



The NEMED Multigrade Report

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Introduction

In Multigrade schools the teacher teaches more than one grade in a classroom. These are a World and European Phenomenon.

They offer education usually to low inhabited, remote and isolated areas.

One of the most important current international trends is the world's rapid urbanisation towards big cities. While urban population increases dramatically and the cities grow explosively, rural population diminishes and the countryside is abandoned tending to be deserted. With respect to education, this means that the number of multigrade schools in Europe and all over the world will keep diminishing.

This is a phenomenon that educationists, planners, policy makers and others should investigate in an attempt to affect it for the benefit of their societies.

In contrast to the current phenomenon of globalisation and mass culture there are many issues in which there is an increasing tendency to focus on the needs and qualities of the individual and considering the special needs of specific groups of people.

Multigrade education is a phenomenon having many similarities with the above situation since there will always be differences and diversities between people of any age, institution or any field of endeavour.

In a society there is a tendency to categorize people according to objective criteria such as age, height, gender etc. This categorization does not reflect differences such as capability, inspiration, creativity and other parameters not easily accounted or measured.

Learning is a procedure that depends on these above qualities, however grouping in classes are organized not by any of them but mainly by age.

Yet in any single grade class every student is neither of the same height and weight nor is growing at the same rate. The same applies for all other above-mentioned qualities of the student, creating a virtual multilevel class.

Further, the educational approaches applied by the multigrade teacher, either a result of

practice or as an outcome of theoretical studies, could produce a new, innovative and very promising educational model.

Hence multigrade schools within the framework of a well designed policy, with the application of many innovative methods and helped by Information and Communication Technologies can become the school in which the attention is paid to individual students rather than to the mass of pupils in a class. In such a multigrade class the curriculum can be designed taking into account smaller groups of students, an individual pupil to the limit, which in this sense becomes the focal point of the educational procedure.

This could probably be an answer to the problems that mass education in monograde schools produces, most of which basically depend on the fact that in traditional monograde schools the curriculum is designed for the 'average' student –an average that is possibly not represented by any pupil in the class.



CHAPTER 1.

1

Information and Communication
Technologies in Teaching and
Learning



1.1 Multigrade Schools

There are many terms to describe multigrade schools in relevant theory, as ‘multilevel’, ‘multiple class’, ‘composite class’, etc, and in the case of one-teacher schools, ‘unitary schools’. All these terms are aiming to describe the coexistence of more than one age group in the same class under the same and only teacher.

Answering the question “why this school type still exists” in a society that strives for equal education for all, many factors could be mentioned explaining the phenomenon. Among them the stronger are social and economical factors that demand the creation and maintenance of multigrade schools. The paradox of that peculiar school formation is that not only they do not violate the apophthegm “equal education for all”, but, on the contrary, they ensure it. Multigrade schools play an important role since they provide access to primary education in rural and isolated places of many countries around the world. The existence and operation of such schools increases the chances of the international society to implement the ambitious goal “education for all”.

School enrolment in the European countries reaches very high levels; therefore the level of illiteracy is nearly zero. However the educational requirements certainly go beyond the standards of basic literacy. In Europe, high educational quality expected to be attained on every educational level. Any school, including multigrade ones, not only should provide education but also should offer quality education.

Still, there are factors that prevent the unobstructed operation of multigrade schools and reduce the quality of education they offer. The main one is geographical position. It is important to mention that the basic generative cause of multigrade schools is the same cause that creates the frame of the negative conditions: Sparse population results in insufficient number of children per school demanded to justify the institution of a conventional school. Therefore, sparse population results inevi-

tably a multigrade school’s solution. At the same time, small communities are usually located far away from urban centers and therefore away from many urban facilities. In other words, distance from the centre creates multigrade schools and also condemns them to very demanding conditions. Since multigrade schools mostly operate away from urban centers, the unconstrained conclusion is that these schools usually operate in underdeveloped areas, and as a result they form the most abandoned part of the educational system.

It is noticeable that multigrade teaching is surprisingly very common. They are a usual institution in European rural areas [1], [2]. Many countries in the Mediterranean, in Scandinavia and some in central Europe, have significant rates of multigrade schools. For instance, in Finland, a country with many remote areas and islands, multigrade schools represent about 30% of the total school number. In Greece (2005-2006 school year data), nearly 44% of primary schools were multigrade and 15% of teachers are working in multigrade schools. Yet, only a few Ministries of Education, Curriculum Development Agencies and Teacher Education Institutions take their role into account. Their functioning within the educational system is marginal due to geographical constraints, socioeconomic features, lack of sufficient school equipment and mainly lack of staff. In general, in the field of multigrade schools practice and research very little progress has been made.

As mentioned above, multigrade schools suffer from the geographical/ social conditions of the areas where they function. At the same time, multigrade schools are radically improving the condition of these areas, since they function as a means to smooth isolation and exclusion. At the same time there are grounds in support of the view that these schools, apart from the educational role, could play an important societal role, since they could func-

tion as “social community centers”.

A number of tools can be used in order to fulfil the educational and social role of multigrade schools. Among them, Information and communication Technologies (ICT) is proved to be of crucial importance. ICT can transform teaching and learning conditions into a very competitive and efficient educational procedure. The most intense disadvantages of multigrade school can be cured if ICT techniques are exploited using best practices. For each distinct multigrade problem, ICT promises to raise back a solution:

- Isolation due to geographical position is less severe if an Internet connection exists and telecommunication devices and software are installed. Lack of frequent interaction with educational society is also less severe, due to the existence and use of relevant forums, digital shareware libraries, data basis that allows exchange of suggested educational software, educational portals, and material.
- The lack of books specially designed for multigrade schools is tackled if multigrade teacher is trained to develop his/her own original e-educational material, adjusted to the needs of his/her specific students.
- The lack of interaction between a multigrade school and the rest of the educational community is also handled if multigrade teacher cooperates with national and international projects using an Internet connection to cover most projects' obligations.
- Lack of training possibilities due to distance from an urban centre is easily taken care of, exploiting ODL techniques that allow in-service training.
- Lack of teaching time is improved, since administrative tasks of a teacher can be simplified with the assistance of ICT office tools, such as document templates, students' records, elec-

tronic correspondence with central educational authorities and more. Less administrative time results in more teaching time.

- Dead time (time when some age groups remain unattended) is improved implementing specially designed educational environments supporting self learning and self evaluation.

Many multigrade learning and teaching techniques have their equivalent procedure using ICT tools.

The Network for Multigrade Education (NEMED) combines the skills of a wide range of people from ten different countries with different backgrounds -educational experts, academic tutors and teachers- aiming to improve the quality of education offered in multigrade schools. The focus of the network is the promotion of communication between its members, the dissemination of teaching models and multigrade teaching practices, the development of teaching attitudes and finally the provision of educational material appropriate for multigrade teaching. The working core of NEMED network is the formation of six groups of different research areas. Group 1, led by Aegean University, is focused on the best practices of ICT enrolment in a multigrade teaching environment.

This work outlines the approach and progress made to comprehend the situation of ICT in Europe, the importance of ICT in education and specifically in multigrade schools. Thus, its purpose is:

1. to look into ICT's availability in schools all over Europe and how it is used by teachers
2. to document the tendencies and the parameters affecting ICT's use in each country and to provide statistical data that clarify the situation
3. to look into the case of ICT's current usage in multigrade education
4. to document the areas in which ICT can be implemented in multigrade education

1.2 ICT's role in teaching and learning

The advantages that ICT brings into a school can only be truly realized if, in response, the school changes the way in which students and teachers engage in the process of learning and teaching. ICT can make a significant contribution in teaching and learning at all stages and across all areas of the curriculum and thus ICT should be embedded in all our educational institutions. Indicatively, ICT can:

- Help students to learn and develop at their own pace
- Foster an increase in the quantity and quality of students' thinking and writing
- Nurture artistic expression
- Help students to use resources that exist outside the school
- Create opportunities for students to do meaningful work
- Provide access to high level and high interest courses
- Increase students productivity and efficiency

However, looking at ICT in a more integrated viewpoint, according to C. Morton [3], ICT should be part of the fibre of the educational experience: "The computer... should be seen as an integral part of an environment that is structured to engage students in the learning process. It should be regarded as an essential element in an educational approach that focuses on gathering information (and on learning how to transform it into new knowledge), on the changing role of teacher-as-facilitator, on the involvement of children in experiential learning, and on the expanded world of lifelong learning. Educational planners have overlooked these perspectives almost entirely."

This type of ICT integration focuses more on the

importance of ICT to change the way teachers teach and the way students learn rather than being concerned with the ICT skills and knowledge that students would require in society. In a review of the literature on the effective uses of ICT to support reforms in teaching and learning four general areas were noted [4]:

1. Facilitating the acquisition of basic and advanced skills in each of the core academic areas
2. Providing opportunities for authentic learning experiences with access to experts, resources, and information beyond the classroom
3. Providing authentic learning experiences by increasing connection to life beyond the classroom and to the world of work
4. Addressing the needs of all students by accommodating individual differences

There has been an increasing support to the view that ICT is a catalyst, improving teaching and learning process in schools. For example, the use of ICT in classroom shifts the roles of teachers and students [5]. ICT also encourages teachers to act more as facilitators, helping students to access and process information and communicate their understanding. Moreover, it is argued that "teaching is no longer just the transfer of information, learning no longer the retention of facts and education no longer the exclusive responsibility of teachers" [6].

In classrooms that can be considered as being ICT enabled, teachers took advantage of this feature in a variety ways. The literature shows that ICT-using teachers apply a variety of teaching styles from didactic instruction to constructivism [7]. Instruction-oriented teachers tend to conduct their teaching in a teacher-centred way. They employ ICT mainly for drill and practice purposes. By compari-

son, constructivist-oriented teachers tended to have student-centred classrooms and use software as a tool, encouraging students to actively participate. The constructivist type usage of ICT tends to support active learning; it becomes a vehicle by which the students construct knowledge [8].

However, ICT has not been properly integrated into school in many European countries, because teachers view ICT as just an “add-on tool” with which you can do things that can be done with traditional ways. It is worth mentioning that in some countries such as Greece and Latvia, the situation is that students are becoming “computer literate” by being taught “tool skills” like word processing and never really being taught that the ICT learning environment is all-embracing rather than a simple teaching add-on.

ICT resources and their availability in classrooms is also an important issue. According to the Office of Technology Assessment [9] some excellent work is done in USA's schools concerning the use of ICT and its integration into everyday life but such progress is not universal. They described the situation as follows: “Computers are available in nearly 100% of European schools, were in use for instruction in schools which represented about one for every nine students. Classroom access to newer technologies, at the time, like CD-ROM and networking capabilities were also limited. While 75% of public schools had access to some kind of computer network, and 35% of public schools had access to the Internet, only 3% of instructional rooms (classrooms, labs, and media centres) were connected to the Internet.”

Cuban states that: “Teachers will appropriate any technology to do what they have always done. And why should they change? If the teaching methods they have always known and used to provide the results that day and education authorities are seeking, then there is little reason to transform the teaching. Some dissonance is needed; some ripples that will create a catalyst for change to ensure that schools recognise individual achievement and learning styles and provide every learner with the opportunity to succeed.” [10].

Technology provides the tools to do the above and evidence suggests that they are effective [11]. But in order to use the ICT tools comfortably and in their

everyday teaching, teachers need an understanding of ICT's potential. They also need training in how to apply these tools, timely support -a just-in-time support- and, most importantly, time and administrative support to experiment. As a result teachers will become “bold” in using ICT, assume the role of a facilitator and, at the same time, students will assume the responsibility for their own learning.

Teachers who saw themselves as facilitators were among the most enthusiastic ICT users, as ICT was particularly suited to support this approach. ICT offers teachers a number of ways to communicate with students, parents and other teaching professionals which were not available previously. ICT applications that were used to communicate better transcended the walls of isolation that shaped the teaching profession and allowed teachers to share experiences with colleagues, school administrators, parents, and experts in the field in both asynchronous and synchronous ways.

This type of evidence led state and local policymakers to realise that the teachers' professional development needs were too urgent and resources too scarce to continue past practices that ignored ICT [12]. Also, the question that has to be answered is how teachers and their schools can use ICT more effectively. To reach what is needed the following have to be included in ICT in a schools' reform plan:

1. Development by all staff of a coherent, unified instructional vision in which ICT plays an integrated, supportive role
2. Promote the voluntary participation of staff, starting with the most interested or able and allowing numbers to grow naturally
3. Provide staff with computers for academic and administrative purposes
4. Reward those doing exemplary or pace-setting work
5. Give teachers enough time to develop ICT skills and integrate ICT into their instructional framework

The effects of ICT's integration on teachers and students have been seen over the last decade. For teachers these effects ranged from veteran ones

1.3 Barriers in using ICT in teaching

who have undergone a dramatic transformation and found a sense of enthusiasm for their craft, to “tech-savvy” teachers who have created wonderful classroom experiences and lessons that engaged their students in real-world problem solving. The effects also included disaffected students suddenly curious about new areas of inquiry, with the help of ICT tools, as well as reticent students who became motivated when investigating a common problem [13].

ICT is playing an increasingly significant role in schools and is already transforming education in different ways. However, there is -to some extent- a discrepancy between what is proposed/ expected and in what really occurs in schools regarding teachers and the use of ICT. In some countries such as UK, Sweden, Finland and the Netherlands, teachers discuss issues with colleagues and download lesson plans. In addition, students access information, visit places of interest around the country and the world and use on-line university libraries to do research. Parents contact teachers by voice mail or email. But these countries are the exception of the rule; in most of the other European countries ICT is not used at all or it is not used on its full potential.

One possible explanation is that, although a number of teachers have incorporated ICT into instruction, many still resist using it. The reason is that those teachers that are not familiarised on how computers work or have limited ICT related skills, have difficulties integrating them into teaching, a situation that leads into a denial in using them. Negroponte [14] believes that the pressure to include ICT into mainstream education is a result of the technological change that had occurred in society. He argues that most of our current teaching force had grown up in a non-electronic era in which the existence of what could be termed as “open ended electronic tools” belonged to the realm of computer program-

mers and enthusiasts and was not at the grasp of the average teaching professional. Nowadays, children grow with ICT; they “think digitally”. While educationalists debate and develop ICT projects that may or may not work, students are developing skills rapidly in this area, with reports suggesting that the two-thirds of them believe that they acquire most of their basic ICT-related skills outside school [15]. The need for ICT integration and the challenges it brings can be appreciated when reflecting on the background of students compared with the one of their parents and teachers. This notion of the difference between learners and teachers, with respect to ICT, is still being debated, for example with Prensky’s analogy of “digital natives and digital immigrants” [16].

In order to fully integrate ICT in schools there are both technical and capacity related barriers that have to be overcome. On the technical side, barriers such as lack of infrastructure, equipment and connectivity can be mentioned. But even in countries where the technical barriers have been overcome and ICT is present in classrooms, other kinds of barriers remain. In these countries, ICT is often used simply as a supplement for existing pedagogical practices. However in order to fulfil the potential of ICT as a tool for enhancing teaching and learning, ICT must be fully integrated into the pedagogical processes, which requires a cognitive shift on the part of educators, curriculum developers, administrators and policy-makers.

The main factors that prevent teachers from making full use of ICT can be broadly grouped into two categories. These are:

- i. Teacher-level factors. For example, teachers’ poor ICT competence, low motivation and lack of confidence in using new technologies in teaching are significant determinants of their levels of engagement in ICT. These factors are directly related to the quality and quantity of

teacher training programmes.

- ii. School-level factors. For example, limited access to ICT (due to a lack or poor organisation of ICT resources), poor quality and inadequate maintenance of hardware as well as unsuitable educational software are also defining elements in teachers' levels of ICT use. Moreover, the absence of an ICT dimension in the overall schools' strategies and the limited experience with project-oriented activities supported by ICT, are decisive in determining levels of ICT use by teachers (*table 1*). A third category of reasons that prevent teachers from making full use of ICT can be called "System-level factors". In some countries it is the educational system itself and its rigid assessment structures that obstruct the integration of ICT into everyday learning activities.

Many authors categorise barriers as external (first order) or internal (second order). First-order barriers include lack of equipment, unreliability, lack of technical support and other resource-related issues; second-order barriers include both school-level factors such as organisational, cultural, as well as teacher-level factors such as beliefs about teaching and technology and openness to change [20]. Lack of equipment is the highest rated barrier internationally [19], often cited even in well-resourced countries. Indeed, one study [26] found that teachers who use technology most are more likely to complain about lack of equipment. It would appear that this is less a barrier in the introduction of technology than to its use in creative and innovative ways. While these first-order barriers are clearly significant, research suggests that the importance teachers attach in them can reflect their own second-order barriers [32]. In particular, teachers' beliefs about the relevance of ICT to their subject can magnify or reduce the effect of practical difficulties they may encounter.

First-order barriers may even mask second order barriers: perceptions of computers as difficult to use may be related with lack of confidence as well as with the hardware or software itself [20]. It is impossible to separate first-order from second-order

barriers, or barriers at the teacher level from those at the school or policy level [33].

Stances towards ICT can be barriers by themselves and can influence or be influenced by other barriers. One study [34] divided stances into three groups: self-confidence with ICT, perceived relevance of ICT, and innovativeness. Although stances partly depend on personality [26], the importance of previous computer experience is widely recognised [20]. Negative experiences affect perceptions of the ease of use and relevance of ICT, reducing confidence and increasing anxiety. Computer anxiety and anxiety about change are key factors limiting teachers' use of technology [30]. Cause of these anxieties is fear of embarrassment when using computers [21] and fear of losing professional status through a downgrading of traditional pedagogical skills [17].

ICT training can help overcome barriers, yet many authors argue that it often fails to do so. While a lack of time and training are major obstacles [24, 26], research suggests there are weaknesses in the design and delivery of many courses. By focusing on basic ICT skills, training fails to prepare teachers to integrate ICT in their pedagogy [23, 35]. On the other hand, one study [20], found that computer novices preferred to be taught basic skills before addressing pedagogical integration of technology. This illustrates the need for differentiated training, taking into account teachers' varying levels of computer experience and learning styles [31].

Initial teacher training receives particular attention in the literature. Within institutions offering initial teacher training, access to ICT can be problematic [36], but perhaps a more serious barrier lies in the fact that tutors often have little experience in using technology to deliver the curriculum [37]. As a result, pre-service teachers lack practical models of integration, leading into an inconsistency between their expectations of ICT use and their actual use [38]. Lack of encouragement to use ICT during teaching practice and varying resources in schools exacerbate this problem [36]; for new teachers as much as experienced ones, integration requires both access to ICT in the classroom and the motivation to use it.

Teacher-level factors	School-level factors
<ul style="list-style-type: none"> • lack of time for both formal training and self-directed exploration and for preparing [17] • lack of ICT resources for lessons [18] • lack of self-confidence in using ICT [19] • negative experiences with ICT in the past [20] • fear of embarrassment in front of pupils and colleagues, loss of status and an effective degrading of professional skills [21] • classroom management difficulties when using ICT, especially where pupil-to-computer ratios are poor [22] • lack of the necessary knowledge to enable teachers to resolve technical problems when they occur [23] • lack of personal change management skills [24] • perception that technology does not enhance learning [25] • lack of motivation to change long-standing pedagogical practices [20] • perception of computers as complicated and difficult to use [24] 	<ul style="list-style-type: none"> • lack of ICT equipment [26] and the cost of acquiring, using and maintaining ICT resources [24] • lack of access to ICT equipment due to organisational factors [26] • obsolescence of software and hardware [18] • unreliability of equipment [28] • lack of technical support [18] • lack of administrative support [29] • lack of institutional support through leadership, planning and the involvement of teachers as well as managers in implementing change [30] • lack of training differentiated according to teachers' existing ICT skill levels [31] • lack of training focusing on integrating technology in the classroom rather than simply teaching basic skills [23]

Table 1: Main factors that prevent teachers from making full use of ICT

1.4 Components of effective ICT professional development

Professional development is effective where it is implemented if it is developed within the school context and meets the needs (local, governmental and societal) of teachers and the students they teach. Support is required from systems and schools to embed professional development effectively into conventional work practices. According to Brand [39], the factors that influence the success of ICT related professional development are:

1. Time. Teachers require time to acquire and transfer ICT knowledge and skills. The actual amount of time required by teachers to effectively integrate technology has been debated by Harvey and Purnell [40].
2. Teachers' individual differences. Skills, knowledge levels and varying needs of teachers need to be considered.

3. Flexibility of professional development opportunities. Teachers' development in the use of ICT should not be based on a "one size fits all" philosophy.
 4. Provisional support. The provision of a person or team with experience in both ICT and curriculum can assist in matching teacher development to school and education department goals.
 5. Collaborative development. Effective ICT development takes place in a collaborative learning environment. Peer coaching and modelling have been most effective in transforming knowledge and skills gained in workshops which aimed to demonstrate how to integrate ICT integration into classroom practices.
 6. Remuneration and teacher recognition. Teachers may need to be provided with incentives and recognition in order to be motivated to acquire new ICT skills. Research from the business sector supports this notion.
 7. Sustained staff development. ICT professional development must be ongoing and systematic. One-shot workshops are ineffective.
 8. Link ICT and educational objectives. Training in ICT must have a pedagogical focus. Guiding teachers to think about curriculum helps them to address how to integrate ICT.
 9. Intellectual and professional stimulation. Teachers and students must be placed at the centre of the process. Meaningful contexts for learning must be considered.
 10. Clear administrative message. Administrators must support teachers' professional development in ICT with action. As Boe [41] argued, information based society requires a new vision of teaching and associated expectations for professional development.
- Other ICT professional development components were summarised by Downes [42] and included:
1. Timely technical, user and curriculum support with a pedagogical perspective.
 2. Culture, leadership and support resources which promote the workplace as learning place for teachers.
 3. Access to ICT for personal and professional use: for practice, for connecting and participating in learning communities and for finding resources.
 4. Curriculum framework and assessment regimes that match the ICT professional development.

1.5 Technical support

Due to the technical nature that ICT professional development implies, attention must be drawn to the importance of technical support as an element of teachers' success with ICT and ICT professional development. It is a crucial factor that professional development models and their providers need to control so that the professional development experience is successful for the teacher. Weiss claims that most plans for ICT failed to include a realistic

model of technical staffing [43]. Whilst businesses generally maintain staff for their various administrative operations (i.e. purchasing, human resources and buildings) few experts in the field of ICT in education have recognised that a large educational computers' network or smaller ones in schools will require a substantial group of trained professionals to cope with its many demands. Weiss exposes this discrepancy by stating that:

“It is truly startling to examine a plan, developed through extensive collaboration involving dozens of well-meaning individuals, and finds that it ignores or grossly underestimates the expert staff the new system will require. In fact, it is not uncommon for ICT plans to include no mention of administrative model at all.”

Often the extra burden on teachers, to perform multiple roles to meet the technical needs of ICT professional development and also provide support for the pedagogical ICT needs, is enough to create failure.

The existence of ICT support or maintenance contracts in schools is an indication of the kind and

level of support given to teachers to make better use of ICT in teaching. Once the school is committed to change, once the teachers are conversant with ICT and the computers are in place, a variety of support mechanisms will be needed. It is important to be a fully-functional support chain between school leaders, teachers and other professionals. ICT poses pedagogical challenges for teachers, so they will look to the insights of educational researchers and colleagues in regard to the most promising methodology. On the technological side, they may require help to deal with software conflicts, installing new software, network management, setting up Internet access, and sometimes technical failure. Some form of quick-response system that provides in-classroom technical support is essential.



CHAPTER 2.

2

Information and Communication
Technologies in Multigrade
Education

2.1 Rural and multigrade schools in the digital era

Many small rural schools fulfil a crucial function providing the children of remote, less accessible and insular areas with access to education which all children are entitled to, thus keeping small remote and aging communities “alive”. However, the operation -even the mere survival- of these schools becomes more and more problematic, as they suffer the consequences of a continuously widening social and economic divide separating urban and rural regions. Next to the well-known urbanisation tendencies and the abandonment of the countryside by younger generations, an increasingly discussed manifestation of this gap is the digital divide [44], i.e. the disadvantage of rural areas in terms of access to the technologies, services and opportunities of the contemporary Information society, which are nevertheless expanding rapidly in urban settings. The digital divide becomes inevitably a problem for the small rural school too, although this is not necessarily in the first instance recognised by teachers. This is due to the fact that even before the introduction and utilisation of new technologies, the rural school has to face a number of essential challenges relating to its very function and existence.

Multigrade rural schools constitute a work environment full of challenges and difficulties for the teacher. Indeed, multigrade school teachers have to teach simultaneously two or more age groups and possibly more than one curriculum subjects in particularly farraginous classes, based on the foundations of a heavily monograde-oriented initial teacher training curriculum, which scarcely makes any special provisions for preparing teacher trainees for the peculiar circumstances of the multigrade classroom. As teachers’ initial professional training does not suffice, the need for competence development through in-service training schemes becomes evident, especially in the light of the fact that typically inexperienced, newly-appointed teachers are posted to remote schools for a relatively short term service.

Thus, the average teacher working in a small rural school needs to acquire new knowledge and skills improving their expertise in multigrade teaching and generally develop and maintain the ability to respond to the challenging circumstances of their professional position.

