

Conclusions on the Analysis of User Requirements concerning the use of ICT in the Didactic Process

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Abstract: The co-operation of the Information and Communications Technologies (ICT) and the Educational Society, is deemed necessary for the adaptation and tuning of the didactic process in terms of pedagogical methodologies, school infrastructure, human resources utilisation and organisational restructuring. The use of ICT in the classroom should be viewed as a highly influencing tool that will support the educators' effort for interaction with their students, rather than as a technical exercise. The initial phases of the TRENDS project, which are described in this paper, resulted in a widely accepted common methodology, that complies with the international standards for determining the User Requirements in the Secondary Education. The major results emerged from this survey are presented here, as well as some common axes that deal with the application of ICT in the didactic process.

1. Introduction

It is nowadays more than evident that the rapid evolution of the Information and Communication Technologies (ICT) during last decade, along with the need for widespread distribution of knowledge, have necessitated the development of pioneering distance education services for the assistance of the didactic process. The collaboration of these two distinct worlds - Computer Science and Education - will result in the creation of a universal Education Society.

The distance education services are expected to find major fields of applications in the didactic process, since they attempt to exploit the benefits that ICT offers in Education, rather than make the educators and the trainees experts on ICT. Yet, the co-operation of these two communities is not straightforward. Experts from both worlds will have to participate in joint projects which will consider the needs and the trends of both sides and will end up with a unified distance learning environment. Such an environment must support multimedia information, such as plain or formatted text, still images, audio and video, especially since it is addressed to people with no experience in using computational environments in their professions. The new age of training via networking will aid the wide distribution of knowledge and the construction of live, virtual classrooms, as well as widely accessible databases of courses on various subjects. In these classrooms, the students will participate in the

training process by inquiring or interacting with the educators, while the off-line courses will be accessed and played independently by the trainees.

A measure of success for a distance learning environment would be the use of computers not only as electronic typewriters and spreadsheets, but as research and educational tools. Another indication of success would be to see educators integrating their lectures with student interactive learning procedures, and learning how to intermix them effectively. Since they aim to serve many target groups of various interests and aspects, the distance learning environments should be user friendly and to cover subjects from multiple areas and also multiple levels of trainees. In order to achieve user friendliness, a serious task of a project is the Users Requirement Specification.

There have been significant projects in the area of Distance Education. In [Veen et al.] there is a review of a range of communication and information technology projects within and across European countries. Most of them describe the collaborative use of electronic mail between schools on an international level. Ruopp et al. ([Ruopp et al. 93]) describe an in depth and long term project called LabnNet which attempts to develop a community of practice among teachers for supporting each other's profession across the USA. Companies such as AT&T have become involved in the development of services under the guidance of experts. Attempts have also been made to quantify the benefits of such electronic information and communication services. For example, [Riel 94] provides evidence related to the development of the skills that employers wish to see in their new recruits.

2. The TRENDS project

The *TRaining Educators through Networks and Distributed Systems (TRENDS) Project* [Bouras et al. 96] aims at the in-service distance training of 2,400 school teachers in Secondary Education, on the “*use of Information Technology and Telematics in the learning process*”, from six countries (400 per country) - France, Greece, Italy, Portugal, Spain and United Kingdom. The training process will be implemented by flexible and distance learning methods, through:

- The development and the use of an in-service, school-based training session, which will be based on multimedia telematics and existing, mature network technologies.
- The establishment and operation of a European Teachers' Training Network (ETTN), consisting of six interconnected “National Sites” (a Training Centre, clients in the schools and teachers in each country) and providing distance training services, by using multimedia telematics, to teachers and teacher trainers.

During the TRENDS project 120 teachers - one from each of the 120 participating schools - will be trained in the early validation phase, and will train the rest of the 2,400 teachers afterwards, in the project demonstration phase. The evolution of a promising and ambitious experiment, such as the TRENDS project strongly depends on the strategy and the “Usage Scenario” that will be adopted. Thus, it is of great importance to specify the User Requirements effectively, covering the needs of both the direct users (educators who will participate in the project) and the indirect users (policy makers in the Education System, ICT experts, etc.).

