms, i.e. as an individual possessing a broad range of complementary skills.



The matrix is also important in mapping the community of ICT pioneer teachers. This community includes all individuals at all stages from aspirant to consultant. However it is useful for members to be able to develop a realistic image of their own development within the community, and to feel confident that that perception is based on concepts shared by other members of the community.

## **4.2 ICT pioneer teacher community**

ULEARN aims to develop a community of practice of pioneer teachers. According to Wenger (1998), a community of practice is characterised by three elements:

- a set of members mutually engaged
- a common enterprise
- a shared repertoire.

### **4.2.1 A set of members mutually engaged**

The mutual engagement of members of a community of practice derives by working co-operatively, which implies acting together to develop a product, a service or the accomplishment of a function of whatever nature (Schmidt & Bannon, 1992). Building an environment for cooperation and making it available for pioneer teachers facilitates the accomplishment of a joint enterprise and induces the development of functional relationships among ICT pioneers.

### **4.2.2 Joint enterprise**

The 'glue' that binds a community of practice is the joint enterprise. This enterprise can be thought of at different levels of granularity. At a higher level, the main aim is school innovation, while at lower level specific common projects can be conceived as articulations of the main joint enterprise. Making things explicit through a negotiation process, creating a 'regime' of mutual accountability, and creating a shared repertoire all help the development of this community.

### **4.2.3 Shared repertoire**

The shared repertoire consists of both conceptual and physical objects and procedures.

Creating an environment in which materials, best practices etc. can be shared among ICT pioneers contributes to growth of a common language, shared approaches and methods, which constitute the repertoire of this community.

ULEARN cannot achieve all of these things, but it can set up structures which will enable the European community of ICT pioneer teachers to develop a conception of itself, and initiate appropriate activities. However in this process it is important to involve members of the community from the very earliest stage, and to seek the involvement of the community in its activities.

This does not necessarily mean following the model of what is already established or accepting uncritically the models which may be espoused by governments or by other powerful interests. While we must offer a model and a structure on which existing national or even local structures can be mapped, in accordance with the terms of the EU funding award we are to apply the experience and expertise of the ULEARN partners to the tasks we have identified.

## **5. DEVELOPING U-LEARN.IT, A SYSTEM FOR THE COMMUNITY OF ICT PIONEER TEACHERS**

ULEARN aims to develop a community of practice of ICT pioneers through the implementation of U-LEARN.IT, a complex distributed system composed of several national systems, harmonised by a coordination unit. U-LEARN.IT can be thought of as a 'system of systems'.

It involves a *European Coordination Unit (ECU)* and the *national systems*, which reflect the structures of current educational and training contexts within partner countries.

U-LEARN.IT's main functions are:

- lifelong learning in ICT in education
- the sharing of knowledge, information and materials
- cooperation among pioneer teachers.

These functions are interrelated to ensure that new competencies are developed and then transferred into the classroom and maintained over time through systematic interaction among the community members. U-LEARN.IT is based on an interactive integrated web environment which is accessible via a portal that delivers the above mentioned functions.

The U-LEARN.IT portal contains:

- the European curriculum for pioneers on ICT in education

- links to the available courses (as far as the *learning function* is concerned)
- links to the available sources (as far as the *information sharing function* is concerned)
- links to the available tools such as forums, newsgroups, cooperation areas (as far as the *cooperation function* is concerned)
- links to the 5 national systems, each containing:
  - the curriculum translated into the national language
  - links to the available courses (in the national language)
  - links to the available sources (in the national language)
  - links to the available tools (in the national language)
  - links to local systems, each containing its own services.

## **5.1 European level**

The main task of the ECU is to harmonize national branches of the system. ECU doesn't impose an extra structure; it co-ordinates and harmonizes the whole system, in order to perform its 3 main functions: learning, information sharing and cooperation.

During the project, the *European Coordination Unit (ECU)* is made up of the ULEARN partnership. ECU activities are:

- defining a common European curriculum on ICT in education;
- specifying how the system functions are to be performed and handling design of the overall system, i.e. the online training environment, contents, learning strategies, methodologies and techniques, online tutor training, the knowledge environment, sharing information and materials, the cooperation environment and so on.
- designing a core of common online courses with the related learning materials
- defining criteria to implement the online environments and the related activities at national level
- defining methods to evaluate the quality of the overall system and to monitor its activities.
- the ECU members interact in an ECU cooperation area, based on a Computer Mediated Communication system (in ULEARN FirstClass® by Centrinity). The structure of this virtual environment reflects that of the cooperative work performed by the ECU. During ULEARN, this work consists in the development of the project activities, and the cooperation area is structured to reflect the breakdown of the project's general activities.

## 5.2 National levels

A national system is composed of a *National Coordination Unit* and a number of *Local Systems*, spread throughout each country.

Generally speaking, the *NCU* functions are:

- designing and implementing the national system (according to the specifications of the ECU)
- running and monitoring the national system. This implies:
  - identifying and developing the local systems within the country;
  - defining a national certification system for the acquired competencies;
  - choosing the software tools and platform to accomplish the specified functions;
  - implementing the specified environments (for learning activities, knowledge sharing, cooperation etc);
  - localising to the national context the learning materials of the courses related to the curriculum;
  - training the online tutors;
  - supervising and supporting tutors' activities;
  - evaluating the quality of the overall activities according to the methodologies suggested by the ECU.

A *Local System* consists of:

- a service centre, which provides the infrastructure (for example it implements the computer conference system locally, provides the administration of this system, gives technical support and general assistance to the local agencies, gathers data on the activities of the local agencies etc.);
- a series of related local agencies which recruit groups of pioneer teachers for online courses, deliver these courses through online tutors (trained at national level), provide assistance for cooperative projects, stimulate discussions inside the community of pioneer teachers, facilitate information sharing, and so on.
- Each national system reflects the structure of the current educational and training context within a given country.

During the pilot phase, each ULEARN partner will act as a *National Coordination Unit* in its own country.

## 6. CONCLUSIONS

In the paper we have described the key ideas, approaches and ongoing achievements of the ULEARN project. A definition in the form of a matrix

that captures the concept of the ICT pioneer teacher has been produced and assumed as a definition. The matrix enables mapping of initial and subsequent professional development of any individual, and represents the basis for elaborating the curriculum for the professional development of ICT pioneer teachers.

The U-LEARN.IT system has been specified and designed. It involves a *European Coordination Unit* and *several national systems*. A *national system* is made up of a *National Coordination Unit* and a network of local systems. Each partner has produced a description of his national branches.

The U-LEARN.IT portal has been designed and its implementation initiated.

U-LEARN.IT can be seen as a laboratory of innovation in learning. The new concept of pioneer teacher provides an effective basis on which to build systems at national and international level, one that can support the growth of a community of expert teachers, and bring about innovation in the school system. The work done so far has made it possible to identify pioneer teachers, has allowed them to meet one another and will help them to grow from aspirants to consultants by means of tools made available via ULEARN.IT. Furthermore, the cooperation environment developed for ULEARN has proved very effective and can provide the basis for a network-based system which supports the collaboration inside *European and National Coordination Units*.

The next steps are: full implementation of the pilot U-LEARN.IT, delivery of the online courses and activities related to the pilot, evaluation of the overall project carried out both at international and national level, definition of a transferability strategy to extend the pilot to a larger scale and to make the system evolve into a stable structure, and implementation of dissemination products (a video and a website) and initiatives including 5 national seminars and an international event.

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