However, several difficulties exist in connection to remote rural teachers’ continuous professional development. For instance, offering in-service training seminars to teachers from remote small schools is a demanding task for educational authorities, as teachers’ round trips between their remote school and an urban training centre tend to be costly -if not virtually impracticable- given that there may not be a colleague available to replace them during their absence. The very concept of competence in the context of multigrade teaching is not clear. In the field of Human Resources Management competence is usually defined as a standardized requirement for an individual to properly perform a specific job. However, whether a teacher is adequately qualified so as to have the ability to perform successfully in the multigrade classroom is a question with no official, standardised, answer. The educational system, through its choices for the initial and in-service training of teachers, does not clearly define what good multigrade teaching is. Teachers are more or less left to explore and learn multigrade teaching on their own, through their solitary experiences in remote rural schools.

It should be mentioned that many of the above described difficulties of teachers working in remote areas are an international phenomenon; the shortage of teachers in rural and remote areas and the weaknesses of the education systems in the provision of training and professional support to these teachers, have been well-documented in the literature [45, 46, 47, 48, 49, 50, 51].

As a response to these obstacles, the use of different forms of technology-supported learning and distance education models have been advocated for the enhancement of quality and accessibility of teacher training programs in rural areas [52, 53]. Relevant attempts have followed the technological trends in the field of computer-supported learning, while the content of training delivered via the different technologies varies greatly, from conventional seminar-type lessons, to classroom observations at a distance [45, 54, 55, 56]. In recent years a lot of attention is also paid to the role satellite telecommunications can play for the bridging of the digital divide [57, 58]. Distance education is also seen as a major field of application in this area, as this technology provides a delivery option facilitating access to new student populations in distance locations [59]. Significant experience has already been gained internationally, particularly in the United States and in Australia (i.e. [60, 61]), as well as in other less developed countries with populations distributed over large geographical areas (i.e. [62, 63, 64]).

Despite the many peculiarities and difficulties characterising the operation of the small rural school and the teacher's role in it, there are also positive, or potentially positive, aspects in this form of education which a skilful and devoted teacher may be able to turn into an advantage for his students, himself, the school, as well as the wider local community. The acknowledgment of the various problems associated with multigrade schools is often contrasted by a growing recognition of multigrade classrooms as not only a necessary, but indeed a good-quality option for education systems, believed even to have some advantages over single-level classes [65, 66, 67]. In addition, what is of more relevance here is a well-established belief in many countries in the diverse roles that the remote rural school can play in collaboration with, and in favour of, the rural community, as an agent promoting local development. Salant and Waller for instance, providing an account of research and publications on the non-educational impact of schools on rural communities,

summarise that the school-community relationship is multi-faceted, with schools having positive economic and social impacts, providing a resource for community development, as well as offering a delivery point for social services [68].

Several links can be traced between education and rural development. To mention maybe the most self-evident, education, and particularly educational attainment, is seen as a rural development strategy through which a better educated rural population leads to greater economic growth [69, 70, 71,72].

Clearly, new leadership roles are foreseen for the rural school teacher in this context. The teacher is encouraged to assume a crucial role in the development and implementation of a culture conducive to lifelong learning and innovation in the school and beyond it, while at the same time making efforts to link school life with the school's external environment, helping the school interact with its environments and creating communities of learning within and outside the school. The aim of any relevant professional development scheme ought to be multi-faceted and rural teacher in-service training should provide teachers with diverse competences: in the area of solutions and opportunities of the Information Society, in the area of pedagogies specifically adaptable to the 'unusual' settings of the small rural school, as well as in areas that are currently scarcely present even in the most progressive teacher training curricula, such as innovation, change management, local and rural community development, etc.

Such a professional development intervention ought to help teachers recognize new roles for themselves, beyond the conventional realisation of teaching tasks. Indeed, the teacher should start seeing himself as a change agent catalysing innovation and development in the school and the local community, as an innovator producing and running a small 'revolution' in the rural school and community.

2.2 Applying ICT in multigrade schools

As evinced in the previous chapter, the role of ICT in education is significant in general but can be decisive in the case of multigrade schools. There are three areas where this role is distinguished, namely: (i) teaching, (ii) training and supporting teachers and (iii) administration [73].

To use ICT in teaching includes various tools and methodologies such as: commercial software readily available, tailor made software for specific subject teaching, televised lectures to be presented off line or video on demand, videoconferences, on line connections with others schools, on line and off line exercises and didactical material.

For teacher training: on line lecturing and consultation, on line and off line material and references specially selected for the instructional needs of a multigrade school.

For the treatment of administrative problems: templates of all the documents a school uses with instructions when each one is used, on/off-line communication with the educational and local authorities, are among the solutions that can be considered [74]. Of paramount importance is the support that is needed to all of these activities -educational, technical, and administrative- by any supervising authority.

The introduction of ICT in multigrade schools is related to some difficulties, which are presented below.

Since ICT applications are based on an extensive use of the Internet and other means of on-line communication, school units should have computers and Internet connections as minimum prerequisites before the ICT introduction. Though this appears essential, in practice, computers are not always available in multigrade schools, or are available but inadequate. The second problem is the type of connection used to access the Internet.

ADSL is the only broadly available choice for on line communication, fast data transfer and especially for videoconferencing. Unfortunately broadband connections are not always available, especially in remote areas.

Today, about nine students share one computer in the EU (11.3 computers per 100 students) [75]. In case of multigrade schools, where class/es may be small, the above-mentioned ratio has no meaning. In such schools usually there are no extra rooms available to be used as computer labs, yet the machines are needed in the classroom where teaching is conducted. The standards for the number of computers for a multigrade school have to be established according to the number of teachers, grades and working groups and not according to the total number of students. The smaller the school, the smaller the ratio pupils/computers should be.

The policy concerning the use of computers in primary schools is under development in some countries, not fully deployed or has encountered problems in others. For instance, in Greece, the project "Information Society" is an extensive strategic scheme concerning the introduction of ICT in many fields of life. Within this framework elementary schools can make the necessary arrangements in order to establish computer lab with Internet connection. The number of computers in such a lab depends on availability of extra rooms and the number of students, criteria that are not met in most multigrade schools and certainly not in single teacher schools. The way of financing the project is bureaucratic and leads to delays.

It is clear that bureaucratic and centralized policies are major barriers for applying ICT in multigrade schools. It depends mainly on the teacher who acts as a schoolmaster as well as to the other teachers to take initiatives, at the school's benefit. Good public relations with local authorities and the local community help a great deal. Interestingly enough,

it seems that these practices are effective and, despite the difficulties, many schools are nowadays equipped with computers, which were acquired using funds that (i) were directed for this purpose from the central educational authorities to local authorities, (ii) were available for this purpose in the budget of European or national pilot projects in which a school participated and (iii) were offered through donations [76].

Providing schools with computers is one issue, ensuring their usage is another. Teachers use a computer if (i) they know how to use it (ii) they are persuaded that it is a tool in support of their teaching duties and (iii) they realise that ICT's may potentially support other duties that they have in their multiple role at school. These dimensions are analysed below:

As far as (i) is concerned, the most decisive factor for multigrade schoolteachers to learn how to use ICT effectively is schoolteachers' training, and, in this context, on-site teacher training, though a costly practice, seems to be the best solution. With training in situ, there is no need for teachers to travel, their teaching duties are exercised during the training period and training is offered on an individual basis which in many times proves to be efficient. Moreover, in situ, the trainer ensures that computers are properly installed, solves any technical problems and gives instructions on how to cope with everyday problems. At this point it is worth mentioning that in multigrade schools the "plug and play" concept is priceless. Hardware and software must come pre-installed and ready to use. Taking for granted that schoolteachers have no previous experience with computers, the whole interface must be as friendly as possible. Helpdesk and technical support by telephone must be constantly available and the schoolteacher should be confident that there is always someone to help if something goes wrong.

As far as (ii) is concerned, proving the importance of computers as educational tools is a difficult task. Given the extreme time pressure within which schoolteachers in a multigrade schools work, ICT can provide quick and practical solutions in actual problems. An example of such an application is the development of a database with exercises and activities for all the grades. The teacher can plan the day's work selecting from the database the ap-

propriate material for the appropriate grade. Thus, the pupils of one grade can work on their own on paper or with the computer the selected exercises, while the teacher teaches another grade. Such databases, which can be on-line and freely accessible, so as to be enriched with new exercises and activities, are useful particularly in cases of inexperienced and newly appointed teachers (who are profiled frequently in multi-grade schools).

In multigrade schools, a common practice within the teaching context is that, when the schoolteacher is engaged lecturing one grade's pupils, the rest of them divided in groups, are engaged in preparing exercises or studying previous or next hour's lesson. Educational software is useful in this case, particularly if specifically prepared for the purpose of this time-sharing type of studying. Commercial educational software is also a good and practical solution, but has the disadvantage of not being directly referred to the contents of the school's curriculum; hence it can be used as a supplement to ordinary teaching approaches as well as a basic instrument in student-centred activities, such as the preparation and presentation of a project in the classroom. Moreover if pupils deal with educational material not necessarily referred to the curriculum, it is difficult for the teacher to check whether they are studying or not. For providing educational material directly adjusted to the school's curriculum, there are several solutions:

- A simple way is to convert text books into e-books; this is not a desired solution, since it does not give ICT instruments the chance to offer to pupils something different and more attractive compared with conventional educational material.
- Another way is to form a comprehensive library of commercial educational software, with detailed information about the parts that correspond to specific sections of the school's curriculum. This partially solves the problem.
- Another approach is to rely on synchronous teaching (videoconference) by a distant teacher, who covers all parts of teaching process.
- Finally, asynchronous teaching (web pages) can be implemented, a technique that gives similar

results as in videoconferencing from teaching point of view [77].

- These practices in their combination provide tools that guarantee quality of teaching and facilitate multi-grade schoolteachers in doing their job.

In parallel, schoolteachers should be convinced that horizontal communication with schools, organizations and other institutions in a number of ways (e-mail, web pages, and videoconference) helps them, supports pupils, provides access to information and reduces isolation. Cross-school activities, lecturing and direct communication with experts can help teachers to promote quality of teaching and to face a number of problems.

With respect to (iii), it is important to bring evidence that ICT helps teachers to implement various administrative duties like students records, calendar of events, certificates etc. All these can be produced in a very efficient manner after templates for all the necessary documents have been developed. As far as communication is concerned, given the adverse geographic conditions, multigrade schools' post is usually delayed so that teachers and pupils are not informed on time about activities and projects in which they would probably want to participate. It is clear that on line communication is expected to improve the situation.

Finally, it is worth noticing that there is a need for a platform for delivering the content addressed to

teachers and pupils. An effective platform comes in the form of a simple portal-like web site. A portal is a web site that is intended to be an all-in-one entrance to the Internet, which also provides Internet services: email, chat rooms, free personal web pages, guides, calendaring, etc. Portals provide a single point of access to aggregated information. The main reasons for using such a site are:

- **Presentation.** It provides a single consistent interface across diverse content and function. Provides common user interaction model and API, which new applications can build on. Delivers a common user experience across different device form factors.
- **Access.** Provides common access mechanism for users to a range of applications (single sign-on). Allows different classes of users to have different levels of privileges, mutable and manageable. Provides access in a continuously available, responsive environment
- **Personalization.** Permits customisations in the interface, to fit each user's specified preferences. Allows portal management to tailor the user experience for different classes of users, based on both implicit and explicit preferences.
- **Administration.** Allow multiple organizational units to create and contribute content and to administer sections of the portal. Allows a central management entity to manage multiple portals across the entire organization.



3

Information and Communication Technologies in NEMED Countries

3.1 Introduction

The following sections outline the situation regarding ICT in NEMED's participating countries. Unfortunately there are two major problems that obstruct the effort to gather and present data. First of all, due to different educational systems, there is neither a uniform definition of the term "multigrade school", nor a common handling of this type of school. Secondly, there is no ministry of education, organization, agency or EU's authority which has specific records or has ever conducted a survey aiming in the collection of data regarding the use of ICT in multigrade schools. The only available figures come from the EC's study "Benchmarking Access and Use of ICT in European Schools" [75], which was carried out in spring 2006 in 27 European countries (Romania is not included).

There are also two concerns regarding the above

study: (i) the figures provided are estimates and statistical projections and (ii) there are no data for multigrade schools; instead there are partial data regarding rural schools that contain multigrade as well as "normal" ones.

For each country participating with schools in NEMED, an overview of the current situation regarding multigrade teaching is going to be presented, followed by an overview of the state of ICT integration into country's primary school curricula. Finally, relevant data from the study "Benchmarking Access and Use of ICT in European Schools" is going to conclude the case of each country.

A complete list of tables comparing the situation in all NEMED's countries along with relevant charts is included in Annex A.

3.2 Cyprus

3.2.1 Overview of the Cypriot multigrade schools

In Cyprus the term "multigrade school" is not mentioned in the educational laws. In the legislation the only terms used are one-teacher schools, two-teacher schools and schools with three or more teachers. The number of pupils each type of school will have is decided by the Minister of Education and Culture. To support multigrade schools the Ministry of

Education and Culture appoints part-time staff in schools which have one or two classes.

According to the Ministry's regulations, mixed age classes should be created with neighbouring classes only and the maximum number of pupils in each class should be 24. In this way it is possible for a school with 72 pupils to have three teachers (12 pupils in each class) and a school with 75 pupils to have six teachers (one of the neighbouring classes has 12 pupils and the other has 13 pupils). For the purposes of NEMED as "multigrade" is regarded

the school which has fewer than seventy-two pupils and a staff up to four teachers (full-time or part-time) including the head teacher who might also have the responsibility for one of the classes (if appointed to such a school). This means that all classes contain children of more than one chronological age and the maximum number of classes is three.

There are 343 primary schools in Cyprus. According to the above definition, 59 of them can be considered as multigrade schools, with 1,721 students attending them (out of 53,934).

3.2.2 Overview of ICT in Cypriot educational system

The Department of Primary Education has initiated, since September 1993, an Information Communication and Technology (ICT) programme in order to enhance the educational process. Today the programme is implemented in all schools in Cyprus including the occupied school in Rizokarpaso. The implementation of ICT aims not only at the technological enrichment of the learning environment, but also at the essential differentiation of the educational process. Thus, ICT is not taught as a separate subject in the Cyprus' National curriculum, but is used as a dynamic tool in the teaching and learning process, aiming at a more effective implementation of the school curriculum and developing of skills such as problem solving, decision making, communication and information handling.

The basic aims of the Ministry of Education and Culture regarding the Information Communication Technology use in primary schools are:

- the development of appropriate and modern building structure and efficient technical support
- the re-construction of the school curriculum at the level of aims and activities in order to include Information Communication Technology use
- the in-service teachers' education in using Information Communication Technology in the classroom
- the schools access to the World Wide Web

Since 2002, the Ministry of Education and Culture

has adopted a programme entitled "The Integration of Information Communication and Technology" which is funded by the European Development Bank and the Council of Europe Development Bank. The action plan designed by the Ministry of Education and Culture addresses the following sectors:

- Infrastructure: The technical infrastructure includes the acquisition of equipment, the networking and the construction of computer laboratories.
- National Curriculum: The plan suggests the enrichment of the National Curriculum at the level of objectives and activities in order to include ICT use in schools and also the development of essential material (software and other) in order to assist the use of ICT in the educational process. During the school year 2005-2006, a team responsible for the enrichment of the National Curriculum has prepared a completed proposal for the integration of ICT in the Cypriot educational system. This proposal includes the theoretical frame and the mechanism for the implementation of ICT.

The training of teachers aims at the acquisition of skills for ICT tools and the ability to use them in the educational process. Cyprus Pedagogical Institute is responsible for developing and implementing teachers' training programmes. Thus far, programmes related to ICT have been offered to about 2000 teachers. ICT consultants provide efficient support to teachers in their effort to integrate Information Technology in the teaching/learning process. During the school year 2005- 2006, seven educational software packages related to language and math have been sent to all schools. Thus, the primary goal of the ICT consultants was to tutor teachers in the use of the software and the implementation in the learning process. It is also essential to note that the enrichment of Science Curriculum aiming at the exploitation of ICT tools in the learning process has been completed. Digital material is being developed such as simulations, databases, web quests and other, in order to utilize the additive value of ICT. The action plan is now being extended in the subject of Mathematics aiming to enrich the curriculum.

In some cases computers are installed in labora-

tories. Every computer in each school has access to the Internet. This new tool proved to be very motivating for pupils. Many children developed communication with children in other schools as well as with Cypriots who live abroad or with foreigners. In this way, two of the main educational aims were achieved at a high degree, the promotion of communication skills and the acknowledgement of other countries' ethics in the context of multicultural education. Information Communication Technology consultants provided efficient support to teachers in their attempt to use Information Technology in the teaching/learning process. They offered support by visiting schools, organising lessons and offered guidance with ideas and activities. Their involvement was of great help in challenging teachers to use the new technologies in education. The Pedagogical Institute has also organised a number of in-service training courses for teachers regarding the introduction of Information Communication Technology in all types of schools.

3.2.3 Relevant data

Cyprus ranks first among the countries participating in NEMED in terms of public expenditure for primary education, exceeding more than 1.5 times the EU's average (*table 2*). In terms of pupils/teacher ratio Cyprus once again ranks first, meaning that, in average, a teacher has to handle quite a lot of students in his class. This is due to the way the Cypriot Ministry of Education divides classes and appoints teachers to them (see section 3.2.1).

Even though in the whole educational system of Cyprus the number of computers per 100 pupils ratio exceeds the EU's average, in primary education the situation is not that good. There is not a significant difference with the EU's average on the subject of the number of schools with computers and Internet connection. Major deviations appear examining the number of schools which are connected to the Internet via a broadband connection. Primary as well as rural schools are well under the EU's average. This also holds true for all schools in Cyprus, meaning that high-speed Internet connections are scarce (*table 3*). Overall, this seems to be

the major problem regarding ICT's integration in Cypriot schools. In addition, it seems that provision for the maintenance of the existing infrastructure is not among schools' priorities.

There is a number of indicators that can be used in order to determine the extend ICT is used in schools. Primary and rural schools are behind the EU and Cypriot average regarding the existence of a school's website. On the other hand, e-mail seems to be used to a great extend by teachers in rural schools, leading to the logical assumption that it is a widespread means of communication in remote areas. This also holds true for students in rural areas. A disappointing low number of students use e-mail in primary schools and in urban areas (*table 4*).

Another group of indicators determining the extend ICT is used in schools is the regularity of usage from teachers and students. Interestingly enough, PCs are used by primary school teachers and by teachers in rural areas quite extensively (*table 5*). Figures on the extend students are using PCs in classrooms are not lacking far behind the EU's average, but there is room for further improvement. The main problem seems to be concentrated in rural schools, but cannot be attributed (ερμηνευτεί?) to lack of adequate number of computers (see *table 3*). It seems that teachers regardless their age and teaching experience use to the same extend computers in their lessons with the exception of teachers with over 20 years of previous service. A logical assumption is that they are less familiarised with ICT.

Cypriot teachers seem to have no problems regarding the availability and access to sources of educational material either from established educational institutions or from off-line sources (i.e. CDs) (*table 6*).

About half of the Cypriot teachers complain that their schools lack an adequate number of computers, a percentage close to the EU's average, but also the highest among NEMED's countries. It seems that they are quite content regarding the availability of educational material, especially in their native language. They also seem to be quite confident about their ICT skills and that they clearly understand the benefits of ICT's integration in education. Lack of interest in ICT is not an inhibitory factor (*table 7*).

Pupils/teacher ratio in primary education	19/1
Public expenditure for primary education as % of GDP	1.89

Table 2: Pupil/teacher ratio and public expenditure in primary education in Cyprus

	Total EU25	Total CY	Primary	Urban	Rural
Computers/100 pupils	11.3	12.4	7.3	12.9	11.3
Schools with computers (%)	98.7	99	98	97.9	100
Schools Internet connected (%)	96.2	95	94	90.3	100
Schools with broadband connection (%)	66.9	31	14.3	40.7	20.6
Maintenance contract (%)	47.1	33.3	30.1	27.7	39.4

Table 3: ICT equipment in Cypriot schools

	Total EU25	Total CY	Primary	Urban	Rural
Schools with websites (%)	63	50.9	34	61.85	39.3
E-mail for the majority of teachers (%)	65.2	49.1	45.1	38.3	60.5
E-mail for the majority of students (%)	23.5	6.9	2.5	3.8	10.2

Table 4: Websites and e-mail addresses in Cypriot schools

	Total EU25	Total CY	Primary	Urban	Rural	Teaching experience (years)			
						<5	5-9	10-19	20+
Used PC in class the last 12 months (%)	74.3	75	87.2	70.9	81.1	75.2	79.4	78.1	60.3
Pupils use PCs in class (%)	66.3	50.9	61.3	53.1	48.8	44.9	49.2	60.5	40.1

Table 5: PC usage by teachers and students in Cyprus

	Total EU25	Total CY	Primary	Urban	Rural
On-line educational sources (%)	74.2	80.3	82.7	80	81.7
Off-line material (%)	83	84.3	85.8	82.7	87.7

Table 6: Sources of electronic educational material used in class in Cyprus

	Total EU25	Total CY	Primary	Urban	Rural
Lack of computers (%)	48.8	57.2	49.1	58.7	48.8
Lack of material (%)	20.3	20.5	12	24	11.2
Lack of material in national language (%)	8.6	2.8	2	1.7	1.1
Lack of skills (%)	22.5	14	12	15.6	10.5
Unclear benefits (%)	16.2	0.5	0	0.9	0
Lack of interest (%)	8.9	4.7	8.9	2.9	8.3

Table 7: Barriers of ICT integration in Cypriot schools

3.3 Finland

3.3.1 Overview of the Finnish multigrade schools

Finland is a very sparsely populated country with only 15-17 inhabitants per kilometre. Finland is also the most country side state in Europe concerning the amount of people living in countryside. So there are plenty of small villages and in distance from each other. The social meaning of multigrade school is based on regional politics in Finland and in people's attachment to their home villages. About 30% of Finnish schools are multigrade schools, only 7% of school age children go to multigrade schools and 19% of the junior school teachers are working in multigrade schools. In many villages multigrade schools are the cultural centre of the village. There is the same phenomenon as in many European countries: some people want and most of them have to leave their home regions for employment and for "a better life". Decrease in birth rate and municipalities' financial problems affect drastically on the situation of multigrade schools. 25% of the multigrade schools have been closed since 1996. Some children suffering from severe behavioural problems or problems in concentration have been successfully integrated in multigrade schools. This has been evaluated as the cheapest way (treating children in multigrade schools) for the society.

Multigrade schools are small with only two to three teachers in each. So teachers work is very demanding and professionally isolated. They have only few colleagues to share pedagogical ideas, problems and materials with. Most of newly qualified teachers will return to their home villages and work as multigrade teachers until their retirement. Only in the circumstances of the teacher training departments one can see multigrade schools as a short period in some teachers' professional life span. So the multigrade teachers need contacts and professional networks.

Multigrade schools are seen by their defenders as a basic human right of a children: to go to school near her or his home. The years of childhood should be safe. The education developed in multigrade schools have also been applied to large schools as so called "grade free teaching" where pupils are grouped not by their age but by their capabilities, interests and potentials. So the multigrade teaching is - though demanding - also modern way of teaching and very safe for our children.

A basic method, which is quite often used for multigrade teaching in Finland, is changing of the working periods. One group/class works while the teacher teaches the other group/class. The teacher needs peace and quiet in the classroom in order to teach properly. This method of changing periods during the lessons is an old and famous one, but nowadays also other methods are becoming more popular. The new teacher generation is capable and willing to use different methods for learning.

3.3.2 Overview of ICT in Finnish educational system

In Finland there have been a lot of efforts to develop ICT. Depending on the municipality and a part of the country there has been developing projects building the infrastructure and using the network to support the pedagogical needs.

The new national strategy (2004 – 2006) includes four segments: computers for schools, school network development, teacher in-service training and teaching methods development. Schools are assumed to have their own ICT strategy as a part of their local curriculum. The student to computer ratio is 8 to 1. All schools have access to the Internet and most of them have a high speed network

connection (54% of the primary schools). The National Virtual School is under development.

Schools (also small multigrade schools) in Finland have a quite good ICT infrastructure. There are personal computer/computers in almost every classroom. There are also data projectors and some schools have video-conferencing equipment. Pupils are basically very active with computers and they like to use them. Most of the teachers are getting along well with computers, but there is a constant need for updating the skills.

The Information Society programme will be successful only if the necessary infrastructure in educational institutions is further improved. Its most important elements are ICT equipment, information networks, software and the related support services. Since 1996, the National Board of Education has helped providers of education and training services to construct information networks and with the purchasing of computers. All Finnish educational institutions are already linked to information networks.

The Finnish Ministry of Education launched a program called OPE.FI in order to improve the ICT-skills of the in-service teachers and teaching personnel. These skills have been divided in three different phases:

1. Level I, basic technical skills to use ICT, 100 % of teachers by the year 2004
2. Level II, pedagogical skills, 50 % of teachers by the year 2004
3. Level III, special skills, and 10 % of teachers by the year 2004.

The first level covers the basic mastering of ICT-tools and it is extremely important for the equal standards in teaching the younger pupils. Their basic knowledge of ICT must not be different depending on the region teachers live or the dexterities they have in ICT. Level one is organized as peer-to-peer learning. Now after this programme has come to end there is new target to build a mentor-system to every part (municipality level) in Finland. These mentors will help the use of ICT for pedagogical purposes.

The aim by the year 2007 is for all those completing

their studies to be given the opportunity to obtain the basic skills and knowledge required in an information society; for at least 75% of teachers to have the skills to use ICT in teaching, and for on-line instruction to be well-established. In line with the programme, measures have already been carried out to develop on-line instruction at all levels of education, increase broadband connections at schools and provide teachers with continuing professional education.