3. Methodology for the User Requirements Specification

The target group of the TRENDS project is trans-European and consists of educators who will be trained on using Information Communication Technology (ICT) in the classroom. Some of the possible techniques that could be used for the establishment of the User Requirements of a trans-European project, according to a widely accepted methodology (eg. [Smith & Mayes 96]), are the following:

Personal interviews with the end users. This technique offers a useful way to investigate the User Needs in real life. The main problem is the enormous number of the end users, which might lead to prohibitive costs. A careful selection of a representative group of the initial target group of the project might aid such a procedure to be more practical and still effective.

Questionnaires. In order to keep the cost down, the use of custom designed questionnaires and surveys may prove a more practical option. The key point of this technique is the construction of the questionnaires, so as

to be representative and to reflect all the possible user requests. The team that will construct the questionnaires must include specialists on the scientific areas that the project deals with, experts on technological issues, as well as representatives of the potential target group.

Organisation of discussion panels for brainstorming and feedback. In these panels, representatives from all sides of the project should participate, for a more objective overview of the situation. This might be useful as a final stage, for verification of the User Needs as they were described by some other technique.

After some co-ordination among the partners of the TRENDS project, some common points emerged from the methodologies for the specification of the User Needs per participating country. These common points were agreed to form the following widely accepted methodology:

1. Interviewing of a number of representatives or key persons of the target groups and experts per country, for a first impression before constructing the custom designed questionnaires.
2. Construction of workshops of key persons for discussion on topics related to the strategic plan of the project.
3. Construction (according to the information provided by the steps 1,2 of questionnaires, and distribution to the potential end users (teachers of schools). These users were categorised in two major groups:
 - Users with experience in using ICT for educational purposes from a limited number of schools.
 - Users with no experience in the use of ICT.

4. Presentation of Results

The survey that took place during the TRENDS project, aims to provide the project with clear ideas for the skills/expertise the teachers must acquire through accessing the foreseen TRENDS distance training services. The outcome of this survey will safely lead to the determination of the “Functional Specifications of the Network”.

According to the adopted methodology, a number of workshops/round table discussions and interviews were organised firstly, in order to have a starting point and a global view of the user needs, before constructing the questionnaires that were eventually distributed to the potential end-users of the project. In some countries two kinds of questionnaires were distributed, one for the experienced and one for the inexperienced users [TRENDS, Bouras et al. 96].

The kind of participants in the workshops/round table discussions and the interviews, differed among the national sites. Among the participants were, university professors, key persons in education policy making, national experts in ICT and Open Distance Learning (ODL), teachers experienced in the use of Telematics in secondary education, etc. In some national sites a common questionnaire was used for the interviews.

The participants of the workshops/round tables focused on key issues related to the teachers’ job profile, his/her initial and in-service training, the “new role” of the teacher implied by the introduction of the new technologies, the needs for support, and the access, cost, management and suitability of the new technologies. The results extracted from the interviews, concern educational policies, the content, forms and aims of further training, and the functional scheme of distance teachers’ training on the use of new technologies.

It was concluded that in order to create better conditions to promote the involvement of the educators in TRENDS, it is important to:

- give to the schools better conditions for the kind of activities involved in TRENDS (provision of appropriate classrooms, access to Internet, etc).
- motivate the school teachers (ie. by providing courses focusing on their own interests)
- create or adopt interfaces and user-friendly services
- create a group of users specially prepared to promote the use of the telecommunications services.