ITC should come along as a natural part of the whole learning process. As educational software continues to develop, it also brings new aspects for learning. In Finland the software publishers are selling software which works in a www platform and can be used independently. These programmes include almost every school subject and pupils can do projects and of course save all the material they have produced. It is also possible to do their homework. For multigrade schools these programmes can be very useful.

Teachers are also using programmes which are suitable for specific needs, for instance mother tongue and mathematics. There is also a number of innovative projects in Finland targeting to create a model that links central and multigrade schools. In this model teaching -for instance special subjects- can be conducted partially from the central and partially from the multigrade school.

The national curriculum is an open framework which gives guidelines to local (municipal or school based) curricular work. The national curriculum is more goal -than content- oriented. A cross-curricular approach has been adopted and ICT is integrated into almost all subjects, with teachers using their own discretion as to when ICT can really contribute to learning content and process. Finnish school curricula require that all pupils are provided with basic skills in information technology. It is not, however, a separate subject, but the main principle is rather to provide tuition integrated with other subjects. Elective or voluntary courses for acquiring skills in the use of computers may also be offered to students in secondary, upper secondary schools and in vocational institutes. According to 2000-2004 strategy, the local information and communication technology strategies in education will have been integrated into curricula. Towards the end of the strategy period, media literacy will be-

come a part of general education.

The national curriculum leaves open how to implement ICT. Except in certain subjects, like in the native language, it is stated what kind of skills must be achieved and how ICT is used (like text typing and process writing). There are recommendations about pedagogical and technical support. There should be, ideally, one technical support person per 50 computers. All educational institutions are to draw up an information strategy for their organisation by the year 2003. These include plans and visions for infrastructure, competence building, content and pedagogical use of ICT. This has initiated a lot of local planning in this area. Targets of students' competencies must be clarified in local school curricula. The national framework curriculum only states the basic skills in using computers and software. Moreover, schools can decide which educational software to use.

Some municipalities, cities (for instance Helsinki) and schools have adapted computer driving license systems, but this is not required by the national curriculum. There is a national Computer Driving License initiative by TIEKE, the Finnish Information Society Centre that is open for all citizens to acquire computer skills.

In the national Virtual School Project more than thousand schools from all levels explore new ways of teaching on-line and using ICT in education. This project encompasses hundreds of local and regional thematic networks and projects that each develops the virtual school concept in their own way.

3.3.3 Relevant data

Finland exceeds the EU's average on the subject of public expenditure for primary education as percentage of GDP. It is also slightly above the average in pupils/teacher ratio (table 8).

Finland is among the countries where ICT -in terms of equipment and infrastructure- is very well developed. All schools are equipped with computers and connected to the Internet. It ranks second between the NEMED's countries (UK is first) in computers/100 pupils ratio. An interesting obser-

vation is that this ratio drops sharply in primary schools, although still above EU's average (table 9). This is a sign that further improvements in this area are possible. Broadband connections seem to be a common place. Maintenance of the ICT infrastructure might be a problem in rural areas, possibly due to country's harsh climatic conditions and thin population distribution.

Thin population distribution also maximises the need for extensive use of communication tools. Almost all teachers have an e-mail address and the vast majority of schools have websites (table 10). Contrarily of what would be expected, primary school students and students in rural areas seem to use e-mail far less than their counterparts in urban areas.

The high degree of ICT's integration into the Finnish curriculum is also verified by the extensive use of PCs -from teachers and students alike- during lessons (table 11). The above statement is also confirmed by observing the even distribution of usage among teachers of various years of teaching experience.

Finnish teachers seem to have no problems regarding the availability and access to on-line sources of educational material from established educational institutions. Off-line sources seem to be less available than expected, especially in urban areas (table 12).

As colleagues from other countries do, about half of Finnish teachers complain that there is not an adequate number of available computers in their schools. They also seem to be very satisfied with the available educational material in their native language (table 13). It would be expected that in a country in which ICT is used extensively, teachers would also have the appropriate ICT skills well developed. Contrary to that, the statement "lack of skills" as a barrier in using ICT in education is slightly above the EU's average and doubles when it comes to urban teachers.

Another interesting fact is that Finnish teachers are quite sceptical regarding the benefits that ICT brings to education. The corresponding percentage is well above EU's average and more than double compared to that of Spanish teachers who come second (among teachers from NEMED's coun-

tries). Once again, teachers from urban areas are more reserved than their colleagues from other areas. Finnish teachers are also the ones that expressed the less interest in ICT. The reasons for

which teachers from a well developed country in ICT are lacking interest in its use and uncertain of its benefits in education, certainly calls for further investigation.

Pupils/teacher ratio in primary education	16/1
Public expenditure for primary education as % of GDP	1.34

Table 8: Pupil/teacher ratio and public expenditure in primary education in Finland

	Total EU25	Total FI	Primary	Urban	Rural
Computers/100 pupils	11.3	16.8	12.2	16.9	16.7
Schools with computers (%)	98.7	100	100	100	100
Schools Internet connected (%)	96.2	99.7	100	100	99.6
Schools with broadband connection (%)	66.9	89.9	87	95.7	87.9
Maintenance contract (%)	47.1	35.5	33.4	44.1	32.6

Table 9: ICT equipment in Finnish schools

	Total EU25	Total FI	Primary	Urban	Rural
Schools with websites (%)	63	86.1	81.6	97.2	87.9
E-mail for the majority of teachers (%)	65.2	95	93.5	95.6	94.8
E-mail for the majority of students (%)	23.5	33.2	26.5	60.8	23.7

Table 10: Websites and e-mail addresses in Finnish schools

	Total EU25	Total FI	Primary	Urban	Rural	Teaching experience (years)			
						<5	5-9	10-19	20+
Used PC in class the last 12 months (%)	74.3	85.1	88	79.7	86.3	86.5	83.8	82.9	87.2
Pupils use PCs in class (%)	66.3	78.8	82	69.8	80	80.7	75.4	78.5	80.1

Table 11: PC usage by teachers and students in Finland

	Total EU25	Total FI	Primary	Urban	Rural
On-line educational sources (%)	74.2	77.7	81.6	83.2	77.3
Off-line material (%)	83	70.7	74.2	60.7	72.7

Table 12: Sources of electronic educational material used in class in Finland

	Total EU25	Total FI	Primary	Urban	Rural
Lack of computers (%)	48.8	47.6	51	37.8	47.9
Lack of material (%)	20.3	18.8	18.3	25.8	18
Lack of material in national language (%)	8.6	1	0	0	1.4
Lack of skills (%)	22.5	24.2	28.5	44.3	18.6
Unclear benefits (%)	16.2	24.2	25.6	34.2	22.3
Lack of interest (%)	8.9	13.5	15.6	15.1	14.1

Table 13: Barriers of ICT integration in Finnish schools

3.4 Greece

3.4.1 Overview of the Greek multigrade schools

In Greece multigrade schools are usually found in isolated rural areas, in small islands and in villages with rather shrunk population. Multigrade schools in Greece are a result of necessity rather than a pedagogical alternative practice. In their negative qualities often educational and research community mentions pressure of teaching time, non fair learning time per student compared to conventional schools, weakened antagonistic learning environment, absence of specialized teaching stuff (on music, foreign languages, sports, ICT, arts etc). But there is a range of positive qualities that have to be pointed out, such as more coherent relations between students and teacher, faster and more effective socialization, stronger bonds with the local community, development of self adjustment and self-learning skills, adaptability on a more demanding environment.

The reasons why multigrade schools can not be abolished is multiple and multi-rational: social reasons demand that population will be kept on its position and further expansion of urban centers will be avoided. Pedagogical reasons demand that students will avoid the trouble of daily long routes to more central schools, losing valuable time. The current trends in Greece regarding multigrade schools' possible evolution are:

1. Abolishment when there is no further local population of school age.
2. Merge of two multigrade schools.
3. Merge of a multigrade school and the closest monograde school.
4. Reduction of multigrade school into a multigrade school with less teachers appointed, due

to the recession of students' number.

5. Upgrade of multigrade school (=more teachers appointed in school which results to improvement of the ratio "teacher per grades) due to students' number augmentation

From a total of approximately 5800 primary education schools in Greece, 2558 are multigrade, meaning that they function with less than six appointed teachers per school (whereas there are six grades: grade A =7 years old students, grade B=8 years old students, Grade C=9 years old students grade D=10 years old students grade E=11 years old students grade F=12 years old students). More than 1300 schools function with less than 20 students as a total number of all grades. In percentage, 40% of primary schools in Greece are multigrade. There is a legislated way of grades division per teacher in multigrade schools (table 14):

Type of school	Grades division
1 teacher school	Teaches all six grades (A,B,C,D,E,F)
2 teacher school	1st Teacher teaches A+C+D 2nd teacher teaches B+E+F
3 teacher school	1st Teacher teaches A+B 2nd teacher teaches C+D 3rd teacher teaches E+F

Type of school	Grades division
4 teacher school	1st Teacher teaches A 2nd teacher teaches B 3rd teacher teaches C+D 4th teacher teaches E+F
5 teacher school	1st Teacher teaches A 2nd teacher teaches B 3rd teacher teaches C+D 4th teacher teaches E 5th teacher teaches F

Table 14: Grades division in multigrade schools

Of course the above are directly correlated to the number of students per grade. For example if there are only 10 students studying in A grade and 10 in grade B, while there are only 2 students in grade C and 2 in grade D a division A+B for first teacher and C+D for second teacher would not be feasible.

Important parameters

The commodities and equipment of the multigrade schools are regularly deteriorated to the ones of conventional schools: they often lack devices that facilitate the administration of the school (fax, computer, Internet) and devices that contribute to the teaching methods (video, photocopier, slides/transparencies projector, maps, educational software, libraries). In some occasions even furniture and services such as heating or plumbing are in bad shape.

The most common profile of the teachers working in multi grade schools is one of a young, inexperienced and freshly appointed teacher. In Greece there is a point system according to the areas the school lays. The most distant a school is the most points a teacher gains. So, a newly appointed teacher will preferably go to a distant multigrade school, so that he/she will quickly attain points to keenly acclaim a position in an urban school.

There are no specially designed multigrade school books. Multigrade school's teacher teaches the same books that are taught in conventional schools, in other words, ministry of education has not produced specially designed books to copy with the special needs and conditions of multigrade schools.

There is no specially organized multigrade curriculum. In a multigrade school, curriculum follows the conventional school curriculum with changes as far as teaching time available for each subject is concerned. That means that multigrade teachers teach the same objects as in a monograde school with the differentiation of the parameter of week time per subject.

Synchronous teaching of more than one grade. What gives the quintessence of a multigrade class is the coexistence of more than one grade (of both age and level) in the same class. So, a multigrade teacher is expected to address his/her teach-

ing to more than one grade at the same time. In that way, there are two viable conditions that may be produced: one is the synchronous teaching of more than one grade. In that way, a teacher treats all grades that he co-teaches as one homogeneous grade.

A contradiction between terms

Greek multigrade schools are titled "monograde" which is the exact opposite term than the international one. That contradiction is the result of the perspective used to name this type of schools: Greeks count number of teachers teaching in a school. If only one teacher teaches (all six grades, or the ones available), that is a "one-teacher-school", that is a monograde. For two, three, four or five teacher appointed in one school to cover all six grades, school is called two-grade, three-grade, four grade and five-grade school respectively, always referring to the number of teachers. All schools occupying less than six teachers are generally called "oligothessia" which could be translated as "few-grades" school. A conventional school (with one teacher for each grade) is called a "polythessia", pointing out that there are many teachers appointed (*table 15*).

On the other hand, common international perspective to name multigrade schools is to count present grades within a class and under the teaching of one teacher alone. It is important to underline here that in Greece the equivalent of the term "multigrade" is approached with the number of teachers per school. Not the number of levels per classroom.

3.4.2 Overview of ICT in Greek educational system

Little attention has been given to the introduction of ICT in primary education from the part of the Greek Ministry of Education. In the meantime, many primary schools have been equipped with computers through parent and teacher initiatives or through other Local, National or European projects. The situation in the primary schools is changing rapidly from day to day as there is great desire at the local level (municipalities, school districts, school principles, teachers, parents, and of course the students themselves) to use ICT in education.

As a result, there are many motivated teachers, mostly on their own and without support from the Ministry, who try to use ICT in various ways.

The most common uses of ICT in primary schools today are the following: (a) use of mostly drill and practice software to help in the teaching of the Greek language, mathematics, geography and history; (b) use of Logo in mathematics and geometry, (c) use of the Internet for finding of information usually in the context of projects dealing with the local history and culture or with the environment; (d) the creation of school web pages and school newspapers.

Even though an organised scheme for equipping primary schools with PCs on a national scale does not exist, nevertheless, the Greek compulsory education curricula recognises the importance of ICT and the role it should play. ICT is not seen only as a separate subject of study, absolutely necessary today for the students' technological literacy, but also as a multi-tool: cognitive teaching, information seeking, communicating knowledge etc.

The theoretical model adopted, for introducing ICT in lower secondary education, is characterized by the teaching of an "informatics" course and the gradual use of computational and networking technologies as a means to support the cognitive process for all subjects of the programme of study. It was recently recognized however that in reality, in every day school life, ICT is present solely as a separate subject in its own right (not as a tool for other subjects).

The skills intended to be developed in the frame of the Informatics course extend beyond what might be considered as basic computer skills as the curriculum calls for use of applications and the use of the Internet. It should be noted that for a variety of reasons (mainly concerned with issues of infrastructure) in many instances (schools) what is offered to pupils is much less than prescribed by the curricular structure.

In terms of curriculum issues the on-going reforms and topics of debate in education in Greece concentrate on:

- ICTs Integration in Education: Reformation and expansion of computer labs in school units

- Computer support of teaching
- Expansion of the existing Pan-Hellenic School Network
- Teachers initial and in-service training.

In qualitative terms the reform aims at the evolution of new teaching methods with emphasis on developing the student's critical abilities, reinforcing self-reliance, and promoting skills for independent study. In quantitative terms the aims intent on the:

- Expansion of curricula.
- Improvement of the students to computer ratio in schools

The Single Framework for Curricula, implies that upon completing compulsory education and in relation to ICT the student should be in a position to:

- explain basic notions and terminology of Informatics (i.e. data, information, coding, data handling, file, save, programme, software, system software etc)
- describe the operation of the more importance/basic computer units
- explain basic notions and basic terminology of current (up-to-date) communication (network) and multimedia technology
- use with ease a computer system (graphical communication environment)
- use basic application programmes for writing and communicating, designing, drawing, modelling, as well as searching-collecting-treating-presenting and transmitting information etc.
- use the World Wide Web and utilize the services provided
- solve simple problems in a programming environment
- discuss and follow the technological development and recognize consequences in different sectors of human activity

Latest developments in relation to key competencies

A project to introduce ICT and improve computer literacy was launched in primary schools in 2004. In its initial stage, schools were asked to state their needs regarding the supply of personal computers and the retraining of teaching staff in this field. At the same time, considerable effort is being devoted to editing software programmes in Greek and (re) training teachers in ICT. A pilot scheme involving a certain number of pre-primary, primary and lower secondary schools is testing the introduction of a "flexible zone" into the school timetable. This scheme sets aside two to four lessons a week for cross-curricular activities. In primary education, the zone is meant to promote initiative, cooperation and critical thinking, etc. The main aim is to develop communication competence (speaking, listening, reading, writing, ability to argue logically, interactive communication), skill in using figures and mathematical concepts, the responsible use of ICT, cooperation, the skill needed to improve individual performance, problem-solving, rational decision-making, resource management, health protection, inventiveness, artistic judgment, the expression of personal opinions, social skills and others.

Unfortunately, the reality is that only a very small minority of teachers have received training on the integration of ICTs in the curriculum. What is also alarming is that almost half of the teachers have never used computers in the past. Overall, most teachers rate their capacity to use e-mail, the Internet and their skills to integrate it into their teaching as "low" or "medium". Understandably enough, the large majority teachers feel that they need more training on computers and on how to integrate ICTs into their teaching.

It is encouraging to note that teachers hold positive beliefs regarding ICTs, their utility and effectiveness for learning, as well as their wider educational implications. Teachers working in schools with computer labs and especially the younger teachers in such schools hold more positive views than teachers who work in schools without computer labs or are older in age

3.4.3 Relevant data

In Greece, the minute pupils to teacher ratio in

primary education (12/1) can be interpreted if one takes under consideration the large number of the existing small multigrade schools (see section 6.3.1). Also, Greece ranks last among NEMED's participating countries regarding the public expenditure for primary education as percentage of GDP (table 17).

Although it seems that all Greek schools have computers and the vast majority of them are connected to the Internet, the ratio of computers per 100 students is the second worst among NEMED's countries, the worst in primary education and far behind EU's average. The situation seems a little better in rural schools, not because they are better equipped, but because fewer students have to share an anyhow small number of computers. Dissatisfying are also the figures regarding broadband connectivity. In reality, broadband connection of rural schools is nearly non-existent because this type of Internet access is available only in Greece's urban centers and their neighbouring areas (table 18).

As mentioned in section 6.3.2, ICT is not yet part of primary school education but still on its early stages of implementation. As a result, one can expect figures indicating the extent of ICT usage in this level of education to be on the low side (table 19). Unfortunately this holds true not just for primary schools but for secondary as well. It is worth mentioning that ICT was introduced in secondary education at least ten years ago. This fact implies that there is a general fault in Greece's educational system regarding the use of ICT.

The extremely low degree of ICT's integration into the Greek curriculum is also verified by the diminished use of PCs -from teachers and students alike-during lessons (table 20). As expected, the older the teachers are, the less likely to use ICT tools in their lessons.

Knowing that ICT is not playing an important role in Greek education a logical assumption would be that there are also few educational resources either on or off-line. One would also expect Greek teachers not to be content with the situation. Contrary to the above, Greek teachers seem to be satisfied with what is available to them (table 21).

Greek teachers are well aware of the benefits ICT brings to education and are highly interested in us-

ing it (table 22). Lack of material in Greek language does not seem to be a problem. On the other hand, they complain that their schools lack an adequate number of computers with a percentage close to the EU's average, but also the second highest among

NEMED's countries. According to the opinion that Greek teachers expressed, an important barrier in ICT's implementation in education is their own lack of the appropriate skills. The relevant indicator is the highest among NEMED's countries.

School type	Number of teachers/school	Average number of students/teacher
1/grade	1	8,3
2/grade	2	10,8
3/grade	3	9,2
4/grade	4	8,0
5/grade	5	
6/grade	6	11,6

Table 15: Terms used for multigrade schools

Statistics:

Total Number of schools in Greece						5.881
Total Number of multigrade Schools						2.558
Percentage of Multigrade schools in Greece						43,5 %
Grades in school (depended on the number of teachers per school)	1/grade	2/grade	3/grade	4/grade	5/grade	
Schools	935	871	534	138	80	
Number of teachers	935	1,742	1,602	562	400	
Number of students	8,187	22,247	19,534	7,602	4,127	

Table 16: Statistical data regarding multigrade schools (2005)

Pupils/teacher ratio in primary education	12/1
Public expenditure for primary education as % of GDP	1

Table 17: Pupil/teacher ratio and public expenditure in primary education in Greece

	Total EU25	Total EL	Primary	Urban	Rural
Computers/100 pupils	11.3	6.5	4.8	5.9	8.3
Schools with computers (%)	98.7	100	100	100	100
Schools Internet connected (%)	96.2	96.6	95	98.6	92.9
Schools with broadband connection (%)	66.9	13.2	7.8	15.9	6.7
Maintenance contract (%)	47.1	43.9	39.9	49.6	37.8

Table 18: ICT equipment in Greek schools

	Total EU25	Total EL	Primary	Urban	Rural
Schools with websites (%)	63	36.8	28.1	42.7	25.5
E-mail for the majority of teachers (%)	65.2	44.2	46.5	37.7	47.6
E-mail for the majority of students (%)	23.5	6.1	5	7.1	5.1

Table 19: Websites and e-mail addresses in Greek schools

	Total EU25	Total EL	Primary	Urban	Rural	Teaching experience (years)			
						<5	5-9	10-19	20+
Used PC in class the last 12 months (%)	74.3	35.6	32.8	32.4	37.3	49.6	44.3	41.9	26.3
Pupils use PCs in class (%)	66.3	23.1	19.6	23.1	21.4	32.7	26.5	28.6	17

Table 20: PC usage by teachers and students in Greece

	Total EU25	Total EL	Primary	Urban	Rural
On-line educational sources (%)	74.2	68.1	71.6	65.9	70.5
Off-line material (%)	83	82.9	88.3	81.1	84.4

Table 21: Sources of electronic educational material used in class in Greece

	Total EU25	Total EL	Primary	Urban	Rural
Lack of computers (%)	48.8	49.5	53.4	54.3	42.6
Lack of material (%)	20.3	16.7	16.4	17.1	17.8
Lack of material in national language (%)	8.6	4	3.5	2.3	5.6
Lack of skills (%)	22.5	31.7	31.5	30.9	34.2
Unclear benefits (%)	16.2	3.4	3.2	2.9	3.3
Lack of interest (%)	8.9	5.3	5.3	6.1	3.3

Table 22: Barriers of ICT integration in Greek schools

3.5 Hungary

3.5.1 Overview of the Hungarian multigrade schools

More than 20% less children were born since 1983 (127,000) until 1998 (97,000) with a linear decreasing. Since 1998 the number of newborns was stagnating around 95-97,000/year until today. In 2004 was the first year when less than 100,000 kids entered primary education and the declination of pupils in primary education will continue for 8 years until 2012 at least.

Since 1994, when it peaked at 4,010, the number of primary schools decreased to 3748 in 2004. Until 2012 more than 500 school close-downs can be expected. In secondary and vocational education this declination appears 8 years later than in the primary education. Since 1998, the number of students per school and per teacher has also decreased, which has led to the intensification of efficiency problems in the system. The ratio of schools with fewer than 100 pupils decreased, while that of larger schools slightly increased. At the same time, the average class size decreased in all sizes of schools in the period under review.

Decrease in the number of school age children also influenced multigrade schools where student population is traditionally very low. The numbers of students in several schools fell beyond the critical “close down level” and are actually doomed to closure in 2007.

Since the end of 1990s the financial difficulties of local authorities are dramatically increased, so a lot of small authorities are not able to support their schools. Regarding information of most recent survey (2004), there are 3115 primary schools (Grade 1-4) in Hungary. 451 of them are part -or full- multigraded educational institutions, and 177 of them are full-multigraded schools (table 23).

3.5.2 Overview of ICT in Hungarian educational system

Computers appeared in schools in the early seventies but they were used to teach programming at that time. A new phase started with the national school informatization programme launched in the early 1980s at the same time as personal computers appeared. In this period groups of teachers committed to ICT use in schools developed. In some schools, computing as a subject appeared in the curriculum, and through the appearance of the Internet (especially the World Wide Web) the PC became an effective communication tool, representing a breakthrough in ICT use. The most intensive phase of hardware development occurred between 1995 and 1997 when the World Bank and the European Union programme PHARE launched big projects in the country. Far beyond just the purchase of up-to-date technology, these projects resulted in a fundamental modernization of vocational education and the development of distance education.

After the first wave of introducing informatics to schools in the 1980s, an extensive project was launched by the Ministry of Education in 1996-97 with the aim of giving schools access to the Internet. After much debate, informatics has been designated an integral part of the National Core Curriculum and became a compulsory subject in 1998. It is taught in both primary and secondary schools for two periods of 45 minutes per week (on average) from age 12 to 17.

Hungarian Schoolnet, the ICT agency of the Hungarian Ministry of Education was set up in 1996 to promote the use of ICT in schools through the provision of Internet access, PC labs and Hungarian language digital content suited to the National Core Curriculum. The computerisation of Hungarian schools, a major national investment,

was backed by international grants. The Schoolnet development strategy has focused on secondary schools, and primary level of education has been a second priority. As a result of this development, all secondary schools and about 60 per cent of elementary schools are now connected to the Internet. At present, only one in every five computers in primary schools is connected to the Net. The other factor is the lack of a competent labour force, especially system managers. At present, in about 85 per cent of secondary schools and 50 per cent of primary schools, an independent systems operator is employed. Employing a small local company for PC maintenance is becoming a general practice. In most multigrade schools, however, low budget prevents any form of assistance, a great obstacle for regular ICT use.

Educational material

Nowadays emphasis shifted from infrastructure to content management. The first version of the Hungarian knowledge repository, called SDT (Sulinet Digitális Tudásbázis/Schoolnet Digital Knowledge Base) was released in December 2004. This educational portal is one of the largest in Europe. In the repository all the assets are stored one by one, have their own metadata and are searchable. A lot of these multimedia assets are in collections, others in sessions but all can be used without other assets in new contexts. The system had more than 100,000 pictures in the end of 2006; this is the most numerous asset types in the repository. The next one is the test item, but the most popular ones are the animations/simulations (22,740) and the movies (8,206) and thousands of text pages. SDT functions as a Learning Management System (LCMS) and helps teacher's store find and edit digital learning resources based on the concept of reusability. All digital learning materials (LOs) are developed and stored by single elements so that they can be used in countless different contexts. A relatively big and rich pool of digital resources developed between 1998 and 2003 was not transferable to this repository, because the concept of reusability was not applied then. This material is stored in a separate database and both repositories are freely accessible and their materials may be used for educational purposes for everyone all over the world without logging in.

Educational material is developed voluntarily by

teachers using the system or through tenders. New tenders were published, national and international best practice have been being collected and translated under the umbrella of the Hungarian National Development Plan (NDP). All the main subjects have been covered with LOs for levels 1-6, and the material is being tested now. The state also bought and localized digital material from abroad and made them available in the same system, like the Sunflower's simulations in science. This phase started in 2005 and in the field of education has the value of 6.5 million Euros in three years. A valuable addition to the repository is its connection to our National Digital Data Archive in 2004. This institute controls and leads the national digitalization program. The collections that have already been digitalized are freely accessible from SDT. A ministry order was published in 2004 defining the system for declaring books to be officially approved. This order also applies for the digital learning resources, although the criteria of selecting and approving CD-ROMs and online materials are under development.

Teachers use SDT mostly offline to adapt and add to learning assets and include them in their teaching sessions. Smooth download, however, requires broadband or limitless Internet access, therefore the next step in the development of ICT use, the extension of broadband service to all Hungarian schools, will mean increased usability for the database. When teachers decide to modify existing resources or to create new ones they can choose to keep them for their pupils or might want to publicize them so that anyone can see and use them. In the last case the materials undergoes certain professional verification process. Within the framework of the National Development Plan I (2005-2007) both the learning content management system and the content development continued with European financial support. As a result of this development period, a Content Editor module has been developed and is being tested by teachers. It has a graph editor that provides the visualization of the structure of the material, even for drawing the concept map. Among the many new features there is an in-built test editor, a teacher presentation editor, metadata editor; an offline player. The user interface has also been redesigned. The Editor is a complex tool that needs training and is not public yet. From September 2007, training courses will accompany its introduction. This feature will make SDT a truly

interactive educational resource both for teachers and students.

According to developers, the learning materials, resources stored in SDT should be “pedagogy-independent”, but contain help and ideas for teachers and learners. Pedagogical advice attached frequently suggests the collaborative use of resources and try to help the shift from teaching to learning. This type of “pedagogical help” is not to be found either in national or in international online repositories, so SDT developers had to find out what the teachers would appreciate as help. A later usability study pointed out that there are six elements that might be useful for orientation: (1) general introduction, (2) technical requirements, (3) previous knowledge needed, keywords, (4) task sheets, additional resources, links, (5) activities, organization of work, differentiation (6) methods of evaluation. This study showed that teachers need longer, more detailed and much more structured pedagogical help for resources than those already stored in the system.

Infrastructure

Although there are approximately 180,000 PCs in Hungarian schools, only about 50,000 of them are Pentium III, equivalent or better, other PCs are older than 6 years and not even capable to run Windows XP or run multimedia applications. This means that the real ratio is 27 pupil/PC, which is the worst in the EU.

Multigraded schools are usually handicapped in Hungary regarding ICT-equipment and Internet-access. In Hungarian multigrade schools, 4-5 PCs are available for educational use as a minimum, but often they are not in use, or damaged. Some of the teachers are well educated in ICT, but they do not know how to use it in classrooms. Most of the teachers do not have basic ICT skills, never used it. It is a rare situation today for small schools to be able to provide students (or teachers) a broadband Internet connection and most of them have not Internet access at all.

In the frame of the 2nd National Development Plan, however, ambitious projects for the 21st Century School Flagship Programme has been formulated to roll out the results of the previous trial programmes. The 21st Century School Flagship Programme provides:

- physical school renovation
- support services for institutional changes
- teacher training, and digital content provision for rolling out the competence based education
- financial and consultancy support for institutional integration

The 21st Century School Flagship Programme (CSFP) is a complex programme, which is aiming to renew the education system according to the requirements of modern life and through competence based education which prepares pupils for life-long learning. The equipment and the appropriate infrastructure to support the acquirement of the basic skills of LLL and the labour market are provided by the Intelligent School Programme, which is a sub-programme of the 21st CSFP. The development of the ICT infrastructure can help to reduce school failure, the integration of SEN children, extending the potential of talented kids, and the acquirement of high quality and appropriate knowledge. Other goal of the programme is to make the educational system more transparent and effective and to set up an up-to-date measurement-assessment system. Major goals of the programme are:

1. Equally accessible ICT infrastructure throughout the educational institution system to support the acquirement of ICT skills
2. Supporting the competence based educational methodology
3. Supporting social and community services providing ICT infrastructure which can help to develop appropriate skills
4. Creating the infrastructure of digital measurement-assessment
5. Creating the electronic information system of the public educational administration
6. Supporting teachers’ pedagogical work
7. Supporting community building, content provisioning infrastructure

The requirements of ICT infrastructure development are:

Equal accessibility

1. Integrating existing infrastructure
2. Relying on local needs
3. Long lasting value stability
4. Low operating cost
5. Wide range of technical interoperability

Teachers training in ICT

In the early 1980s, teacher training programmes and in-service training courses were introduced in large numbers to satisfy the accelerating need for ICT educators. In 1982, a design contest for school computers was launched by the Hungarian Ministry of Education to equip a large number of (mostly secondary) schools with affordable and easy to use computers, complete with pedagogically valid educational programmes. However, the “home-computer” category was not really able to build into curriculum of other subject (because of tech lack of multimedia capabilities, and user-friendly interface). A third objective was also formulated but, unfortunately, not realized: to train teachers of different disciplines to use computers in their preparation and daily teaching practice. Today, the main problem for the dissemination of ICT-based educational methods is the inefficient level of teacher ICT competency and a lack of equipments in small schools.

In 1999, Hungary has adopted the Bologna process for higher education and reformulated degree requirements for teachers as well. All teaching degrees are now offered on Master level (3 years Bachelor level education in any of the sciences, arts or humanities followed by a 2-year Master course). Those Bachelor level students, who intend to continue their studies for a teaching degree, must take 10 credits of introductory courses in Education.

Basic training in ICT is also a compulsory part of every type of college or university degree program in Hungary, while ICT-supported teaching and learning methods may be acquired through optional courses during pre- and in-teacher training. Compulsory in-service training involves 120 hours course attendance once every 7 years.

The key issue in the dissemination of results of innovative projects and successful use of ICT in teaching and learning seems to be teacher training.

Hungary is among those countries where teachers are key agents of ICT-supported reforms. Infrastructure and availability of digital learning resources are important but only if teachers are able and ready to make optimal use of them. In order to provide high level, standardised and quality controlled in-service courses for teachers, large scale national initiatives (with the participation of the Hungarian Schoolnet) were launched and tens of thousands of teachers trained between 2000 and 2006.

In order to benefit from an international co-operation to ensure continuous development of in-service teacher training courses in ICT, Hungary joined the EPICT Consortium in 2005 (www.epict.org). EPICT -the European Pedagogical ICT Licence- is a comprehensive, flexible and efficient in-service training course introducing a European quality standard for the continued professional development of teachers in the pedagogical integration of information, media and communication technologies in education.

3.5.3 Relevant data

The pupils to teacher ratio is the smallest among NEMED's counties and can be explained by the decreasing birth rate in country (see section 6.4.1). Public expenditure in primary education is the second lowest but very close to EU's average (*table 24*).

The overall picture of ICT equipment and infrastructure is mixed. The vast majority of schools have computers which are connected to the Internet. There are fewer computers per 100 students compared to EU's average, especially in primary education and in rural areas. On the other hand, broadband connections are well above EU's average, the third better among NEMED's countries and even more widespread in urban areas (*table 25*).

The digital divide between urban and rural schools is even clearer when examining the number of schools with websites and the number of schools where the majority of students have e-mail addresses (*table 26*). The relevant figures from urban areas are well above EU's average, while the correspond-

ing ones from rural areas are well below.

The low degree of ICT's integration into the Hungarian educational system is confirmed by the extend teachers and students are using PCs during lessons. It is the second lowest among NEMED's countries and far behind the EU's average (table 27). It seems to be little variation of the above indicators among different teachers' ages, with the exception of the older ones who use PCs even less.

As to the quantity and quality of the available elec-

tronic educational material, Hungarian teachers are uniformly not very satisfied with the on-line sources from established educational institutions, compared with EU's average (table 28). The situation is somewhat better for the availability of off-line material.

Finally, examining the possible barriers regarding ICT's integration into the Hungarian education, according to teachers' point of view, none stands out with the exception of lack of computers which is around the EU's average (table 29).

No. Schools:	Part Multigrade	Full multigrade
3115	451 (14.5%)	177 (5.6%)

Table 23: Multigrade schools in Hungary

Pupils/teacher ratio in primary education	10/1
Public expenditure for primary education as % of GDP	1.045

Table 24: Pupil/teacher ratio and public expenditure in primary education in Hungary

	Total EU25	Total HU	Primary	Urban	Rural
Computers/100 pupils	11.3	9.6	6.8	10.4	8.9
Schools with computers (%)	98.7	97.3	96.7	98.4	95.8
Schools Internet connected (%)	96.2	96.1	95	96	94.7
Schools with broadband connection (%)	66.9	77.4	74.3	81.4	73.3
Maintenance contract (%)	47.1	40.2	40.4	42.3	40.7

Table 25: ICT equipment in Hungarian schools

	Total EU25	Total HU	Primary	Urban	Rural
Schools with websites (%)	63	55.6	44.4	80.2	40
E-mail for the majority of teachers (%)	65.2	42.8	34.9	51.8	38.9
E-mail for the majority of students (%)	23.5	26.3	20.5	34	17.5

Table 26: Websites and e-mail addresses in Hungarian schools

	Total	Total	Primary	Urban	Rural	Teaching experience (years)			
	EU25	HU				<5	5-9	10-19	20+
Used PC in class the last 12 months (%)	74.3	42.8	36.8	45.4	42.2	44.2	48.4	50.8	37.2
Pupils use PCs in class (%)	66.3	35.8	32.7	34.2	37.7	37.4	37.3	40.7	32.6

Table 27: PC usage by teachers and students in Hungary

	Total EU25	Total HU	Primary	Urban	Rural
On-line educational sources (%)	74.2	55.1	53.7	54.2	53.7
Off-line material (%)	83	72	73.9	68	74.5

Table 28: Sources of electronic educational material used in class in Hungary

	Total EU25	Total HU	Primary	Urban	Rural
Lack of computers (%)	48.8	48.5	50.7	52.9	45.9
Lack of material (%)	20.3	9.7	9.4	11.6	9
Lack of material in national language (%)	8.6	2.6	2.2	4.3	2.2
Lack of skills (%)	22.5	9.3	9.9	7.9	10.5
Unclear benefits (%)	16.2	7.3	6.5	10.9	6.4
Lack of interest (%)	8.9	3.4	3.4	5.1	3.5

Table 29: Barriers of ICT integration in Hungarian schools

3.6 Italy

3.6.1 Overview of the Italian multigrade schools

In Italy, the term “multilevel class” is used instead of “multigrade school”. Multilevel classes (pluriclassi) are primarily classes composed by pupils of different ages. Those multilevel classes can be set in Italy in order to guarantee the right of education to people having specific needs linked to a number of social, geographic, linguistic and health conditions that will be specified below. In this framework, multilevel classes were already set for linguistic minorities, for immigrants, and for handicapped pupils;

for improving the level of education of the prisoners; for adults not having the primary school certificate; for children in hospital; for pupils living on the mountains. The system of the multilevel classes has been further improved after the reform of education started in the late 90’s.

Multi-level schools in hospitals

A multilevel school can be set in the paediatric section of a hospital hosting few children. This school guarantees that children of different age and level of education continue to be educated, despite their inability to go to school.

Special schools

Special schools are created for providing education for handicapped people and/or for children having lower skills.

Immigrants

Multilevel classes are also organised for pupils immigrated in Italy from other European and non-European countries, in order to meet the need of improving their Italian language skills, while respecting their origins. These classes group no more than five pupils and their curricula should aim at their integration in the Italian society through teaching Italian culture and language, but also promoting language and culture of their country of origin. The laws regulating the immigration from non EU Countries provides teachers with a special support for dealing with pupils coming from different cultures. According to the law, multilevel classes should be created for helping the foreign pupils to integrate themselves, with the help of specialised experts (so called *mediatori culturali*). As a matter of fact, this kind of support is rarely properly put in practice and teachers complain that the children are not supported enough. In practice, foreign children learn Italian in regular classes and act as translators between their teachers and their non-speaking Italian parents.

Primary school classes for civilians and soldiers

Local authorities can also create primary courses for adults not having completed the primary school. Equally, multilevel schools are organised in barracks for soldiers not having completed the primary school.

Jails

Special classes are created in jails for prisoners not having completed the cycle of primary school and/or for training them and preparing them to get a job and integrate themselves back to society. Secondary school courses can also be organised on request of the jail to the Ministry of Education. According to the Italian law, each multilevel class cannot group more than twelve prisoners. This represents a problem in certain jails. For example, in a jail based in Rome, a multilevel class has been created for people than sixteen years of age and not having completed their cycle of primary school, but also 810 prisoners expressed interest in following the courses but there is no infrastructure and professors for setting

more classes.

Linguistic minorities

Several linguistic minorities are based in Italy. The biggest minorities live at the borders with France, Austria and Slovenia, in regions having a special form of autonomy due to the presence of these minorities. In such regions, i.e. Valle d'Aosta and Trentino Alto Adige, pupils are either educated in two languages -the national one and the minority one- or mainly educated in Italian, but the minority language represents a consistent part of their curricula. The linguistic minorities are officially recognised and protected by the Italian constitution

Since few years ago, other minorities such as the Greek or the Albanian where not given specific rights linked to the protection of their language. In late 90's some pressure for the protection of local traditions and languages came from European and international institutions. As a result, Act n. 482 "Norme in materia di minoranze linguistiche storiche" (Law concerning historical linguistic minorities), passed in 1999, recognised these minorities and promoted education activities for avoiding the loss of the cultural heritage represented by these historical minorities. The law promotes courses in the minority language in all minority communities: courses of minority languages are organised at school for pupils and special courses for adults are set in cooperation with the local authorities. Few years later, a new Act for the protection of the Slovenian minority was also passed, with the aim of protecting minorities that represent a link between different countries and cultures of the European Union.

Teachers involved in teaching minority languages report that those languages represent a fundamental factor of cohesion in rural areas, but also that the minority languages are going to be lost despite the relevant legislation. The few multilevel schools in the areas where linguistic minorities are based are the only tools for preventing the minority languages and culture to be completely lost.

Multilevel classes on the mountains

Multilevel classes are also created in rural mountainous areas. Education in these areas is financially supported in order to support families living in the area and to avoid the migration of the community from rural to urban areas. More and more school

are closing on the mountains despite the need -and claim- of the local communities to have their own school.

Under the above presented circumstances, out of 17,229 primary schools (with 137,366 classes and a population of 2,790,333 students), 3,564 classes can be characterised as multigrade.

3.6.2 Overview of ICT in Italian educational system

In 1997 the Italian Ministry of Public Instruction promoted a program for the development of educational technology. This program aimed at spreading the use of technology to support education in Italian schools in any level. The scale of the program was large and involved the whole of the school system, with a great economical investment to equip all the schools with computer laboratories and to train teachers. Despite this great investment, Italian schools, back in 1999, scarcely used computers and telecommunication for educational purposes. Technology was used to carry out marginal activities at school and was not really integrated in the classroom routine.

In 1999 a research on Information Technology in Education (called SITES) was committed by the IEA (International Association for the Evaluation of Educational Achievement) and executed by the CEDE (National Institute for the evaluation of the Educational Achievement). In this research, a great difference was found in computer accessibility and availability depending on the school level. For example, the student-computer rate in primary school (from 1st to 5th grade) was about 90 students per computer. This means that a school of about 500 students had a computer lab with 5 or 6 computers. At junior school level (6th to 8th grade) this rate dropped to 40 students per computer and in the last year of secondary school (13th grade) the rate was 14 students per computer.

The school reform in year 2000 proposed the following objectives related to the schools' technological infrastructure:

1. All students should master information and communication technologies (both the tools and conceptual mastery, based on scientific foundations).
2. Curricula at every level must include the science of information and communication technologies (ICT), integrated in various disciplines; in addition, at least in the first two years of secondary school, the study of ICT must be a specific discipline (i.e. Computer Science), and compulsory for all students.
3. To effectively integrate technology into the curricula, it must be clear how the skills provided by each discipline may include the use of technology.

A more recent school reform (Law 53/2003 and related decrees) has made the study of English and Computer Science compulsory from the first year of Elementary school to the end of high school. Conventions for the reduction of prices for computers in schools have been established in 1999 by art. 26 of Law 23/99, basing on agreements with Consip, a society of the Ministry of Finances that provides consultancy and technological services to the Public Administration. These have considerably increased the schools' technological equipment: 18.3% of desktop and 54.9% of laptop computers installed in schools have been acquired thanks to these agreements.

The Ministries of Education, of Finances and of Technologies have promoted a program ("PC for teachers") to encourage teachers to buy their own computers, through market-surveys and price cut agreements. The Decree of June 3, 2004 has established the terms and conditions for the "Reduction of price for teachers of public schools to buy a personal laptop computer in the year 2004".

The Ministry of Education monitors the situation of technological resources for education in Italian schools through an online survey on the Ministry web site (www.istruzione.it), which is submitted to schools and updated every year. Annual reports are published on the website. The Ministry is especially interested in ensuring the access to technological resources in every school, and promoting all initiatives directed to fully support the teaching of computer science from Elementary school on, and

experiment with new educational models based on the use of technologies.

Italian schools usually have a science lab, video room (where videos are usually watched; sometimes there is also a TV on wheels), projector for transparencies, language lab, computer lab, computers in the headmasters, secretaries and (not always) teachers' offices. Blackboard, transparencies projector and projecting screen are visible. Traditionally, Information and Communication Technologies have always been present in technical and professional institutes, where specializations in computer science have existed since 1967 (MIUR, 2001). In the 1980s, the National Plan for Computer Science introduced computer science in experimental math and physics curricula in all high schools; most schools were provided with a computer lab. Further investments allowed increasing and renovating the equipment.

Results of national surveys of technology

A survey on Technological Resources for Education in Italian schools has been conducted for the Italian Ministry of Education (MIUR). Online surveys published on the Ministry web site during school year 2003-04 were completed by 87% of all Italian schools. Results have been published on the Ministry of Education website in September 2004.

An online survey was conducted by the national Observatory for Technology (OTE) of the Ministry of Education between 2002 and 2003 to assess the presence of networks in Italian schools. Data were collected from 1,100 schools only, but they are useful to show trends. 10% of the schools reported having a LAN connection. The observatory also collected 100 best practices of school LAN implementations; descriptions have been made available to every school on the Ministry website, offering examples to help schools implementing their own network. LANs in schools are rapidly increasing: from 426 in 2000, to 770 in 2001, to 1116 in 2002-03 (10.1% of the schools).

Surveys since 2001 show the progress of technology in schools (more computers, more LANs, more equipment, less disparities...). Survey reports (MIUR, 2004) reveal that in the years between 2001 and 2004 the number of students per computer has decreased from 28:1 to 10.9:1, in full alignment with European standards of 1 computer every

10-15 students. 100% schools possess computers; however 26% of computers are on the verge of obsolescence. High schools, especially technical-professional institutes, tend to possess more computers than elementary and middle schools; where there are strong connections with the local community and sponsoring from local companies, disparities are more evident. The total number of computers in kindergartens is 3,355. Over 85% of Italian schools have Internet access, over 700 have wireless, and 23,000 computer science laboratories are present in schools of every order and level, with decreasing disparities between primary and secondary education. 84% of schools web sites are administered by teachers.

Professional development of teachers for technology integration

The Ministry's objectives concerning teachers training in Information and Communication Technologies in year 2000 were to train 90,000 teachers (by offering 1,800,000 training hours) by the end of school-year 2001/02. 196,000 teachers in 2003 have been involved in technology training programs. Teachers are required to a minimum amount of training hours a year, in order to retain their position in the teachers' national ranking. Training may concern technology, learning methodologies, advancements or modifications in some disciplines, and so on. Teachers learn how to use tools like Word, PowerPoint, Flash, Publisher, Photoshop and so on to make presentations, to create resources, and to make projects with their students involving the use of computers. While advanced courses teach the use of rather complex tools like Flash and Photoshop, in basic courses teachers are taught how to use a computer from the very beginning (e.g. how to switch it on and create a new folder). Many teachers are enthusiastic about experimenting with their students with the newly acquired skills.

Major challenges

The European Action Plan for the Information Society (e-Europe), approved by the European Commission and the Ministry Council of the European Union in 2000, recommended every country to promote initiatives and destine funding to the following objectives:

- Provide all schools with Internet access and multimedia resources by the year 2001

By the year 2002:

- Create Internet access in every classroom
- Connect all schools to an European high-speed research network
- Create services and resources for teaching
- Train all teachers for an effective use of technologies
- Adapt school curricula and teacher training curricula

These ambitious objectives have certainly not been achieved in all Italian schools as of this time. However, schools are making remarkable efforts to move in this direction. The broadband plan for the Italian schools, designed by the Innovation and Information Technology Ministry, envisages that 85% of Italian schools will be provided with cable and broadband (ADSL, optic fibre, Powerline or satellite) by 2005. Private and public organizations will provide financial support. The necessary funds for the implementation of the ICT tools (PC and internal wireless cable) will be provided by the Ministry of Education; banking foundations (which cooperate with the schools in the Piemonte and the Emilia Romagna Regions) Regional (POR) and European (PON) funding and by local pilot projects (such as “Mars” in the Sardinia Region or some other projects in Milan and Brescia).

While there is still a large effort being made to build the necessary infrastructure in schools and to give them access to a broadband connection, ICT is interwoven in all major initiatives of teacher training, provided at national level. Through the “Puntoedu” blended e-learning system, following different training schemes, more than 500 000 teachers have become competent in the application of ICT in teaching. Nevertheless, in some schools computers are still in computer labs, rather than in classrooms, which can leave teachers of non-technical subjects with trouble convincing colleagues that they need to use ICT. On the bright side, through eTwinning, many teachers have been successful in demonstrating the marvellous things that are possible if the school masters allows them to use the lab for their classes.

3.6.3 Relevant data

In Italy, the pupils to teacher ration is among the lowest among NEMED’s counties but can not be attributed to the existing number of multilevel classes (see section 6.5.1). Public expenditure for primary education accounts for about 1.22% of Italy’s GDP, which is above EU’s average (table 30).

Although all schools have computers and Internet connection, Italy achieves a disappointing score in the ratio of computers per 100 students. The score is even worst for primary schools, which is the second lowest among NEMED’s countries. Broadband connectivity fluctuates around EU’s average, but there is a clear antinomy between urban and rural schools (table 31).

As to the indicators that can be used in order to determine the extend ICT is used in schools, Italy presents a mixed picture. On average Italian schools have more websites than the rest of schools in the EU, but this does not apply for primary and rural schools (table 32). Teachers in rural areas use the e-mail as means of communication more extensively than their urban colleagues, but in all the average is around EU’s standard. Italian students use the e-mail far less than the rest of Europe’s students and primary students do so even less. Regarding the regularity of PC usage from teachers and students during lessons the respective percentages are very close to the ones in the rest of Europe. Interestingly enough, the more experienced the teachers are, the more they use ICT tools in their lessons (table 33).

It seems that Italian teachers are using off-line educational material more often than on-line from established educational sources (table 34). According to the opinion that Italian teachers expressed, the most important barrier in ICT’s implementation in education seems to be their own lack of interest. The relevant indicator is the only one above EU’s average. Although the computers per 100 students ratio is low, Italian teachers do not regard the lack of computers as a significant barrier (table 35). It also worth mentioning that primary school teachers are the most convinced for ICT’s benefits in education among their colleagues of the other educational levels. Primary school teachers along with teachers from rural areas also complain for their

lack of skills, but the relevant indicator is still below EU's average.

Pupils/teacher ratio in primary education	11/1
Public expenditure for primary education as % of GDP	1.22

Table 30: Pupil/teacher ratio and public expenditure in primary education in Italy

	Total EU25	Total IT	Primary	Urban	Rural
Computers/100 pupils	11.3	8	5.7	8.2	8.1
Schools with computers (%)	98.7	99.6	99.4	98.9	100
Schools Internet connected (%)	96.2	97.8	96.5	96.9	98.9
Schools with broadband connection (%)	66.9	69	62.8	78.2	54.5
Maintenance contract (%)	47.1	53.2	52.8	56.9	50.4

Table 31: ICT equipment in Italian schools

	Total EU25	Total IT	Primary	Urban	Rural
Schools with websites (%)	63	72.6	65.2	74.1	65.3
E-mail for the majority of teachers (%)	65.2	66.3	66.3	61.7	70.3
E-mail for the majority of students (%)	23.5	11.3	6.8	10.5	11.4

Table 32: Websites and e-mail addresses in Italian schools

	Total EU25	Total IT	Primary	Urban	Rural	Teaching experience (years)			
						<5	5-9	10-19	20+
Used PC in class the last 12 months (%)	74.3	72.4	71.6	71.9	71.5	59.6	65.6	73.9	73
Pupils use PCs in class (%)	66.3	66.8	66.5	66.7	65.1	53.1	62.9	68.8	67

Table 33: PC usage by teachers and students in Italy

	Total EU25	Total IT	Primary	Urban	Rural
On-line educational sources (%)	74.2	59.2	62.4	60.4	51.5
Off-line material (%)	83	82.7	84.6	83	81.3

Table 34: Sources of electronic educational material used in class in Italy

	Total EU25	Total IT	Primary	Urban	Rural
Lack of computers (%)	48.8	30.8	30.4	29.3	26.6
Lack of material (%)	20.3	16.7	16.5	16.3	18.9
Lack of material in national language (%)	8.6	6.7	7.5	6.1	8.7
Lack of skills (%)	22.5	16.3	19.8	14.4	19.3
Unclear benefits (%)	16.2	5.4	2.5	4.8	8.4
Lack of interest (%)	8.9	12.6	12.3	12.1	9.8

Table 35: Barriers of ICT integration in Italian schools

3.7 Portugal

3.7.1 Overview of the Portuguese multigrade schools

The educational system in Portugal involves six levels: pre-school, 1st cycle, 2nd cycle, 3rd cycle, secondary and higher education. The 1st cycle involves four years of study, is generalist and is the responsibility of a single teacher which can, in specific areas, be helped by other teachers. There is a lack of references regarding multigrade teaching in Portuguese official publications. Furthermore, it seems that teacher training in Portugal does not address the issue of multigrade teaching. Apparently, this seems to reflect that this reality is not acknowledged. Nevertheless, based on several interviews and talks with 1st cycle teachers, it seems that multigrade teaching is a common situation in this level of education. This is even more true in rural schools but on urban schools as well.