In order to satisfy the training needs indicated by the teachers, it was suggested that it is important to develop courses or other initiatives that focus on the following aspects:

- educational methodologies for specific subject areas
- pedagogical issues
- management and implementation of educational projects

- application of information and communication technologies
- integration of information and communication technologies into the curriculum
- provision of essential know-how on using basic telecommunication services such as e-mail, news, fora, bulletin board systems
- development of basic skills on the use of co-operation tools over network infrastructure
- development of basic skills on constructing WWW pages (eg. HTML editors)
- educational potential created by the use of telematics services, either privately or in the classroom.

In order to upgrade the educational system, the need for further education and the utilisation of new technologies should be highlighted. Moreover, the teachers should become more acquainted in researching methods and not only skilled in using learning technologies in order to bridge the gap between the degree of technological complexity and the real didactic innovation. The most appropriate way to accomplish this is via small groups or on an individual basis.

Educators should also learn to familiarise themselves with the new educational methods. Different forms of training should be applied and co-exist, eg. seminar type, distance training, schools-based, at home. The majority of teachers believe that long distance training should be accompanied by some form of interpersonal communication and contact with other teachers. The vast majority of teachers said they prefer the combination of training with the use of computers and the distribution of related literature.

The experienced users said that their current personal usage of ICT was high, indicating that they used ICT to produce learning resources and for administrative purposes. This usage is less concerning the use of ICT in their lessons. At school the greatest use was in a departmental room, spreaded throughout the day.

Training at school should provide the student with the opportunity to “construct” the new knowledge within an appropriate technological and learning environment. The contact between the trainer and the trainee should make use of all the capabilities offered by modern technology. Another important issue is the development of courses aiming to help teachers to cater for those students whose performances are not satisfactory.

While there is a prevailing use of off-line technologies, the demand is oriented toward on/off-line technology (in the educational and teacher training environments). Among the on-line technologies the prevailing interest is for E-mail and WWW servers, while among the off-line options the prevailing interest is for teaching software and applications. Nearly all teachers would like to collaborate with colleagues from other countries and receive information on European educational programs, mostly for aspects related to the subject taught.

The general attitude of the inexperienced users towards the use of new technologies is quite positive. Most of them said that are particularly interested in initiatives regarding modalities of using new audio-visual and multimedia learning tools. Most teachers prefer to be trained through examples of real applications, or through a combination of theoretical presentations, empirical applications and suggestions on existing literature on the subject. Also, the interviewees seem to be particularly interested in the professional updating of teachers and in the Consultation of encyclopaedia, atlas, dictionaries, reference books.

5. Comparative Analysis of Results

5.1 Introduction of ICT to the Educational Process

First of all, with their all-encompassing approach regarding the specific needs of educators, the countries participating in the project illustrate the principle that training in the use of information technology is not the project's main purpose. The main aim is the familiarisation of educators with the use of ICT as a supporting tool for the educational process. Within the same context is the realisation that the further education of teachers in the field of ICT will improve their professional skills, change their teaching habits and give them a more positive profile which will contribute to the improvement of the quality and efficiency of their work.

Since the educational background of teachers in the use of the new technologies is deemed inadequate, it is necessary that they undergo an initial basic training course on ICT and its capabilities as a teaching tool. In most countries - Spain, Portugal, Greece, France - these needs revolve around certain facets of ICT.

5.2 Application of ICT to Didactics

Nearly all countries have exhibited the need for additional scientific knowledge pertaining to particular subject matter. This knowledge ought to either fill in ascertained gaps in the initial training of educators or contribute to the updating of the educators on the subjects they teach (Italy, Portugal, Spain).

Certain countries (Italy and Portugal) have proposed the introduction of parallel training programs for the interdisciplinary approach to the lesson being taught. The aim is to diffuse knowledge among the users of the TRENDS network. For this purpose, the training model must be as open as possible and satisfy wider pedagogical, scientific and social needs. Within the same framework are:

- The need for further updating of educators on the new didactic methodologies that are developed and applied to each subject matter, is deemed imperative.
- The need to learn ways and methods in order to readjust the didactic methodology used by educators in the wake of the new knowledge they will have acquired and the new skills derived from the use of new applications within the context of ICT (England).
- The need for the provision of additional knowledge regarding pedagogical theories that can be applied in real everyday school situations (Portugal).
- The need to update and educate the students in the new evaluation methods (Greece).