Two factors for this situation might be hypothesised: the progressive decreasing of 1st cycle pupils, which increases the pressure for having multigrade classes; the problem of academic underachievement, which joins pupils in different curriculum levels at the same group.

3.7.2 Overview of ICT in Portuguese educational system

In Portugal, the integration of ICT in education, as it is stated in the official discourse, is a “priority”. This is based on recognising the importance of developing information and knowledge society and the potential of ICT for improving teaching and learning. The following sections summarise information of official reports on the subject (Ministério da Educação - Departamento de Avaliação

Perspectivas e Planeamento, 2001; Ministério da Educação – Programa Nónio-Século XXI, 2002).

ICT equipment of schools

Official reports give figures on the ratio computers/ students just for the 2nd and the 3rd cycles. Considering this ratio, in 2000 there was one computer for each 23 students. There is an ongoing effort to equip schools with computers aiming at ratios of one computer for each 5 to 15 students in 2004 and one computer for each 10 students in 2006. It is also envisioned the existence of one computer per classroom, besides its availability in other school places, like libraries, resource centres, computer laboratories, science laboratories and school clubs.

In 2000 few 1st cycle schools had a computers’ network. Most of other cycle’s schools had networks, but with few connected computers. Authorities optimistically aimed of a network of all schools by the end of 2002.

Concerning schools equipment in terms of ICT applications, in 2000 few 1st cycle schools were furnished with these resources. In contrast, most schools on other educational levels were provided with at least some applications. There is an ongoing effort to provide schools with connectivity, applications and means of technical assistance as well as an ongoing development of virtual networks of polyvalent learning sites.

Evaluation of educational applications and sites

In Portugal, educational applications and Internet sites are still not the object of a systematic and scientifically based evaluation. Therefore, there is no a quality certification system which would enable teachers, educational technicians, parents and students to get specific information on applications and sites (i.e. content, quality, audience, etc) and to

select them for different purposes. The only initiatives in this field are ongoing dissemination campaigns of existing resources.

Development of educational applications and sites

Comparing with other EU countries there is not a considerable professional development and production of applications and sites in Portugal. To foster this development and production there are some organised competitions and call for proposals. Besides that, most relevant official ICT development includes now the development of Internet systems to gather statistical information of schools, as well as sites to inform the public about the educational system and to facilitate the filling of forms.

Official definition of students' and teachers' competencies in ICT

Definition of what should be students' and teachers' competencies in ICT is important regarding a clear view about educational and training goals as well as certification criteria. Portuguese official definition of students' competencies in ICT includes:

- interest for learning with ICT (including self-learning and co-operative work)
- capacity to use ICT consistently and autonomously (i.e. handling applications and processing information with ICT)
- experimental, ethical and solitary attitude in the use of ICT
- capacity to transfer acquired competencies in ICT

Besides, the official definition of teachers' competencies in ICT states:

- openness and positive attitudes toward ICT use
- capacity to adapt to a new role as teacher (i.e. as mediator and supervisor)
- domain of teaching with ICT skills (including how to promote the syllabus integration of ICT and how to use it for students with special needs)
- ability to evaluate and exploit existing applications and resources

- ability to foster vital values in ICT usage (e.g. safety, vigilance of information, copyright, ethical issues)

School usage of ICT for learning and teaching

In most Portuguese schools ICT is still used by a minority of students and teachers. Furthermore, in those schools where ICT is used, it's more employed by students than by teachers. This fact raises the question of the context where ICT is used. In the 1st cycle ICT is mostly used in the disciplinary context. After the 1st cycle ICT is mostly used by students outside the classroom (in the context of free-time) in a non-formal supervised way (i.e. in libraries, resource centres and computer laboratories).

With which intention ICT is used in Portuguese schools? Inquires suggest mostly for searching information (especially after 1st cycle), information production and recreation. Other more peripheral uses of ICT include Internet-communication, managing of information and data processing. When used by teachers, ICT is mostly employed outside the classroom as a professional aid.

There is an ongoing curricular reorganization of aims in order to give ICT a more prominent role in Portuguese education. This includes integration of ICT in all subjects and offering of ICT as a new secondary optional subject, as well as a new secondary training area. This new area of studies involves contents related to ICT technologies, applications, programming, ICT management and maintenance. Moreover, the curricular reorganisation involves launching ICT applications for teaching students with handicaps and for distance teaching (i.e. "tele-classes" by Internet) in specific situations (e.g. particular families; students with special needs; hospitalised children; students who study Portuguese abroad).

Teachers training in ICT

Teachers training in ICT can be identified, in Portugal, at two levels: pre-service and in-service training. Pre-service level of training is still incipient, regarding the promotion of teachers' acquaintance with ICT. Nevertheless, there is an ongoing integration of ICT in pre-service training courses, which is the responsibility of higher education institutions.

At in-service training level, development of ICT knowledge and competencies permeates the system through optional courses offered by training centres of school associations. These offers are not uniformly spread and they still lack of exemplary teaching units with ICT, which seem essential for teachers to understand how ICT can be integrated in learning and teaching.

Authorities “aim” to an in-service self-training of all teachers in ICT. The official discourse proposes this training as an opportunity for transforming teachers’ needs and concerns into professional development processes. It also stresses that training shall promote mastery not just in ICT tools but also on ways these tools can be used to promote learning. For this it is suggested the organisation of networks for sharing good practices, distance training activities, action-research initiatives, curricular development projects and training workshops.

Research and evaluation of ICT usage

In Portugal, research and evaluation in learning and teaching with ICT is officially recognised to be still very restricted. This research occurs mainly in research centres and Universities. Analysis of presentations to the most recent Portuguese congress on new technologies in Education indicates that national research in this field is mainly oriented first to teacher training and secondly to teaching strategies with ICT. Other not so well represented subjects are: ICT social aspects, learning with ICT, ICT evaluation and production, ICT curricular integration and methodology of research.

3.7.3 Relevant data

Portugal, along with Italy and Hungary, has a very low pupils to teacher ratio. Also, Portugal’s public expenditure for primary education is the second highest among NEMED’s countries (Cyprus is

first) with a percentage that amounts for 1.6 times the EU’s average (*table 36*).

Portugal and Greece are the two NEMED’s countries where the implementation of ICT in education is problematic. Portugal’s ratio of computers per 100 students is the worst among NEMED’s countries and far behind EU’s average. The situation is even worst in primary schools, but it seems a little better in rural areas. Dissatisfying are also the figures regarding the existence of contracts for the maintenance of schools’ ICT infrastructure. On the other hand, broadband connectivity, in general, is very good and only in primary schools falls behind but still above EU’s average (*table 37*).

As mentioned in section 6.6.2, ICT in Portugal is still on its early stages of implementation. As a result, one can expect figures indicating the extend of ICT usage to be on the low side. However, not all of the relevant indicators confirm the above statement. The number of teachers and students with an e-mail address is certainly very low (*table 38*). On the other hand, quite a lot of urban schools seem to have a web site. Also, teachers seem to use PCs during their lessons quite often, but students do not (*table 39*). For teachers to find on-line educational material from established educational sources seems to be difficult, achieving the worst score among NEMED’s countries. This is also true for the off-line sources, not to the same extend, but still is the worst score (*table 40*).

Portuguese teachers are well aware of the benefits ICT brings to education and are quite interested in using it (*table 41*). Lack of electronic material in general seems to be a problem at a great extend and also finding material in Portuguese language is also difficult. Portuguese teachers complain that their schools lack an adequate number of computers with a percentage close to the EU’s average, but according to their opinion is the most important barrier in ICT’s implementation in education.

Pupils/teacher ratio in primary education	11/1
Public expenditure for primary education as % of GDP	1.86

Table 36: Pupil/teacher ratio and public expenditure in primary education in Portugal

	Total EU25	Total PT	Primary	Urban	Rural
Computers/100 pupils	11.3	6.4	5.8	6.1	7.6
Schools with computers (%)	98.7	97	96.4	98.3	99
Schools Internet connected (%)	96.2	92.1	90.4	98.3	92.2
Schools with broadband connection (%)	66.9	72.8	69.8	79.8	74.1
Maintenance contract (%)	47.1	13.4	10.5	21.9	10

Table 37: ICT equipment in Portuguese schools

	Total EU25	Total PT	Primary	Urban	Rural
Schools with websites (%)	63	61.2	56.3	70.6	57.2
E-mail for the majority of teachers (%)	65.2	31.6	28.9	37.7	25.1
E-mail for the majority of students (%)	23.5	12.1	10.3	14.3	10.5

Table 38: Websites and e-mail addresses in Portuguese schools

	Total EU25	Total PT	Primary	Urban	Rural	Teaching experience (years)			
						<5	5-9	10-19	20+
Used PC in class the last 12 months (%)	74.3	69.5	70	64.4	70.7	67.5	74.9	72.8	65.2
Pupils use PCs in class (%)	66.3	49	48.9	45.3	49.3	48.4	53.6	48.8	47.4

Table 39: PC usage by teachers and students in Portugal

	Total EU25	Total PT	Primary	Urban	Rural
On-line educational sources (%)	74.2	48.4	47.6	52	46
Off-line material (%)	83	67.6	68.2	67.3	70.6

Table 40: Sources of electronic educational material used in class in Portugal

	Total EU25	Total PT	Primary	Urban	Rural
Lack of computers (%)	48.8	48.1	46.8	48.9	46.7
Lack of material (%)	20.3	23.7	26	16.4	38.4
Lack of material in national language (%)	8.6	5.6	5.2	6.6	4.9
Lack of skills (%)	22.5	11.3	12.7	11.3	15.3
Unclear benefits (%)	16.2	2.3	2.2	3.3	0
Lack of interest (%)	8.9	5.8	5.4	6.5	7.1

Table 41: Barriers of ICT integration in Portuguese schools

3.8 Romania

3.8.1 Overview of the Romanian multigrade schools

In the 2004-2005 school year, 54% of the primary education units and 20% of the secondary education units were in a multigrade situation. At the same year level, 177560 pupils learning in multigrade classes were enrolled in grades I-IV and 24117 in grades V-VIII. In most multigrade schools, the teaching language is Romanian, but 733 schools are using Hungarian in the teaching-learning process, 16 schools use German and 28 other languages (Slovak, Serbian, Romanes). The geographical distribution of these schools corresponds to the areas where the population of Hungarian or German nationality is important (particularly in central and western regions of Romania).

In general, the territorial distribution of schools providing primary education meets the population needs. In urban areas most residential districts have at least one public school providing primary education, many of them within walking distance from the pupils' homes. If parents wish to enroll their child to a different school than the one existing in the neighborhood, it is their responsibility to ensure transportation of the child. Multigrade education is a reality based on economic and geographic necessity and is specific to rural areas. Multigrade schools activity is very often associated with education activities organized in shifts.

In the rural area the primary schools network is well developed, in all villages existing at least one school providing primary education. In some cases, due to the geographical conditions (villages in the mountains and in the Danube Delta) distance between pupils' houses and the schools can be rather long. The Ministry of Education and Research provides transportation means (minivans) mostly for pupils that are attending gimnaziu education in zone-cen-

tre schools – local public administration authorities (commune) covering for the transportation costs.

Through the Phare project “Access to education for disadvantaged groups” certain County School Inspectorates in cooperation with the local public administration authorities have acquired minivans to ensure school transportation, including for pupils in primary education within the defined target-group. In addition to the central-level measures, it has been reported that local public administration authorities, in some cases with the support of individuals, NGOs, charity foundations, etc., are currently ensuring in some areas transportation of the pupils attending primary education. However, in order to improve school attendance and enrolment ratios in primary education in the rural areas, further efforts are required towards supporting school transportation, mostly from the part of local public administration authorities, as reinforced by the Education Law.

3.8.2 Overview of ICT in Romanian educational system

The evolution towards an Information Society marks a new step in the history of civilization and it always brings profound and fast changes in all the fields of social and economic life. These changes accelerate globalization but at the same time they cause an increasing divide. The information society (IS) represents an economy and a society in which the collection, storage, processing, transmission and the use of knowledge and information, using electronic means – including interactive communication techniques – play a very important role. The information society represents a new life-style and work-style, a new way of working in the economy and the development of a new society, a new era in

the human civilization. Information society has begun to shape itself once the information and communication technologies (ICTs) started to increase exponentially and so did the use of these technologies.

Education has to be therefore continuously preoccupied to create information handling skills and abilities amongst the pupils, students and teachers, so that they have a better quality of life and a better civilisation standard in the Romanian society through equal access to the national and global information resources. The actions undertaken in education have to be looked at as part of a new and complex policy of developing and valuing human resources, from the point of view of the information society and the knowledge based economy.

Taking into consideration the ideas mentioned above, the educational reform in Romania has looked at the introduction of Information and Communications Technologies in more than one direction, ensuring that there is a legal environment that would allow changes in the national curriculum for university and pre-university education, the initial and in-service training of teachers, open education and distance learning, post-graduate courses in informatics, attracting private sector and civil society in the process of equipping schools and training teachers, informatizing the informational system of the national education and the extension of the communications network.

The Ministry of National Education has adopted and approved the Programme for the Implementing of Information and Communications Technologies in pre-university education (www.edu.ro/prtinf.htm) which is part of the National Informatisation Strategy and the Implementing in an Accelerated Rhythm of the Information Society approved by the Romanian Government under Decree no 58 of 02.02.1998. The general objectives of the project are: to support the reform in the pre-university education through ensuring a good technical and informational environment, the creation of the necessary infrastructure for communication and documentation at the educational level, the training of the teachers and auxiliary staff in schools so that they have the skills to use modern information systems, the development of educational materials (software) according to the new curriculum. The financial support for this project has not been yet

identified, but some of the objectives have been achieved or are currently under work.

Informatics represents a tradition in Romanian education. Before the introduction of the new curriculum plan, informatics was studied in high schools or in special classes. The new curriculum plan of pre-university education brings along the development of Informatics through the introduction of the following subjects: Informatics – for the mathematics-informatics special classes (compulsory), Information Technology – in lower-secondary (optional) and in theoretical and vocational high schools (compulsory), Informatics – Computer Assisted Technologies – for technological high schools (compulsory) and the Technology of Information Processing and Applied Informatics – for vocational high schools (compulsory) (Minister's Order no: 3207/03.02.1999, 3420/12.03.1999, 3540/02.04.1999, 3788/10.05.1999, 3879/26.05.1999, 5086/15.12.1999).

The general objectives set in the study of the subjects mentioned above were related with those of other European countries: developing capabilities to use a computer system and a range of well-known software, making some applications using certain algorithms, developing communication skills in an active individual or team environment, using information sources and processing means in order to access, process, present and understand information, technological development and its implications on environment and society.

From the content point of view the subjects mentioned are related to other subjects from a series of European countries: the role and functions of computer systems, the main functions of an operating system, word processing, design packages, spreadsheets, Internet and additional services, algorithms, basic elements of programming languages, practical applications, informatics and its impact on society.

The new curriculum plan for the pre-university education allows some extra-curricular classes where Information and Communications Technologies can be used.

In universities, the system has mainly kept the Informatics as it was, but there are a few new subjects in connection to ICT in different faculties and their

departments. In the next few years, universities will have to be prepared for the new profound changes that seem to be approaching on global level (multimedia techniques and the virtual university). This way, we will insure extensive training in the use of computers, of the Internet and in general informatics of the young generation from the university and pre-university education.

In the field of teachers training, the Minister's Order no 3437/18.03.1998 has approved "The In-Service Teacher Training Programme in pre-university education" which contains a series of training sessions in using computers for the teachers teaching in pre-university education. Through the Minister's Order no 3345/25.02.1999 concerning initial teacher training, of training a specialist for the teaching career, there are a few recommendations that encourage the adaptation of the curriculum used in universities and colleges that train future teachers to the new orientations of primary and secondary education: training future teachers to use modern technologies.

The training in the field of the use of Information and Communications Technologies has to be extended to all the categories of citizens and all age groups. This objective is closely linked to the professional re-training and lifelong education. Through MO 3354/25.02.1999, the Ministry of National Education has approved the setting up of "Open and Distance Learning" which can be organized by any universities through general courses, professional re-training courses, or revising professional knowledge, courses and seminars that have a curriculum that leads to obtaining a Degree, or post-graduate courses.

The universities that offer post-graduate and re-training courses have introduced in their curriculum informatics or information and communications technologies courses.

At the same time, the Ministry of National Education has launched the programme called "The Schools as a system of services for the community" through MO 11650/26.07.1999 and which offers a good environment for organizing different Information and Communications Technologies activities for the community.

Taking into consideration the mission of educa-

tion, which is to prepare citizens of our country for the information society and to support the rise of the intellectual level of people through IT, the Ministry of National Education has launched a project entitled "Computers in schools and high schools" which intends to provide every school (a minimum of 8 and at least one connected to the Internet) and every high school (at least 12 computers and at least one connected to the Internet) with computers.

In order that this provision of equipment is efficient and because some schools have not been equipped with computers the Ministry of National Education has issued an order through which it encourages schools and Local Education Authorities to share resources wherever possible.

The activities that focused on the provision of computers in schools and connecting them to the Internet, both at university and pre-university level, activities that focused on the training of teachers and of network managers, have attracted good private industry and civil society participation (NGO's, charities, foundations) and also other ministries or governmental agencies. The Ministry of Education has signed co-operation protocols with Procter & Gamble (25.08.1999), ORACLE (03.11.1999), Microsoft (16.11.1999) CISCO SYSTEM International B.V. (22.07.1998), Sun Microsystems, Inc (07.11.1997), Educating for an Open Society Foundation (25.09.1999), National Agency for Science, Technology and Innovation (07.02.2000), Ministry for Youth and Sports (26.04.1999) Ministry for Agriculture and Food (12.11.1999), Defense Ministry (17.04.1998), Culture Ministry (19.04.1999). In the "P&G 2000" programme have participated the following companies: IBM, Xnet, Save the Children Foundation, and PROTV.

A big number of teachers and senior school staff have participated in study visits or pilot projects that focused on ICTs through the European Programmes (Socrates, Leonardo da Vinci, Tempus, etc).

Within the Reform Programme of the Pre-university education, Management and Finance Component, and again through its sub-component of Informational System of Pre-university Management, some clear objectives can be pointed out: the modernization and extension of the informational educational management system and its informatization, improving quantity and quality of the use of

information regarding education form its decision making level for medium and long term planning. This programme has been funded through the World Bank and aimed at creating a good information infrastructure by providing equipment and software to the 42 School Inspectorates and to the Ministry of National Education.

The university education has access to international funding through the PHARE programme HER9601 for improving university management. The main objective of the programme is to improve the information infrastructure by providing equipment to 55 universities, 4 libraries and national institutes.

RoEduNet is a communications infrastructure that comprises data of national interest, defined and developed within the national education system. The data communications infrastructure RoEduNet is opened to all non-profit organizations, with legal Romanian status, that develop educational, research and/or cultural activities. ICD ReduNet is in charge with the National Ministry of Education strategy in the communications field and provides information to all institutions in the national education system.

The connecting of schools of the education system to this large and comprising network ensures: access to scientific/educational information available on the Internet; access to the necessary applications needed in an education based on multimedia technologies; the development of open and distance learning; structured and clear dissemination of the necessary information needed for the system to function; the functioning of applications that support the managerial and decision making process as a whole, access of information on both ways, from the centre to the last school and the other way around; a good integration with the other educational institutions of the public administration system on specific information flows; distance access of citizens (parents, pupils, students, etc) to public information offered by the system.

3.8.3 Relevant data

There are no relevant data regarding ICT in education in Romania at the time this report was drafted.

3.9.1 Overview of the Spanish multigrade schools

In Spain each autonomous region has total competitions in educative matter, which means that from the effective Educational Laws (LODE, LOGSE, LOPEGCE and LOCE), they can adapt them to the social, cultural, historic, economic and politic reality of the Community. It entails, then, that each Region (named Autonomous Communities) has

their own organization and management of the rural school; even so there are common points in all the Regions in terms of the existence of two basic kinds of rural school: unitary rural school and cycle-based rural school.

The unitary rural school is that school of a single classroom where boys and girls of different ages and educative levels receive teaching jointly. The unitary rural school is divided, as well, into two models: complete school and class-based school. The complete school is the one that is constituted by boys and girls of all the cycles of infantile and

3.9 Spain

primary education, without missing any cycle or level; if this is the case, they receive the name of class-based.

The cycle-based rural school is that school of several classrooms, always less than 9, in which coincide children of two or more levels, depending on the existing classrooms and the groupings that are considered more suitable, without having a teacher by course or level.

The diversity of contexts in which the multigrade school in Spain is based entails that, in broad strokes, we can establish two extended models of schooling in the rural spaces:

- a. Non-grouped rural school, whose operation is self-governing, although the general tendency is sharing activities, and even masterful travelling specialists, with other schools nearby.
- b. Grouped rural schools which constitute what is known as groupings. These groups of multigrade schools are born in Spain with the purpose of:
 - Breaking with the professional isolation of the rural teacher.
 - Opening cultural horizons to rural boys and girls.
 - Strengthening the collaborative and team work.
 - Sharing human, structural, administrative and managing, material and economic resources to be used by all the schools of the group.
 - Developing an own model of participation of the educative community in the daily own tasks of the rural school.
 - Collaborating in territorial balance and dignifying the rural population.

In short, preserving the territorial balance and improving the quality of the education in the rural areas, and consequently the life quality of the inhabitants of these areas.

In all the Spanish State there are groupings of schools that receive different names: CRA (Grouping Rural Schools) in Castile Leon, Castile La Mancha, Asturias, Galicia and Madrid; CER (Rural Educational Centres) in the Valencian Community;

ZER (Rural Education Zone) in Catalonia; CER (Collective of Rural Schools) in the Canary Islands and CPRA (Public Grouped Rural Centres) in Andalusia.

Overall, 675 primary schools can be classified as multigrade, with a total population of 91,846 students.

Rural Schools in Aragon

Aragon presents a serious territorial imbalance due to a lack of intermediate cities between Zaragoza, with a 60% of the population, and the uninhabited and dispersed rest. The situation of the Teruel province, where the CRA Arino-Alloza is located, is particularly bad; a territory of 14,803.5 Km², with an average altitude of 800 meters with around 140,000 inhabitants (INE, 2002), marginalized from the natural axes of Spanish economy, from great routes of communication, where the distances are measured in hours instead of kilometres and with an aged population, followed by the consequent reduction of the birth rate.

Rural schools in Aragon (region with educative competitions of the Education and Science Ministry until recent times) are organized in Grouped Rural Centres (CRA); a CRA is, by law, a grouping of rural, generally non ordinary schools, that form a single centre with a common educative project, a curricular project, a directive team, a staff meeting of teachers and a Centre Scholastic Board, that design an Annual General Programming for the group of schools of the CRA and that is evaluated in the Estimate Memory at the end of the school year. In the year 1986 appears the first Decree of CRA (BOE 9/1/87); it is a Decree that contributed, in its beginnings, to flexibility and autonomy; at the present times an extreme rigidity is stated, which does not often facilitate an optimal operation.

Also in Aragon, and in Teruel, originate the CRIET (Rural Centres of Educative Innovation of Teruel) with the intention of correcting the inequality of education that certain social groups were suffering; regarded as support services to rural school, the CRIET aims at:

- Developing the rural children's sociability and personality, creating a net of friendly relationships among the parents and students of differ-

ent towns and regions.

- Complementing integral training of small rural school students in certain aspects of knowledge. Being a meeting place, with pedagogical purposes, for the CRA teaching staffs.
- Coordinating and exchanging the complementary activities carried out by different teachers.
- Developing innovation activities.
- Gathering all the educative community together to engage in a dialogue about a rural school with a possible future.

Rural schools in Asturias.

In Asturias, the rural school is also organized in CRA; the constitution process of the Grouped Rural Centres in Asturias is long; from 1992 to the present time there have been constituted approximately 34, which have travelling specialist teachers corresponding to Physical Education, Languages, Therapeutic Education, Audition and Language, Musical Education, and Travelling Support to Infantile Education. Even so there are rural schools which are not grouped.

Rural schools in the Canary Islands.

The geographical and historic characteristics of the Canary archipelago form a space distributed by islands, with specific circumstances such as insularity, in some cases double insularity, with an adverse orography for communications and a rural space of singular conditions and particular characteristics. The rural school or small school in the Canary Islands is the one that, in the rural field or The Collective Group of Rural Schools (CER), does not reach the line one, that is to say, of nine units. The CER, as a rural schools group, has the aim of strengthen the processes of improving the quality of teaching, defying the isolation of the unitary and non ordinary schools and consolidating the team work of the teaching staff at the rural surroundings; rural schools that do not belong to any group also exist.

Rural Schools in Catalonia.

In the year 1988 appeared the Decree of Scholastic Zones in Catalonia; a ZER is a group of rural schools (unitary and/or cyclical) which due to teachers' pedagogical affinity and certain geographic proximity are structured as a scholastic centre.

They share an educative and curricular project (with travelling specialist teachers in physical education, musical education, special education, foreign languages (English or French) the optional subject of catholic religion), without losing the school's own idiosyncrasy. At the present time, around 103 ZER, spread over all the rural Catalanian territory, are recognized by the Education Department. Together with ZER there is another type of multigrade schools groups, called the Functional Grouping. These are conceived as a group of schools without an educational and curricular common project but which share the specialist travelling teachers.

Rural schools in Galicia

In the Autonomous Community of Galicia, the unitary schools (Infantile and First cycle of Primary Education) live together with cyclic schools or ordinary schools located in the rural areas. Unitary schools are grouped in CRAs (Grouped Rural Schools) as the consequence of a voluntary process in which, differently from other Spanish regions, all the members of the education community take part. Most CRAs are located in A Coruña and Pontevedra provinces; there is only one in Ourense province and none in Lugo province. Generally, the average number of units is 8-9, but with a wide range of variability; there are six CRAs with less than seven units and four with more than thirteen. The aspect where we can find a higher level of uniformity is that of the educational levels which are attended in these centres. All of them are composed by Infantile Education and First Cycle of Primary School.

3.9.2 Overview of ICT in Spanish educational system

From different ministries several initiatives have been started off so that Information Society arrives in the same way to the rural world as to the urban world. In this sense, it is interesting to highlight the site of the Spanish Network of Rural Development (www.redr.es), existing in the Internet as a meeting point of the different rural areas. Among other initiatives the following projects must also be highlighted:

Aldea Digital (Digital Village). Internet in the rural school.

The Program “Aldea Digital” emerged as an institutional initiative for the integration of the new technologies in the rural school and began during the school year 97/98 in the province of Teruel. This programme recognises the rural school’s right to provide quality education and with the most advanced methodology, without renouncing to the way of life and quality of life which are characteristic to the environment it is situated. All the Rural Grouped Centers (CRA) and all the Public Schools of 1, 2 or 3 units of the territory managed by the Educational Ministry take part in “Aldea Digital” program.

Goals of the project:

1. Facilitating the consolidation of a sustainable development model in the rural areas through the students and professors training in the use of the tools that will rule the economy of the 21st century in a knowledge-based society.
2. Reinforcing the local identity in a global world.
3. Situating the Rural Grouped Centres at the head of the innovative process in educational matter applying the ICTs.
4. Helping the teachers in their professional task, allowing them to dedicate more time to the personal attention to every student thanks to the use of the technology as didactic resource.

During year 1998, the Ministry of Education and Culture implanted the project in villages of 100-500 inhabitants in the province of Teruel, endowing 168 classrooms and rural centres of the most modern technology and giving the teaching staff training courses. 27 Rural Grouped Schools (named CRAs), 3 Resources and Educational Innovations Centers (CRIES), 7 public schools, 5 Professors and Resources Centres (CPR), and the Provincial Direction itself have built an Intranet with 168 access points, which works to full yield.

The success obtained by the pilot project “Aldea Digital” implanted in the province of Teruel, pushed the Ministry to take the decision of extending this program of integration of the ICTs in rural public schools up to Asturias, Cantabria, Castilla y León, Castilla-La Mancha, Extremadura, Madrid, Murcia y La Rioja.

The program “Rural Internet”

The main purpose of this program is to bring the broadband and the use of new technologies to remote rural areas or areas with specific demography, where citizens shouldn’t be marginalized in relation to the urban areas inhabitants, who have better access conditions to the Internet. “The Internet in the Libraries” programme tries to provide public libraries with broadband connectivity, in order to transform them in Public Access to the Internet Centres. These programs will benefit around 3,000,000 potential users, who will be able to access the Internet free of charge and with a quality network from the installed public centres.

Telecentros

In March 2003, the Agriculture Ministry, the Spanish Federation of Municipalities and Provinces, and Red.es subscribed a collaboration agreement to set up the Rural Internet Programme. The programme came along with the main aim of applying new technologies to the rural environment. With this purpose, centres with public and free access to the Internet were installed in the rural villages and, at the same time, computer tools and software oriented to the primary sector were developed on behalf of Agriculture Ministry. In addition, the government delegations and autonomic one-province communities, apart from co-financing the programme actions, committed themselves to enrich the quality of the “telecentros” through training and activities.

This way, thanks to the common effort of all the involved agents, the “telecentros” installed within the Rural Internet Programme allow, on one hand, bringing the information society benefits nearer to the rural population and, on the other hand, to foster the territorial development of these areas. The good reception of the programme, which has benefited more than 1,500 municipalities, has encour-

aged a new agreement among the Agriculture Ministry, the Spanish Federation of Municipalities and Provinces, and Red.es, oriented to reinforce and extend the actions performed until now. Thus, a new performing programme called “Telecentros.es” has arisen, whose actions will be developed along the period 2005- 2008. With this program, which has an estimated investment of 24 million euros, 1,500 “telecentros” will be installed in villages located in rural areas with difficulties in accessing the new technologies, as well as in disadvantaged urban areas, although those rural areas without networking technologies will be prioritized.

Regional initiatives

Spain, as it is divided in Autonomic Communities with power in education and development matters, shows different local impact enterprises, some of them within the framework of the national projects and initiatives named above.

a. Educastur, Rural Schools In Asturias

In order to foment equal access to the knowledge society for Infantile and Primary Education students, disregarding their geographical origin, the Education and Science Council of Asturias has set up the programme “Educastur” during the school year 2004-2005. This program, as a first stage and within the framework of the agreement “The Internet at School”, has the goal of providing the schools located in rural areas with basic equipment to make possible the use of TICs in the classrooms.

Throughout the second semester of year 2005 specific formative courses were offered to the teachers from rural areas at the reference teachers’ centres and resources centres.

b. “Medusa Project”. Rural schools in the Canary Islands.

This project tries to achieve the integration of communication and information technologies in the school frame, performed by the Council of Education, Culture and Sports of the Canary Government. With this program the regional government follows the same strategic lines as “Canary Digital” project, which expects to obtain the progressive incorporation of the Canary community to the Information Society.

The Council of Education, Culture and Sports has considered as a priority matter to implant the ICTs in schools. This action is reflected in the educational agreement document as one of main goals to accomplish a quality education.

The project works on:

3. Providing infrastructures and equipments
4. Teachers’ training in the use of ICTs as well as their educational optimization.
5. Students’ training and good use of ICTs.
6. Innovation and investigation processes impulse and elaboration of educational contents.
7. Support to the dissemination of educative contents through communications and networking.
8. Academic and administration management of the schools.

c. SIEGA program in Galicia

Education and University Council of Galicia has developed since 1998 the Information System of Galician Education (SIEGA) which tries to integrate the whole educational community in the information society. SIEGA is structured around four peak groups: Multimedia Educational Services (SEM), Education administrative management (GADE), Galician education network (REDUGA) and the unit of centres support (UAC). From 1998 to the beginning of the school year 2003-2004 44.200.00 euros were invested, 27000 computer equipments were installed ready to be used by 35000 teachers and 355500 students from public centres. The student per computer ratio is 11 in primary school and 9 in secondary school.

In September 2003 the Educational Site started up, including all the available resources and educational contents, all the information related to Education and University Council and to the general educative field, as well as management services based on web applications. Besides, the electronic mail service of the council was extended in the last course with 5000 new accounts, which means that 25000 students are already beneficiaries.

The new application GADE-WEB was set to run in 741 schools of primary education in Galicia. This application allows to centralize the database and to make the management easier. In addition, the economic management application for the public centres with web environment was started. The use of the online educative administration among teachers, students and parents has been encouraged through management applications and citizen information. The attention unit to the educative centres is processed automatically with the purpose to give a smooth and easier answer to their necessities. In the last scholar year e-learning platform was initialized, designed to promote quality distance training for teachers, adults and high vocational training students.

Spain is still behind when it comes to Internet use in society, a factor that is reflected in the schools generating deficiencies and difficulties for the implantation of ICTs in the education centres. Even so, the rural community has been provided with an intense development and financial impulse, thanks to the initiatives previously introduced, and rural schools are ahead of development and innovation (although it is important to say that not all the centres are at the same level but an indicative amount of them). In this sense, the experience called “digital blackboard” that is being implemented for the school year 2005-2006 in Aragon, shows the great capacity that these centres can have thanks to the digital town programs, among others.

3.9.3 Relevant data

Students to teacher ratio in Spain is slightly lower than EU’s average. Slightly higher than EU’s average is the percentage of public expenditure for primary education (table 42).

Spain presents a case where indicators regarding

ICT’s implementation in education offer a mixed picture. Although the computers to 100 students ratio is below EU’s average and especially in urban areas, in rural areas the situation changes dramatically with a more than a twofold increase of the relevant parameter (table 43). A logical assumption is that provision has been made for the development of ICT in rural schools. Rural schools also score slightly better in the number of computers in general and in the ones that are connected to the Internet. Primary schools are also slightly in ahead of schools of all the other levels of education. As to broadband connectivity, Spain is well ahead the EU’s average, but percentages drop sharply in rural schools.

Examining the number of schools with websites and the number of schools where the majority of students have e-mail addresses it is noticed that both parameters are below EU’s average (table 44). It is also observed that students from rural areas use the e-mail twice as much as students from urban schools.

Teachers in Spain use PCs during their lessons less than the EU’s average. This once again does not apply for rural schools where the percentages are slightly higher (table 45). As expected, the number of teachers that use PCs during their teaching drops the older they are.

Regarding the availability of on-line and off-line material, Spanish teachers seem to have access in both (the second best scores in NEMED’s countries) (table 46).

Finally, according to the opinion of Spanish teachers, the most important barriers in ICT’s implementation in education is the lack of computers, the lack of material and the lack of material in their native language (table 47). The respective percentages are close to the ones in the rest of the European Union.

Pupils/teacher ratio in primary education	14/1
Public expenditure for primary education as % of GDP	1.2

Table 42: Pupil/teacher ratio and public expenditure in primary education in Spain

	Total EU25	Total ES	Primary	Urban	Rural
Computers/100 pupils	11.3	9.5	8.6	7.5	16.6
Schools with computers (%)	98.7	95.8	97.1	93.7	98.3
Schools Internet connected (%)	96.2	94.7	95.7	93.7	98.3
Schools with broadband connection (%)	66.9	80.7	79	86.7	67.6
Maintenance contract (%)	47.1	49	50.4	51	47.6

Table 43: ICT equipment in Spanish schools

	Total EU25	Total ES	Primary	Urban	Rural
Schools with websites (%)	63	53.2	51.6	53.3	54.7
E-mail for the majority of teachers (%)	65.2	65.1	66.4	62.9	69.7
E-mail for the majority of students (%)	23.5	14.2	14	11.6	21.3

Table 44: Websites and e-mail addresses in Spanish schools

	Total EU25	Total ES	Primary	Urban	Rural	Teaching experience (years)			
						<5	5-9	10-19	20+
Used PC in class the last 12 months (%)	74.3	68.2	68.9	63.4	77.5	72.5	73.4	69.9	64.4
Pupils use PCs in class (%)	66.3	60.1	61.6	55.8	70.2	60.4	60.2	64.7	57

Table 45: PC usage by teachers and students in Spain

	Total EU25	Total ES	Primary	Urban	Rural
On-line educational sources (%)	74.2	83	84.9	81.8	83.2
Off-line material (%)	83	86.5	88.2	85.9	89.6

Table 46: Sources of electronic educational material used in class in Spain

	Total EU25	Total ES	Primary	Urban	Rural
Lack of computers (%)	48.8	48.3	47.8	48.6	47.1
Lack of material (%)	20.3	22.9	22.1	20	24.3
Lack of material in national language (%)	8.6	8.8	11.3	8.1	8.3
Lack of skills (%)	22.5	14.7	15	12.7	20
Unclear benefits (%)	16.2	11.9	8.4	13.6	8.9
Lack of interest (%)	8.9	6.1	6.8	6.8	5.5

Table 47: Barriers of ICT integration in Spanish schools

3.10 United Kingdom

3.10.1 Overview of UK's multigrade schools

The general situation regarding pedagogy for multigrade classrooms is neglected in the UK. Where teachers are aware of it, they most frequently speak about it, not in terms of multigrade classrooms, or even about mixed age classrooms. They tend more frequently to refer to problems they have in terms of the difficulties created by the national curriculum when they teach classes containing pupils of more than one curriculum level. Having a national curriculum is relatively new in the UK having been introduced in 1988 to stipulate what must be studied in England and Wales by state school students up to the age of 16. There is not a long tradition of meeting its very detailed and quite complex requirements. This is a possible explanation for the situation described, i.e. that teachers locate their multigrade teaching within concepts of meeting curricular goals and outcomes, rather than in terms of how to create satisfactory classrooms with children of different ages, levels of maturity, and curricular targets to meet. However, and in addition, UK teachers are very well trained, and normally would be fully aware of issues around mixed ability classes. It seems that they also tend to approach is called multigrade classrooms in terms of mixed ability issues.

Legislation affecting multigrade teaching

Schools in the UK are largely free to organise their classes in whatsoever way they wish. However, in England particularly, there is a host of requirements that heavily affect such choices. Schools must comply with the intake policy of their LA (Local Authority), which prescribes the age of the children who may be admitted. Exceptions are those schools that are “aided” and usually pertaining to a religious denomination. They have to pay regard to the LA's admissions policy but their governors

ultimately determine admissions.

Schools are provided, through their LAs, with a “standard number” above which they should not admit further pupils. These are usually couched in terms of intake to Year Groups (grades). They are designed to protect popular schools from becoming overcrowded or subjecting the LA to unplanned expenditure in terms of buildings and staff. These standard numbers are based largely on the school's accommodation and often bear little relation to the economic or advised size of a class. However, there have been many cases where the standard number has been over-ruled by appeals committees acting on behalf of parents wishing their child to attend a particular school.

English schools have devolved budgets based mostly on the number of pupils. Budgets are allocated on the LAs formula, guided by government regulation and the total share made available by government. Schools have to be mindful of the financial implications of losing or gaining pupils. For example, even if space is available, an additional 12 pupils to a full Year Group provides insufficient funding to form another class.

While the above provide the context within which English schools work, the schools themselves have little opportunity to affect them. However, there is legislation and regulations that also impact on how classes are formed that often affect decisions about classes.

There is legislation relating to the assessment of all pupils at ages 7, 11 and 14. All schools must administer “Standard Assessment Tasks” to pupils at these ages. These test results must be available for parents but they are also used in public data about each school's effectiveness, even to the publishing of league tables of schools. (The data is now becoming more sophisticated by accounting for schools' contexts and the degree of relative im-

provement that pupils make.) The public use of this data imparts high stakes for schools, especially when they are in competition for pupils. Consequently, the details of what is taught to pupils nearing the testing points is of great importance and those with multigrade classes often see the other aged pupils as an impediment. In reality, the pupils of any one age group already often have substantially different levels of attainment and need differentiated learning -skills which many multigrade teachers have developed well. Some larger schools set (group) pupils by ability for the subjects to be assessed, although research about setting is mixed. Some smaller schools group their pupils for these lessons by ability and not age.

Primary teachers are daily aware that monograde pupils usually display a range of abilities and NC Levels and these classes do not have uniformity in their curriculum and intellectual needs. The strategy of differentiating the learning and tasks for pupils of different prior knowledge is one that many small school teachers do well and that inspectors often expect to see. Furthermore, teachers in training are taught the need to provide what pupils need whether they are of low average or high ability for the class.

Many of the factors above provide motivation for schools to avoid multigrade classes. However, there is a tension and a growing small minority whose thinking is longer term and more holistic. These schools occasionally form multigrade classes even when they have options for all monograde classes. Experience has indicated mixed reactions from parents.

In Scotland, only some of the above pressures towards monograde teaching are at work. Schools do not have fully devolved budgets. The testing regime is less intrusive. In Wales, schools have fully delegated budgets but the Curriculum is less prescriptive and the region is moving away from externally provided assessments at 7 and 11.

Because in the UK education is seen as a complex process, which is not amenable to sequential information transfer, advisers generally do not see multigrade teaching as a significant difficulty as long as teachers have high quality practice and differentiate appropriately. In any case, inspectors expect learning to be differentiated even in monograde classes,

where it is usually needed. Many schools and LAs adopt a philosophy of learning that integrates both constructivist notions (such as Piaget's) and social learning (such as Vygotsky's). These preclude issues of age and focus on pupils learning at different rates. Consequently, multigrade teaching is not seen as a pedagogic difficulty but only as a logistic one. Furthermore, despite the logistic difficulties of teaching a differentiated curriculum, schools with under 100 pupils (where there is most multigrade teaching) have results in the core subjects that are slightly better than others, although this may be partly to do with the pupils' socio-economic backgrounds. The role that LAs play in connection with multigrade teaching is now largely concerned with the degree of support and advice offered for small schools and to help with the logistic difficulties of differentiating the curriculum.

Statistical data

It has not been possible to find very detailed authoritative data on the mixed age/level classes across the UK overall. The situation is complex, and various figures are to be found. The UK is split into four national regions: England, Scotland, Wales and Northern Ireland. Each has a good degree of devolved powers to run their education systems. No specific statistics are held concerning the number of classes with more than one age group (multigrade), except for Scotland, where they are called "composite classes". This is largely because schools group their children depending upon numbers and these can change even during a school year.

England

Since primary schools (in the large majority of cases) educate pupils for seven years and the average class size is 27.3, most schools having under 150 pupils are likely to have some degree of multigrade teaching. About 8000 schools are likely to have at least one and possibly more multigrade classes. This approximates to nearly 40% of classes with more than one age group. However, this figure may be ameliorated where:

- Schools have above average class sizes in some year groups (grades) to allow mono-grade teaching,
- Staffing has been enhanced,
- A proportion of schools having under 190 pu-

pils are Infant only schools (i.e. having pupils 4 – 7 years of age) and these schools normally manage monograde teaching throughout.

- A proportion of schools are “First Schools” having pupils up to the age of 8 or 9. These exist in a minority of areas as a legacy of the country’s interest in adjusting transfer ages to better suits pupils’ developmental and social development and were created in from the late sixties through the seventies.

However, there is a small proportion (probably less than 10%) of larger schools that choose to group their classes as multigrade either because they attempt to match pupils’ by ability or for perceived social and learning benefits. Impressions from one inspector with over 250 school visits indicate that around 35% of classes are multigrade and this is across a full range of school sizes.

Scotland

In Scotland statistics, including those for “composite classes” are collected annually from schools in late September. The number of multigrade (or composite classes) was 4737 in 2005. These were in 2194 schools (some 29% of Scottish primary classes) and contained 94454 pupils (average class size was 20).

Wales

In Wales, information is collected annually from schools in January, (although the ’06 data is not yet published) but the number of mixed age classes is not specifically collected.

Northern Ireland

In Northern Ireland statistics are collected from schools in October. Like Scotland, multigrade classes are called “Composite classes”.

United Kingdom Primary* School Statistics (2005)

The schools above educate some 5,045,900 pupils of which 478400 or 9.5% are taught in schools with 100 or less pupils. It is in these schools where multigrade teaching is most likely to be found because full primary schools of less than about 150 pupils are unlikely to have all its classes taught as monograde. The difference between the 9.5% of pupils and the 18% of small schools is due to the fact that small schools often have smaller classes.

3.10.2 Overview of ICT in UK’s educational system

The use ICT runs throughout the education system in the UK and has become a significant and integral aspect of UK’s education. Children aged 3 and 4 can usually learn basic computer-handling skills at nurseries throughout the UK. From the age of 5 onwards, ICT is a core subject at school and is integrated in the teaching of other subjects. For students in schools there is a National Curriculum for ICT which must be followed between the ages of 5 and 16. In addition, ICT is a required aspect of all other National Curriculum subjects, and must therefore figure in every teacher’s planning. ICT capability is also identified as a ‘key skill’. For teachers, ICT is also becoming increasingly important as an aid to preparation, to record keeping and reporting, in aspects of administration and communication, and as a means of professional development.

Curriculum 2000 provides a framework for using ICT across the curriculum. Guidance materials from the DCSF on the use of ICT in literacy and numeracy demonstrate how ICT can be used as a teaching tool as well as a learning aid. Many schools have identified further opportunities where ICT can contribute significantly to pupils learning in their subject schemes of work. In order to raise standards in pupils ICT capability, and for ICT to contribute to the raising of standards in other subjects, it is important to make clear and coherent links between the delivery of the Programme of Study (PoS) for ICT and the wider use of ICT within the curriculum.

The schemes of work for ICT provide guidance on how schools can implement the PoS. The intention is that pupils are taught the knowledge, skills and understanding of ICT before they apply these in a curricular context.

ICT in primary and special schools

The way ICT is taught and used in primary and special schools is usually determined by the amount and deployment of hardware. Various initiatives have increased the number of ICT suites in schools and led to more discrete teaching of ICT in primary schools. Where a suite exists, it is essential to check whether opportunities are provided for pupils to

apply new knowledge, understanding and skills in appropriate curriculum contexts. Conversely, where an ICT suite is not available, it is important to monitor how skills are taught and applied.

The primary scheme of work for ICT on the DCSF website provides guidance and examples of where ICT can be applied and developed across the curriculum.

The Government, through the DfES and the TDA, has also identified a requirement for ICT skills and pedagogical understanding for the award of Qualified Teacher Status, regardless of teaching subject. Practising teachers, who qualified before the new arrangements for QTS came into force, have been expected to participate in the New Opportunities Fund (NOF) training programme for teachers. The aim has been to create a teaching force aware of, and able to use, the possibilities of ICT in teaching, professional development and administration

Aims and purposes of ICT

The scheme is underpinned by assumptions about the aims and purposes of teaching IT at key stages 1 and 2 (5-7 and 7-11 years old), which also underpin the National Curriculum programme of study. These are that IT teaching should offer opportunities for children to:

develop IT capability, including their knowledge and understanding of the importance of information and of how to select and prepare it;

develop their skills in using hardware and software to manipulate information in their processes of problem solving, recording and expressive work;

develop their ability to apply their IT capability and ICT to support their use of language and communication, and their learning in other areas;

explore their attitudes towards ICT, its value for themselves, others and society, and their awareness of its advantages and limitations.

Knowledge and understanding

Children should:

understand how ICT can be used to communicate and handle information, control and monitor events, and model real and imaginary situations.

Processes and skills

Children should:

- acquire and develop the skills associated with using ICT to:
 - pass on ideas by communicating, presenting and exchanging information
 - find things out and handle information
 - make things happen by controlling and monitoring events
 - try things out by modelling real and imaginary situations
- acquire and refine the techniques e.g. saving, copying, checking the accuracy of input and output needed to use ICT
- practise mathematical skills e.g. ordering numbers including negative numbers, measuring and calculating to an appropriate number of decimal places, drawing and interpreting graphs and bar charts in real contexts
- learn why numerical and mathematical skills are useful and helpful to understanding
- develop the skills of collecting first-hand data, analysing and evaluating it, making inferences or predictions and testing them, drawing and presenting conclusions, and use all these in their work with ICT

Building on children's earlier experiences

Many children will have used a computer either at home or in their nursery and reception classes. These experiences are likely to have included:

- contact with, and discussion of, the technology in their everyday environment e.g. washing machines, televisions, videos, games consoles, hairdryers, remote control toys, traffic lights and cash registers
- using toys that simulate real-life applications of ICT e.g. telephones and cameras and ICT-based toys and games e.g. keyboards that can save and play back tunes, sound-activated toys, robots and walking dolls
- talking about computers that they have used, how they made them work, what they used them for, and how they knew that those tools were computers

- developing eye and hand co-ordination using a concept keyboard, mouse or joystick to move the pointer on the screen;
- knowing how to use the computer safely and sensibly e.g. not touching the plugs and switches or taking out the disk.
- from personal use of ICT in a few areas to understanding a wider range of uses of ICT and the consequences of its use for themselves, their work and others
- from using ICT to address a single task e.g. writing a story to addressing more complex issues, and balancing conflicting needs and criteria e.g. writing an account of an event for the school magazine that fits in the space provided and communicates the relevant details to the anticipated audience

The differing backgrounds children have in IT capability offer a significant challenge to teachers. Children who have access to ICT outside school often have greater skills in handling hardware and software. However, they may not have the full range of IT capability expected in the programme of study. By observing children's developing IT capability, teachers will be able to ascertain what tasks and expectations would best support their learning.

Features of progression

To ensure children make progress in IT, teaching should promote opportunities for children, as they move through Key Stages 1 and 2, to progress:

- from using single forms of information to combining different types of information, matching the form of presentation to the audience and what is being communicated
- from personal use of ICT to using ICT to meet the needs of, and communicate with, others
- from using ICT to replicate and enrich what could be done without ICT e.g. playing a word game or drawing a picture to using ICT for purposes that could not have been envisaged without it such as exploring 'what if' situations and modelling new ones
- from using everyday language to describe work with ICT to increasingly precise use of technical vocabulary and ways of recording

- from organising information as separate items e.g. a single graphic image to organising information in sequences and more complicated, interactive, structures e.g. a multimedia presentation or a database
- from initial exploration of ideas and patterns to more systematic use of ICT for analysis and design

3.10.3 Relevant data

In UK the pupils to teacher ratio is the second highest among NEMED's countries and can be attributed to the way classes are formed (see section 6.9.1). Public expenditure for primary education is the third highest and well above EU's average (*table 49*).