5.3 Needs of End Users for the adopted Training Model

The development of an environment favourable to communication with a content which is of interest to the educator who uses the services offered to the TRENDS users, has been deemed necessary for educators. This conclusion has emerged from the research carried out in many countries (Portugal, Spain, Italy, France). Educators need to communicate on matters regarding: 1) information about the innovations in education, and exchange of information between the users of the system, and 2) update on the organisation and application of educational procedures aiming at the dissemination of better teaching attitudes.

It has emerged from the research carried out in Greece that there is a need for the provision of information on the organisation and functioning of other education systems. The capability to exchange educational material and experiences on the use of ICT is also required. The proposal that students should also be given access to this information is noteworthy. The establishment of these terms of communication will promote, among other things, a European dimension in education (Italy, Spain).

In certain countries educators prefer to be trained within the framework of the school system rather than through on-line communication with the trainer (Spain, Italy). Yet, on-line communication with the instructor (and with colleagues on a national and international level) is generally viewed as a necessary prerequisite. The occasional direct communication between the educator and the trainer is equally important.

Several countries (eg. Italy, Spain), lay stress in the participation of the entire school community (students, teachers etc.) in the TRENDS network. Other countries (Greece) favour both the individual and the group procedure. It has been proposed that groups should comprise people sharing common interests. According to conclusions made in Italy, educators with a different background can only be grouped together, if the sole purpose is to learn the general uses of technology as opposed to using it as a teaching aid for specific lessons.

In several countries (eg. England, France, Portugal) it is generally believed that the educators undergoing further training, who will in turn train their colleagues, that they should have some form of knowledge and experience on ICT, good relations with their colleagues, a positive attitude to ICT and strong motivation.

As for Italy, experts and those from the target group, who are experienced in the use of ICT, prefer to be linked up from their homes. Others, less experienced in the use of ICT have expressed an interest in working both from home and school on the basis of a flexible time schedule.

The provision of sufficient incentives for educators participating in the TRENDS project constitutes one of the more critical aspects for its success. One category of incentives referred to by educators and experts of all participating countries concerns the provision of substantial help to educators to carry out their work. It also entails the opportunity to work with colleagues and students beyond the confines of regional limitations, and

access to information sources, the opportunity to develop common projects and initiatives with other educators and bodies outside the field of education. Finally, educators must be able to take advantage of the benefits provided by long distance training (flexibility, speed) and fulfill their professional ambitions.

6. Conclusions

The synthesis which has been attempted in order to illustrate the basic common needs of educators in the TRENDS project, led to the following conclusions:

- The use of ICT in the teaching process seems to be promising and beneficial.
- The programme should not only furnish supplementary knowledge on the subject taught, but also provide guidelines for interdisciplinary approaches on common matters.
- Information should be provided on the use and opportunities provided by access to educational material databases, documentation centres, electronic libraries etc.
- ODL is a method accepted by the majority of the members of the target-groups in each country.
- On-line communication between the educators and their trainers and colleagues is generally viewed as an elementary tool and essential precondition.
- The combination of vision, text, sound, video etc. is generally considered necessary, as is the use of WWW server, e-mail, news, video-conferencing etc., along with some relative printed literature.
- The TRENDS network would rather use existing communication technologies (eg. Internet, Euro-ISDN).
- Schools are generally accepted as the training grounds, provided that some infrastructure problems are solved. Many educators however have expressed the interest to undergo, when feasible, training at home.
- As for some incentives to participate in the programme, it is advisable, apart from strictly educational considerations, to examine others such as training certification, accommodations with respect to the work schedule at school, financial benefits, etc.

7. References

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