UK is a model country regarding the implementation of ICT in all stages of education. All of the relevant indicators are either the best or close to the top and in any case well above the EU's average (*tables 50-54*). No significant differences occur between primary schools and the rest levels of education. The same holds true for urban and rural schools. The only exception is in broadband connectivity which is somehow lower in rural schools.

	100 and under	101 – 200	201 – 300	301 – 400	401 and over
England	2501 (14%)	4723 (27%)	5547 (31%)	2702 (15%)	2169 (12%)
Wales	485 (31%)	510 (32%)	386 (26%)	127 (8%)	65 (4%)
Scotland	755 (35%)	571 (26%)	487 (22%)	264 (12%)	140 (6%)
Northern Ireland	342 (37%)	259 (28%)	129 (14%)	85 (9%)	97 (11%)
Total UK	4083 (18%)	6063 (27%)	6549 (29%)	3178 (14%)	2471 (11%)

Table 48: Number of schools by pupils enrolled

Percentages have been rounded and may not add up to 100

Statistics from DfES National Statistics – Volume – Statistics of Education 2005 Edition

* Includes all maintained schools having pupils within the range 5 to 11, i.e. infant, first and full primary schools, but excludes PRUs, Special schools and schools in the independent sector.

Pupils/teacher ratio in primary education	17/1
Public expenditure for primary education as % of GDP	1.7

Table 49: Pupil/teacher ratio and public expenditure in primary education in the UK

	Total EU25	Total UK	Primary	Urban	Rural
Computers/100 pupils	11.3	19.8	15.9	19.1	20.8
Schools with computers (%)	98.7	N/A	N/A	N/A	N/A
Schools Internet connected (%)	96.2	99.8	100	100	100
Schools with broadband connection (%)	66.9	75.1	74.1	81.4	69.2
Maintenance contract (%)	47.1	82.3	84.6	83.3	78.3

Table 50: ICT equipment in UK's schools

	Total EU25	Total UK	Primary	Urban	Rural
Schools with websites (%)	63	73.4	71.2	77.5	67.6
E-mail for the majority of teachers (%)	65.2	85.3	84.6	84.3	85.1
E-mail for the majority of students (%)	23.5	40.5	37.1	43.2	35.1

Table 51: Websites and e-mail addresses in UK's schools

	Total EU25	Total UK	Primary	Urban	Rural	Teaching experience (years)			
						<5	5-9	10-19	20+
Used PC in class the last 12 months (%)	74.3	96.4	97.4	95.6	97.7	96.7	95.9	98.3	95.2
Pupils use PCs in class (%)	66.3	82.8	84.9	84.1	84.5	79.8	86	81.6	83.5

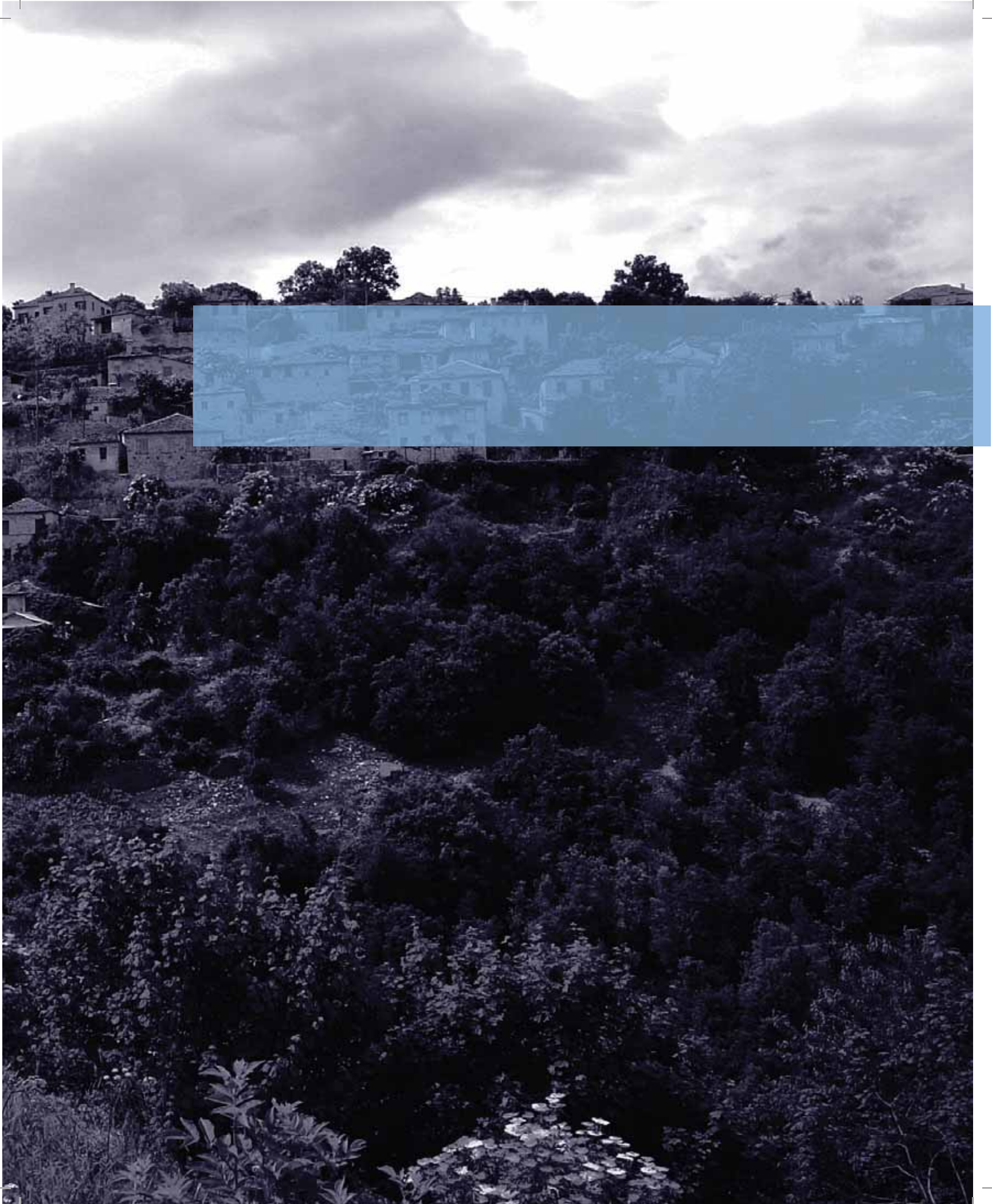
Table 52: PC usage by teachers and students in the UK

	Total EU25	Total UK	Primary	Urban	Rural
On-line educational sources (%)	74.2	94.2	95.6	94.4	95.9
Off-line material (%)	83	88	89.7	85.6	91.2

Table 53: Sources of electronic educational material used in class in the UK

	Total EU25	Total UK	Primary	Urban	Rural
Lack of computers (%)	48.8	31	20	38.4	N/A
Lack of material (%)	20.3	4.2	0	3.6	N/A
Lack of material in national language (%)	8.6	0	0	0	N/A
Lack of skills (%)	22.5	10.7	8.8	5.5	N/A
Unclear benefits (%)	16.2	5.2	8.5	0	N/A
Lack of interest (%)	8.9	0	0	0	N/A

Table 54: Barriers of ICT integration in UK's schools



4

ICT in European Education: Discussion and Overview

4.1 Discussion-Conclusions

In the previous chapter an overview of the educational systems of the countries participating in the NEMED project was presented in relation to the multigrade schools that exist in them. Also, the role of ICT was outlined. The extend of ICT's integration in the educational systems of the above countries was further clarified with data from the survey "Benchmarking Access and Use of ICT in European Schools". The indicators that were used were focused mainly in primary and rural schools. This was done because, as mentioned in section 6.9, there are no specific data regarding multigrade schools and the logical hypothesis is that the majority of multigrade schools are rural.

The first question that needs to be answered is how common multigrade schools are. Table 55 reveals the current situation and also indicates the difficulties that exist in gathering data and even in defining the term multigrade. For instance, in Cyprus, multigrade schools are called one, two and three-teacher primary schools; in Italy there are multilevel classes; in Spain the term that is used is unitary rural schools and in the UK there are mixed age/level classes. Exact figures from a number of countries were not available, and in one case (Portugal) there was not even an estimation regarding the number of multigrade schools.

The total number of students that are educated in a multigrade environment reaches approximately the 1,000,000 mark in NEMED's countries. Even though just over 7% of about 13,715,000 students study in multigrade situations, it is important to stress the role that this type of schools play in accessing primary education in all rural and isolated places in many countries of the world, providing education for all. It is also important to point out that although these schools represent the most abandoned part of the educational system, operating in remote and usually underdeveloped areas of their respective countries, few Ministries of Edu-

cation, Curriculum Development Agencies and Teacher Education Institutions take their role into account.

In order to determine the current state of ICT's implementation in education in NEMED's countries, but also have a rough estimate of the future trends, one has to examine the ICT's degree of penetration in a country in general and not just in education. For this reason two indicators will be used: (i) Internet penetration and (ii) broadband penetration. The data presented in tables 56 and 57 come from InternetWorldStats.com an international website featuring up to date world Internet usage, population statistics and Internet market research data, for over 233 individual countries and world regions [78].

An observation that can be made is that the lesser Internet's penetration is in a country, the stronger the growth rate is (i.e. Hungary and Romania) (chart 1). This means that sooner or later NEMED's countries that fall behind EU's average, will reach that level. On the other hand, Internet growth is still strong in countries where it is already well developed (with the exception of Finland where growth is slowing down). This means that some countries will have to be make additional efforts in order beat the gap and overcome the digital divide.

Broadband penetration is an indicator of the availability not only of high speed Internet, but also of a number of communication services such as telephone and video on demand (double play, triple play); services that can play an important role in ICT's integration into multigrade schools. In this case, the distance between Finland (where broadband penetration is considerable) and Greece (where broadband penetration is minimal) is overwhelming (chart 2). Interestingly enough, in these two countries, as well as in Romania which is also on the down side, multigrade schools are quite

common. Finland presents a case where ICT is playing an important role in education (see sections 6.2.2-3), while in Greece and in Romania ICT still struggles to find its way into education (see sections 6.3.2-3 and 6.7.2).

From the above chart the digital divide in NEMED's countries becomes self-evident. It appears that three groups do exist. Finland along with United Kingdom are well above EU's average and at the front-end regarding ICT's spread and availability. Portugal, Spain and Italy are in the middle. Hungary, but especially Romania, Cyprus and Greece are at the bottom.

Consequently, it is important to examine if and in what extend the digital divide manifests itself in education. From data presented in chapter 6, one can effortlessly conclude that it exists. In order to further demonstrate the unbalances in NEMED's countries, a subjective indicator is going to be used. Countries are ranked in a descending order for each of the following indicators: (i) computers/100 pupils, (ii) percentage of broadband connections, (iii) percentage of schools with websites, (iv) percentage of schools where the majority of teachers have an e-mail address, (v) percentage of schools where the majority of students have an e-mail address, (vi) percentage of schools where a maintenance contract exists, (vii) percentage of schools where teachers used a PC during their lessons the last 12 months and (viii) percentage of schools where students used a PC during their lessons the last 12 months. For each of the above indicators a score is given in each country according to the position it possesses. Since the available data involves eight countries (Romania is excluded) plus the EU's average, the maximum points that can be given to a country for each indicator are 9 and the minimum is 1. The total maximum score a country can achieve is 72 (8 indicators * 9 points) and the minimum is 8 (*table 58, chart 3*).

By examining the above table, the following remarks can be made:

- In Finland and especially in the United Kingdom (67 points out of 72) ICT is excellently integrated in education and in accordance to the existing high degree of ICT's penetration in the total population.

- Even though in Portugal Internet penetration is the highest among NEMED's countries and broadband connections are very close to EU's average, ICT is not utilised in education.
- In all countries (with the exception of Portugal) ICT's penetration in society can determine -more or less accurately- ICT's penetration in education and vice-versa.
- The last country (Greece) has to achieve a three-fold increase in ICT's utilisation in education in order to reach EU's average and more that four-fold increase in order to reach UK's top score, while, at the same time, well developed countries are developing even more.
- Spain's primary schools score can give at the country a better place than education as a whole does. Quite impressively rural ones can do that even better. The explanation lies in the ratio of computers/100 students where it is far better in rural areas than in urban ones (see section 6.8.3).

The focus of NEMED's project was primary rural schools. It is true that in some countries primary education is seriously under-funded and in some others does not receive proper funding. In any case, part of these funds is channelled in ICT related activities (i.e. acquisition of PCs, teachers training in ICT, on/off-line material, etc.). Therefore, it would be useful to determine how ICT in primary education is going to advance in NEMED's countries. For this reason the subjective indicator mentioned in the previous paragraphs is going to be used, along with the public expenditure available for primary education (as a percentage of a nation's GDP). Assuming that in all countries the same portion of public expenditure for primary education is devoted for ICT purposes, the situation in a one year and in a two years period will be shaped as shown in table 58 and chart 4.

By examining the above table, the following remarks can be made:

- ICT's integration and ICT investments in primary education and in education in general can not grow indefinitely. In some point a plateau will be reached where further growth will not be required and less expenditure will be needed in

order to maintain and manage the existing status. This statement applies in countries such as the United Kingdom and Finland, where ICT already plays an important role in education.

- If Cyprus and Portugal continue to direct the already elevated percentage of their GDP in primary education and at the same time implement initiatives regarding the application of ICT in education, soon they will join the other already advanced countries.
- The distance that will separate two countries, Hungary and especially Greece, from the leading ones and even from EU's average will be enormous and will keep growing unless actions are taken.

Of course, this growth model is rather crude, based on assumptions and therefore it is most likely inaccurate. For instance it does not take into account initiatives for the application of ICT in primary education which are not financed from a state's budget for primary education (i.e. EU's Community Support Frameworks and co-financing, private sector's investments, etc.). Besides, the model assumes that rural and urban schools are equally funded. It is unknown if initiatives regarding rural and multigrade schools exist, and therefore their impact can not be calculated. Consequently, one should consider it as a simple hint of how things might be shaped unless certain governments decide to take immediate actions.

A more general conclusion that can be drawn from the above appose of data is that in no country special provision has been made regarding the extensive introduction of ICT solutions in rural and hence in multigrade schools. Regardless if a country's educational policy dictates the use of ICT or not, policy decisions have a homogeneous affect in all of its educational levels, in all of its regions and not just in certain parts and in certain areas. For example, in Finland, ICT is used extensively in education and the relevant infrastructure is very good. But Finland also has a significant number of multigrade schools that are benefiting from the use of ICT exactly the same as all other schools do, even though the problems they face are not proportionally the same. The exact phenomenon is observed in Greece where ICT is not a factor in its educational system. No primary schools are taking ad-

vantage of ICT's benefits in education, including multigrade ones.

Multigrade schools will be present in the educational scene for a long time, either as a necessary "evil" for some or as an interesting pedagogical experiment for others. But it is not an overstatement to say that multigrade schools have little chance to be the priority in any country's educational planning. To change the situation a change in attitude must be involved. Additional steps are also required in order governments to realise ICT's specific benefits in multigrade schools and how ICT can quickly upturn the situation that exists in them. It is exactly in this area where the NEMED project plays an important role.

Drastic constraints concerning teaching time per student, intense fragmentation of the teaching procedure, lack of coherence, the need for time-sharing so as to meet the needs of a non-homogeneous class, make the multi-grade school a very demanding professional area. The teacher of such a learning environment is called to unify diversified groups, set objectives for more than one grade, transform heterogeneous groups into collaborative teams and integrate pupils into a functional entity. At the same time, the teacher, the students and even the residents of the area where the school is situated are beyond the reach and helping hand of any type of authority that could provide immediate solutions to any problem that arises.

On the other hand, research and experience gained during the project, have demonstrated that ICT's many fields of application have the potential to contribute in different aspects of educational development and effective learning: expanding access, increasing efficiency, enhancing quality of learning and teaching, and improving policy planning and management. ICT also offers possibilities in facilitating skill formation, sustaining lifelong learning and advancing community linkages. Ultimately, ICT is the tool that can be used and affect multigrade schools' operation dramatically, providing solutions that improve the educational services offered by them. Unfortunately, in many instances, as shown in previous chapters, ICT is used less by the people that need it the most.

ICT can cure -in some degree- the two main problems that multigrade schools face, time and isola-

tion:

One of the most important obstacles a multigrade teacher faces is the pressure and lack of teaching time: while he/she addresses his/her teaching to a specific students' age group, the rest present age groups remain unaddressed and involved in silent tasks. This time can be deteriorated into "dead" time for the students, unless teacher has achieved a high pre-organization of these silent tasks. ICT can respond to that problem in a very sufficient way. ICT can provide all the necessary means and tools to the teacher so that dead time is shrunk and learning time is increased for all students.

Self learning educational e-material can be adequately developed to support multigrade learning. E-educational material can be in many different forms: a CD-ROM, an educational website, original e-material developed by teacher him/herself and uploaded on a server so that it will be accessed via the Internet, original e-material developed by teacher him/herself and uploaded on a local PC so that it will be accessed via Intranet and even original educational material developed by students themselves.

Also, a multigrade teacher is often charged with the burden of administrative work. Especially for those types of multigrade schools that there is one teacher for all six grades, teacher is the headmaster of school having to deal with all consequent paperwork. Official correspondence consumes extra time from the already compressed time table. ICT can simplify administrative tasks and automate routines so that time will be saved and added into teaching time.

A broadband connection can give communication opportunities to multigrade and rural schools so that their isolation is alleviated to a great degree. An example is teachers' training. Multigrade schools are regularly in isolated areas, which outcomes that teachers can not easily move to get professional training. ICT can permit in situ training using ODL techniques and also allow teachers to have access to training procedures without leaving their school.

Multigrade school's communication with the rest educational community is hindered. ICT can facilitate communication providing a wide range of communicational tools: videoconference software,

websites containing a forum, web sites providing a virtual library with exchangeable material. The above can facilitate dramatically the communication with other schools, nationally and internationally, with universities and other official institutions. That offers the chance to multigrade students and teachers to exchange ideas, solutions, material and experiences.

Before the ICT era in education, multigrade schools' cooperation with national or international projects was critically encumbered due to distance and communicational problems. Now, ICT has simplified the pre-requirements. All willing schools can participate in projects having partners in all parts of the planet, exchanging material and information and ideas daily via Internet, with no extra charge or delays.

Finally, ICT can provide courses that small rural or urban schools cannot offer to their students because it is difficult for those institutions to recruit and retain specialized teachers, particularly to teach mathematics, science, and foreign languages. Schools that do not need a full-time physics or English teacher can use radio, TV, or on-line instruction, using already developed multimedia materials and sharing one "teacher" among several schools. Alternatively, retired or part-time teachers who live hundreds of miles away can teach the online courses.

There are also other areas where ICT in multigrade schools can play an important role. For instance, there are no special multigrade-centered books. Multigrade students have to be taught with the conventional books of a monograde school, which were designed for different class type. ICT can provide tools for developing especially multigrade-centered designed educational material. ICT can provide web access to that uploaded material and permit exchange between people who are interested.

ICT can also give opportunities not just to students, but also to all people that live in the area, transforming multigrade schools into viable institutions rather than a necessary burden. Small communities, due to geographical and social isolation, offer small access to cultural events, to information and to lifelong learning conditions. ICT can alter this situation offering digital access to information, communication and lifelong learning for all and multigrade schools are the ideal place to host these activities.

In the light of the above, the development of a network such as NEMED is justified. The reason is that it focused on the issues of multigrade teaching and the problems of rural schools which in many

occasions coincide. These issues were very seldom, if ever, being a subject of study in European level and emerged as a complex system of educational, social and economic parameters.

Country	Number of primary schools	Students in Primary Education (2005)	Number or % of primary multigrade schools	Number or % of students in primary multigrade schools
Cyprus	343	53,934	59 (one, two and three teacher primary schools)	1,721 (3.2%)
Finland	2,667	381,785	800 (30%) aprox.	26,725 (7%) aprox.
Greece	5,870	650,309	2,558 (43.5%)	61,697 (9.5%)
Hungary	3,115	430,000 aprox.	628 (20%) est.	N/A
Italy	17,229	2,790,333	3,564 multilevel classes	N/A
Portugal	6,976	772,154	N/A	N/A
Romania	N/A	970,295	54%	177,560+24,117 (classes I-IV+V-VIII) (20.8%)
Spain	8,514	2,619,875	675 (8%) unitary rural school	91,846 (3.5%)
United Kingdom	22,344	5,045,900	4,083 mixed age/level classes est.	478,400 (9.5%) est.

Table 55: Multigrade schools in NEMED's countries

Internet penetration in NEMED'S countries					
	Population (2007 Est.)	Internet Users latest available data ¹	% Population (Penetration)	Usage Growth (2000-2007)	Rank
Portugal ²	10,539,564	7,782,760	73.80%	211.30%	1 (+22.00% EU avg.)
Finland	5,275,491	3,286,000	62.30%	70.50%	2 (+10.50% EU avg.)
United Kingdom	60,363,602	37,600,000	62.30%	144.20%	2 (+10.50% EU avg.)
Italy	59,546,696	31,481,928	52.90%	138.50%	3 (+1.10% EU avg.)
TOTAL EU 27	493,119,161	255,580,191	51.8 %	170.80%	
Spain	45,003,663	19,765,033	43.90%	266.80%	5 (-7.90% EU avg.)

¹ Cyprus: 8/07, Finland: 9/05, Greece: 3/05, Hungary: 8/07, Italy: 7/07, Portugal: 9/06, Romania: 9/07, Spain: 7/07, UK: 8/07, Total EU27: 6/07

² There are conflicting data regarding Internet users and broadband penetration in Portugal (as well as in all other countries). Data from EU authorities and organisations are significantly lower than the included in this report. Internet World Stats data were preferred since they are gathered from multiple sources and are updated more frequently.

Cyprus	971,391	356,600	36.70%	197.20%	6 (-15.10% EU avg.)
Greece	11,338,624	3,800,000	33.50%	280.00%	7 (-18.30% EU avg.)
Hungary	10,037,768	3,050,000	30.40%	326.60%	8 (-21.40% EU avg.)
Romania	21,154,226	4,940,000	23.40%	517.50%	9 (-28.40% EU avg.)
TOTAL WORLD	6,574,666,417	1,244,449,601	18.90%	244.70%	

Table 56: Internet penetration in NEMED's countries

Broadband penetration in NEMED's countries					
Internet Users	Broadband connections, latest available data ³	% of Internet users	% of population	Rank (% of population)	
Finland	3,286,000	1,518,900	46.22%	28.79%	1 (+11.06% EU avg.)
United Kingdom	37,600,000	14,361,816	38.20%	23.79%	2 (+6.06% EU avg.)
TOTAL EU 27	267,458,327	87,413,669	32.68%	17.73%	
Portugal	7,782,760	1,760,341	22.62%	16.70%	4 (-1.03% EU avg.)
Spain	19,765,033	7,505,456	37.97%	16.68%	5 (-1.05% EU avg.)
Italy	31,481,928	9,427,300	29.95%	15.83%	6 (-1.9% EU avg.)
Hungary	3,050,000	1,198,709	39.30%	11.94%	7 (-5.79% EU avg.)
Romania	4,940,000	1,769,300	35.82%	8.36%	8 (-9.37% EU avg.)
Cyprus	356,600	72,420	20.31%	7.46%	9 (-10.27% EU avg.)
Greece	3,800,000	787,000	20.71%	6.94%	10 (-10.79% EU avg.)
TOTAL WORLD	1,244,449,601	304,471,379	24.47%	4.63%	

Table 57: Broadband penetration in NEMED's countries

³ Cyprus: 8/07, Finland: 3/07, Greece: 3/07, Hungary: 12/06, Italy: 3/07, Portugal: 12/06, Romania: 9/07, Spain: 7/07, UK: 3/07, Total EU: 9/07

	Total	Primary	Urban	Rural
UK	67	67	66	67
FI	62	62	64	61
EU	45	47	45	45
IT	43	39	42	40
ES	40	45	37	48
HU	33	31	38	31
CY	30	27	28	30
PT	24	26	27	27
EL	15	15	16	13

Table 58: NEMED's countries score (subjective indicator)

	Primary score *GDP 2 years	Primary score *GDP 1 year	Initial primary score	Public expenditure for primary education as % of GDP
UK	194	114	67	1.7
FI	111	83	62	1.34
CY	96	51	27	1.89
PT	90	48	26	1.86
ES	65	54	45	1.2
EU	62	54	47	1.15
IT	58	48	39	1.22
HU	34	32	31	1.045
EL	15	15	15	1

Table 58: Anticipation of ICT's progress in NEMED's countries

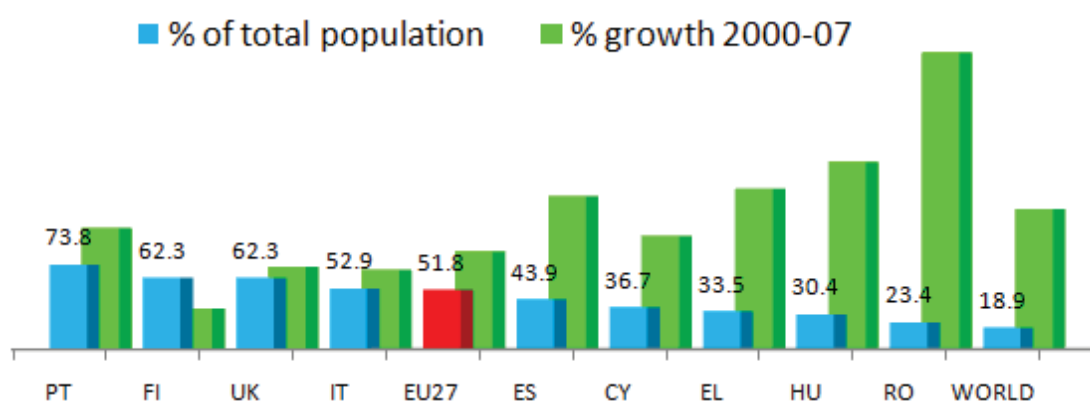


Chart 1: Comparison between Internet penetration and growth rate (bars indicating % growth were reduced to half of their original size)

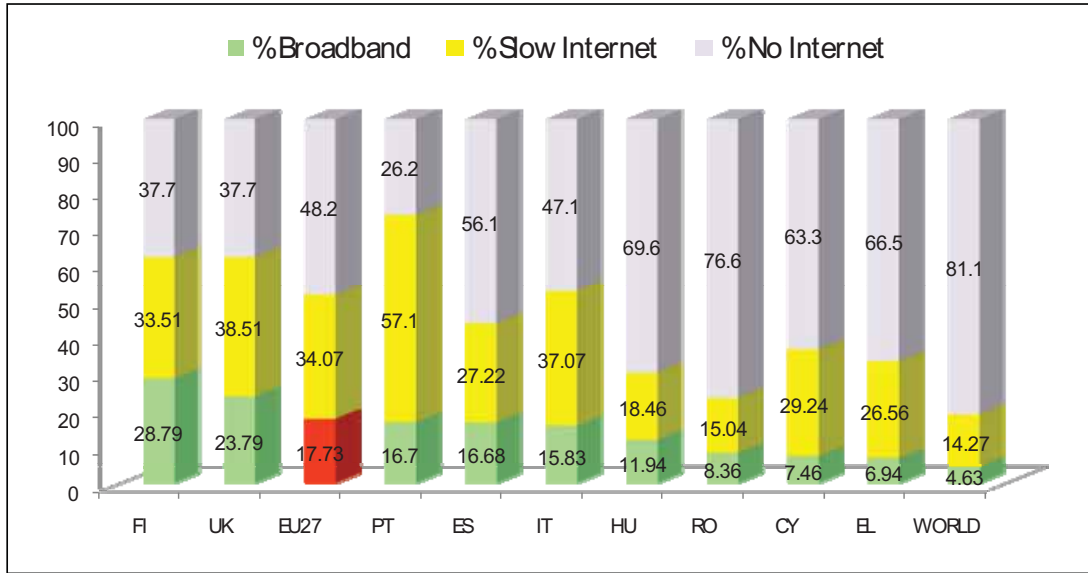


Chart 2: Percentages of population with broadband, simple and no Internet connections

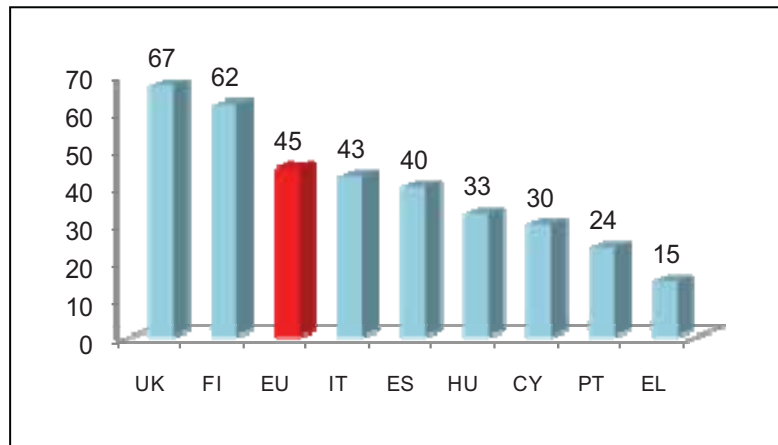


Chart 3: NEMED's countries score (total)

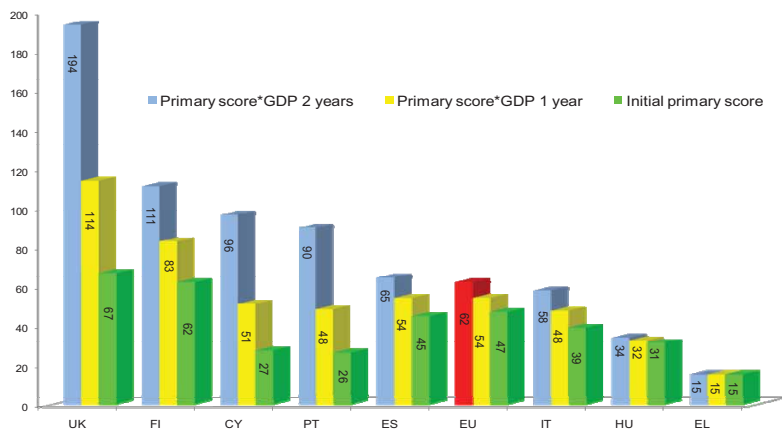


Chart 4: Anticipation of ICT's progress in NEMED's countries



CHAPTER 5.

5

The teachers Management role /
Basic Behaviour

5.1 The teachers' management role

5.1.1 The teachers' management role/basic behaviour

One of the main difficulties that teachers of multigrade schools have to face is the fact that the particular post is more demanding than in a monograde school. If the teacher is incompetent, then this fact will be easily noticed. As a result, there is no room for weak teachers in multigrade schools. The responsibilities are more, the environment is different, and therefore competent teachers are of vital importance. If one of the teachers in a multigrade school is finding it difficult to cope, then the consequences to the pupils will be particularly damaging.

With this chapter our basic aim is to provide teachers with some useful guidelines that will help them with the organisation of their class and point out the variety and complexity of the roles that they have to undertake in order to succeed in a multigrade school. First we begin with some difficulties that teachers face in multigrade schools, and then we discuss the teachers' role as well as the heads' role. Afterwards, we provide some best practices that teachers can use and the chapter ends with a conclusion.

5.1.2 Difficulties That Teachers Face

Due to its size and to the small number of pupils a multigrade school inevitably has mixed age classes. These kinds of classes may also be found in terms of vertical classes, family grouping or multigrade classes. By that we mean the classes where children of different chronological ages are taught together in the same classroom. Teachers should face this fact as the greatest challenge that they have to face

in a multigrade school.

Another issue which is very often raised as a weakness of the multigrade school is teacher isolation. Isolated teachers are the ones who prefer to work in privacy, do not wish to exchange ideas about their work and believe that they are competent enough to teach effectively for the rest of their career. This is more likely to happen in a multigrade school where the exchanging of ideas, methods and problems among colleagues is limited due to the small number of staff. Isolation has effects both on teachers and children. To minimise these effects teachers should communicate their ideas and common interests with their colleagues and present clearly what they do to everybody.

Another set of difficulties teachers have to deal with regards to the management of time, since the organising of the work in the classroom involves not only managing the children and planning the curriculum, but also managing time, space and resources. Time is a very important resource, especially in the multigrade school where the children have to work on their own for extensive periods of time. To make the best use of it teachers should set clear objectives and organise the school day by using a variety of activities. Also, teachers have to use the existing resources as best as they can and try to improve them within their capabilities.

5.1.3 Teachers' Role

It is a fact that teachers are the most expensive and important resources in any classroom, especially the multigrade one. As we have already mentioned, teachers' role in a multigrade school is a demanding one. The heavy work load that has to be shouldered by a small group of staff, the mixed age and ability classes, the small number of colleagues, the need to

offer the same curriculum as in monograde schools with no additional support, are all examples of the particular demands made on teachers. In order to succeed, teachers have to give answers to quite a few problems. They have to decide on a number of things which classroom management involves and find the best solutions for each situation. That is why the teachers' management roles and basic behaviours are a constituent part of teachers' effectiveness and success.

Let us now examine some of these roles and behaviours. In the first place, we have the different approaches and techniques that teachers can use. The decision depends on the particular group of children and the subject to be taught. Some suggestions are direct teaching, group work, learning by investigation, learning through discussion, learning from materials, learning with computers and audio-visual aids. It is important to use different approaches and techniques so as to motivate the students and keep their involvement and interest continuously at high levels. Their seating and working arrangements should each time vary according to the task. Furthermore, teachers should provide pupils with additional educational resources (e.g. web resources) which can be used when silent work is in progress.

Secondly, there is the classroom climate which should be purposeful, task-focused, relaxed, friendly, flexible, interesting and with an established sense of order. Pupils should be encouraged and supported to learn and the relationships should be based on mutual respect and rapport. Teachers have to facilitate cooperation among pupils and help them out with self-learning activities. Teachers should have in mind that the kind of climate they establish in their classrooms will have an important impact on the level of learning of their pupils.

Thirdly, teachers should consider discipline in relation to pupils' movement and acceptable level of noise. Teachers should discuss with their pupils these matters and set clear rules and expectations regarding their behaviour. It should be clear that teachers are the persons in authority and that they should control the management of learning activities. Teachers should always try to find out the causes of misbehaviour and not only suppress the symptoms. The degree to which discipline can be imposed is limited and it depends more on consent

and the degree of respect forthcoming from the pupils. Most examples of misbehaviour can be prevented by careful lesson planning. Pupils will misbehave if they have nothing to do, if the work is too hard or if they are waiting for resources. Once the lesson is in progress, constant monitoring of what is going on in the class is the most effective way of preventing misbehaviour.

Fourthly, we need to consider the classroom's physical environment and appearance. The physical impression of the class may be an ally to the teaching and is conducive to positive pupil attitudes. The class should always be clean and tidy and teachers should try to put their personal seal in the room.

Finally, but no less important, is the teacher's presentation. Teachers should get the attention of the class before they start and the first few minutes should motivate pupils' interest and arouse their curiosity. Teachers have to persuade pupils about the utility of each chosen subject to be taught and explain to them the specific actions expected of them. Teachers should also keep their voice level to the minimum necessary and vary the volume and pace to give variety. In addition, they should take great care in the use of language and remember that much communication between teacher and pupil is non-verbal.

Teachers in multigrade schools have a variety of tasks that they need to undertake. These among others include the following:

- The observation of pupils
- The organisation of the learning programme
- The selection of learning material
- The presentation of learning material
- Matching work to pupils
- The structuring of pupils' learning
- Training learning behaviour
- Providing inspiration and encouragement
- Organising a learning environment
- Ensure that pupils develop a common understanding with the teacher

- Assessing and recording pupils' progress and development
- Assessing teaching performance and approaches.

Besides these tasks, teachers in multigrade schools also need to have some teaching skills, the most important of which are:

- Observing and interpreting pupils' behaviour
- Skills of organisation and control
- Communication skills
- Planning skills
- Problem-solving skills
- Evaluation skills.

Teachers' role in establishing authority in the classroom and the social climate can vary. Teachers can adopt different roles, including the following:

- Commander-in-chief, who carefully controls and hones pupils' behaviour by organising and providing all the stimuli needed for learning to occur
- Translator or summarizer of ideas provided by the pupils
- Equal partner with pupils in creating ideas and problem solutions.

In Table 1.1, five indicators related to effective classroom management are provided in conjunction with poor classroom management indicators. These will help teachers realise the dimensions to which attention should be given. To sum up, we could say that teachers in multigrade schools need to fulfil a wide range of roles and behaviours which among other include: plan and organise pupils' work, communicate effectively, lead by example, coordinate and guide learning, motivate and counsel pupils, control their behaviour and assess their performance.

If teachers of multigrade schools have the above points in mind, then it is expected that their work will be facilitated and they will be successful in their role to a great extent. What is needed is hard work and a positive attitude that the appointment in a

multigrade school is mainly a learning experience.

5.1.4 Heads' Role

We should also point out that running a multigrade school is definitely not an easy job to do. The load of heads is dual. They are responsible for managing the school and in addition they are responsible for the teaching of one of the classes. One could argue that the role of the teaching head in the context of the multigrade school can be a peculiar and problematic one in a number of respects and might constitute one of the more obvious anachronisms in the education system. The responsibility for whatever happens in the school will inevitably focus on the head, so the combination of both teaching and managing roles is extremely demanding.

The heads' role in a small community is quite complex. Heads should act as examples and prove their professional ability to the other staff to make them confident and respected. Moreover, heads act as initiators and facilitators by leading the staff with their ideas in order that development and innovation can take place and help them to grow professionally. Finally, heads act as evaluators, since there is frequent isolation from external sources of advice.

It is obvious that the role of heads for the effective management of multigrade schools is very important, since they are asked to fulfil two distinct but interlocking roles – the one of the manager and the one of the class teacher. Multigrade schools need inspired teachers for their effective management and for meeting the challenges of the 21st century, therefore appropriate appointments to these schools should be a matter of first priority.

5.1.5 Best Practices That Teachers Can Use

Classroom management

- Good management is the key to class control. One of the first steps teachers should undertake is to establish a warm and friendly environment

in their class. This depends on the relationship with pupils and the way that they manage their behaviour. A good suggestion is that teachers should devote some time at the beginning of the school year in order to develop pupils' skills in the ways that they will work during the year.

- Teachers should always use disciplinary action as a last resort and remember that skilful teaching and good classroom management are the most effective strategies that they can use to control behaviour in their classrooms. Pupils who are stimulated by their teachers' lessons and who are interested in the activities that have been prepared for them will have little time or inclination for misbehaving.
- Problems usually start when pupils have nothing to do or if the task has not been explained properly to them. Teachers occasionally need to remind their pupils of the reasons for their rules. Pupils will be more likely to follow rules that they understand and accept. If pupils participate in their preparation, this is even better.
- In a multigrade setting it is important for teachers to let their pupils have some responsibility for managing their own behaviour and show that they trust them to work well on their own. Pupils can work in pairs where more able pupils help less able ones in order not to disturb the teacher when teaching with another class.

Lesson management

- Teachers should start the lesson by giving each group a clear indication of what they are going to do (their activities) and timing for that lesson. If teachers want the pupils to move to different areas of the room, then they have to make sure that they know when to do this. Something that keeps pupils' interest and prepares them for the lesson to follow is to read them a story every day before the lesson starts.
- The pace and flow of each session should be maintained at a level appropriate for each group. There should be a difference in the way younger and older groups are taught.
- Pupils should be clear about the way in which

teachers expect them to move from one activity or teaching area to another.

- The progress of each group should be monitored at some point during each lesson and teachers should plan to spend a longer time with each group discussing the lesson and giving help to groups or individuals where necessary.
- Any extra resources that pupils will need to use should be prepared in advance and pupils should know where to find them.
- Effective management strategies should be used to control noise and movement in the class rather than disciplinary measures. Clear procedures for handling these issues should be agreed on with pupils right from the beginning.
- Five minutes at the end of each lesson period should be left to check that tasks have been completed and to summarise the learning of each group during that session.

Classroom organisation

- It is particularly important that the arrangement of the classroom is as flexible as possible so that teachers can easily make changes in order to meet different teaching situations.
- Teachers may find it useful to provide specially designated learning areas in the classroom because pupils are often required to work on their own and they need to be able to find appropriate learning resources. One way to achieve this is to have in a corner of the class an exercise book which has various activities, such as crosswords, find the differences, write the story through the pictures etc.; then, pupils choose the work they want to do.
- Pupils will get restless if they have to stay in the classroom all the time. Teachers should provide them with opportunities to work outside when appropriate.

Display techniques

- Displays are essential as a means of helping pu-

5.1.6 Conclusions

pils to learn. They should include material developed by pupils and items to stimulate interest, developed by the teacher. When pupils finish their work they can type it on the computer to be displayed as well.

- Displays should always have a specific purpose linked to the teaching or to the interests of the pupils; as far as possible they should be made of materials that can be easily obtained in the local area.
- Even in the most limited environment, it is possible to find ways of displaying work and create an interesting and stimulating classroom.

The kind of classroom climate that teachers establish and the way in which they manage their pupils can have an important impact on their learning achievements. They do not only affect the pupils' level of learning, but also their willingness to learn and the way that they behave in class. The overall appearance of the classroom can affect the attitude of pupils towards learning. Ways in which teachers can stimulate interest and provide opportunities for independent study have been proposed. There will always be constraints on the way in which teachers organise and manage the classroom due to the size of the room or the availability of resources. We do hope that this chapter has pointed out some of the skills needed for effective classroom management and has shown the basic roles and behaviours that teachers need to possess in order to be able to better teach in a multigrade setting.

Good classroom management (effective teacher)	Poor classroom management (ineffective teacher)
1. Arranges the classroom to meet instructional goals (for example, uses appropriate classroom organisation to promote lesson goals)	1. Fails to establish a classroom arrangement that matches the instructional goals
Pre-establishes classroom rules (for example, in the areas of speaking out, getting out of seat, group work, make-up work, in-class assignments, instructional activities, etc.)	2. Fails to inform pupils orally and visually of expected behaviour
3. Develops instructional routines (for example, in the areas of beginning of class, group activities, assignments, instructional activities, etc.)	3. Fails to develop procedures that guide pupils through most frequently repeated tasks
4. Establishes a system of incentives and consequences to respond to appropriate and inappropriate behaviour	4. Fails to develop an adequate system of reward, reinforcement and consequences to promote appropriate behaviour
5. Uses low-profile classroom control to maintain instructional momentum	5. Responds to misbehaviour in ways that disrupt the flow of the lesson and increase loss of instructional time

Table 5.1: Indicators of classroom management

Source: Adapted from Borich (1999).

Τετάρτη

Πέμπτη

Παρασκευή



6°C



7°C

CHAPTER 6.

6

Multigrade classroom
management

6.1 Introduction

Managing a multigrade classroom is difficult because there is more than one grade level in the classroom. Sufficient planning time must be available to meet the needs of both teacher and students. Hence, the teacher must be skilled in managing instruction to reduce the amount of 'dead time' during which children are not productively engaged on task. This means that teachers must be aware of different ways of grouping children, the importance of independent study areas where students can go when they have finished their work, and approaches to record keeping which are more flexible than those prevalent in the monograde classroom. Students may need to be taught the value of independence and cooperation by involving them in classroom decision making.

The multigrade classroom appears to be more labour intensive and requires more planning, collaboration, and professional development than the conventional graded classroom (Cushman, 1993; Gaustad, 1992; Miller, 1996). Insufficient planning, staff development, materials, support, and assessment procedures will have an impact on the success of the multigrade program. Despite these constraints, there are special benefits to multigrade

classrooms, both for learners and teachers:

- Flexible schedules can be implemented and unique programs developed to meet students' individual and group interests and needs.
- Combined classrooms also offer ample opportunity for students to become resourceful and independent learners.
- Students learn to set personal learning goals, assess themselves and reflect on their own learning
- Multigrade classroom provide opportunities for students to gain self-knowledge as they interact with older and younger peers.
- Teachers have more time to develop a deeper understanding of each student's strengths and needs over two or more years and can plan instruction at the student's level of development
- In planning programming for two or more years, teachers have opportunities to be more flexible with curricula, planning projects around student interests

6.2 Classroom Management Strategies

Placing students from several grades in one classroom does not in itself create a successful multi-age classroom, however. Multi-age classrooms are based on a student-centred, subject-integrated approach to learning. Managing the multigrade classroom is an essential element in successful instruction and

requires good organizational ability and consistency. Students come into the classroom expecting the teacher to give them guidance and direction about rules and procedures and how the classroom is organized for instructional use. Having a uniform and predictable set of rules and procedures simplifies

the task of being successful. Having clear and efficient routines makes classroom life run smoothly. Because there could be many different levels in a multigrade classroom, the need for clear, consistent rules and procedures is even more critical than in traditional, single-grade classrooms.

A literature review conducted by Wang, Haertel, and Walberg (1993) found that classroom management had the largest effect on student achievement (Marzano, 2003). Effective multigrade teaching involves the use of a range of strategies that can be followed to help create an effectively managed classroom, with the aim of successful pupils' instruction:

Be Prepared

- If you are getting a new class of students, learn their names and a little bit about them before school starts.
- Establish several classroom rules with the students. They will be more apt to follow them since they have helped develop them.
- Establish procedures
- Explain to the students what is expected of them.

Be Planned

- When planning your day, provide as much detail

as possible.

- Ensure that you have enough work and activities planned for the day. Begin teaching at the beginning of the class and stop when the class is finished.
- Vary the activities throughout the lesson.

Be Organized

- Assign each student a number at the beginning of the year to help keep track of books and assignments.
- Have a large envelope on the bulletin board to place extra copies of assignments. If any students are absent, missed assignments can be easily accessed.
- Keep important information and papers in a binder that can be easily accessed.
- Mark and return student work promptly.

Effective teachers have been consistently observed by researchers to engage in three distinct phases of **classroom management** and discipline:

- planning before school begins,
- implementing plans, and
- maintenance (Emmer, 1987).

6.3 Preparing for the beginning of school

It is expected that effective teachers make their expectations explicit through clear rules and procedures that are consistently taught and enforced. The first two or three weeks of school are used to establish teacher's expectations. In this respect, early planning and preparation is critical for starting the school year right. Before the students arrive, the teacher must develop a vision of classroom life: how students will behave and relate to one another, where they will work, how resources will be organized, etc. During this phase, teachers focus on

planning the arrangement of the classroom, organizing supplies and materials, and planning instructional activities for the first few days of school.

Key areas for teacher attention:

- Arranging the classroom
- Identifying expectations for behaviour
- Planning consequences (rewards...)
- Student participation

6.4 Beginning the school year:

During this phase, the teacher tries to put into practice the plans that have been developed before the start of school. This is the time when norms are established and students develop a view of how “their particular class will operate.”

Key areas for teacher attention:

- teach students to behave
- consider students’ concerns
- lead the class
- the teacher as a model

6.5 Maintaining good discipline

Once the school year started and positive student social and academic norms have been established, the teacher must seek to maintain these norms. In this phase, the teacher’s role shifts toward keeping high levels of student engagement and preventing disruptions of the learning environment.

Key areas for teacher attention:

- Monitoring and handling inappropriate behaviour, by:
 - focusing the students’ attention;
 - direct instruction (telling the students exactly what will be happening);
 - monitoring /check on the students’ progress)
 - use active participation methods
 - encourage empathy
- Organizing and conducting learning activities, by:

- clearly sequenced and presented activities
- encourage pupils to ask questions
- focus on understanding of concepts
- encourage cooperation and understanding
- avoid “closed” questions
- don’t be afraid of noise when it comes from the working pupils
- organize the learning environment

Activities that are well-planned, clearly sequenced and presented, and provide for high levels of student success tend to produce a high degree of student engagement. When students are actively learning, they are less likely to become involved in inappropriate behaviour. Effective teachers also organize the learning environment to reduce the amount of influences that can disrupt the flow of instruction, whether in teacher-led groups, small workgroups, or during independent seatwork.

6.6 Classroom organization strategies

In the typical multigrade classroom where multiple activities are likely to occur at the same time, **classroom organization** is a critical factor in developing smooth, predictable routines. It is known from research on effective classroom practice that when students have a clear understanding of classroom structure, procedures and rules, they are more likely to follow them, especially if they have had some involvement in decision making.

The main aim of any classroom organization is that pupils have a clear understanding of classroom structure, as well as procedures and rules.

Activity centre - an area of the classroom that the teacher has designated for a specific purpose):

- individual desk/seatwork, where students work independently at a desk.
- pairwork, where two students work together
- groupwork where three or more students working together
- areas designated for art, audio-visual equipment, computers, and other instructional resources.

Learning centres - *are independent stations set up throughout the classroom where children can go to actually engage in some learning activity. Children choose the center they will go to and decide on the amount of time to spend there. The learning center approach provides a time when children explore and practice skills to their own satisfaction. These centers provide children with opportunities for hands-on learning, cooperative learning, social interaction, real-life problem solving, autonomous learning, and open-ended activities. "Open-ended activities allow for each child to successfully engage in the activity at whatever skill level the child happens to be," notes Stone (1995). Learning centers should reflect the goal of active learning; they must not be workstations full of worksheets for students to complete. Learning centers offer an opportunity for children to be responsible for their own learning; this responsibility is the foundation for*

lifelong learning (Stone, 1995).

Subject area resource center - where student resources relating to a specific subject are located.

Types of activities that can be found in classrooms:

- individual study
- group work
- whole-class instruction
- brainstorming
- audio-visual and reference work
- testing/assessment

Furniture and equipment should be arranged to create activity centers appropriate to the type of activity you intend to occur.

Designing the classroom – guiding principles:

- organize the classroom as a center of learning activities
- furniture and educational materials have to support the types of learning
- organize the classroom resources within subject-area resources center(s)
- assure the flexibility of the classroom arrangement in order to accommodate new learning activities
- involve the children for the room arrangement
- place a picture chart of the sequences of daily activities so that the pupils can see what come next
- separate quiet and noisy activities areas

Examples of seating arrangements have been pre-

sented in annex to indicate the flexible approaches that can be adopted.

6.7 Conclusions

This chapter presents the findings of a literature review aiming at highlighting the main issues related to the multigrade class management and organizational strategies. Managing the multigrade classroom is an essential element in successful instruction and requires good organizational ability and consistency. Furthermore, in the typical multigrade classroom, where multiple activities are likely to occur at the same time, organization is a critical factor

in developing smooth, predictable routines.

While the ICTs penetrating within the rural remote areas, where most of the multigrade schools are located, the class management and organization strategies need to be re-evaluated in order to take advantage of the use of software tools such as virtual classrooms and communication channels like satellite links.

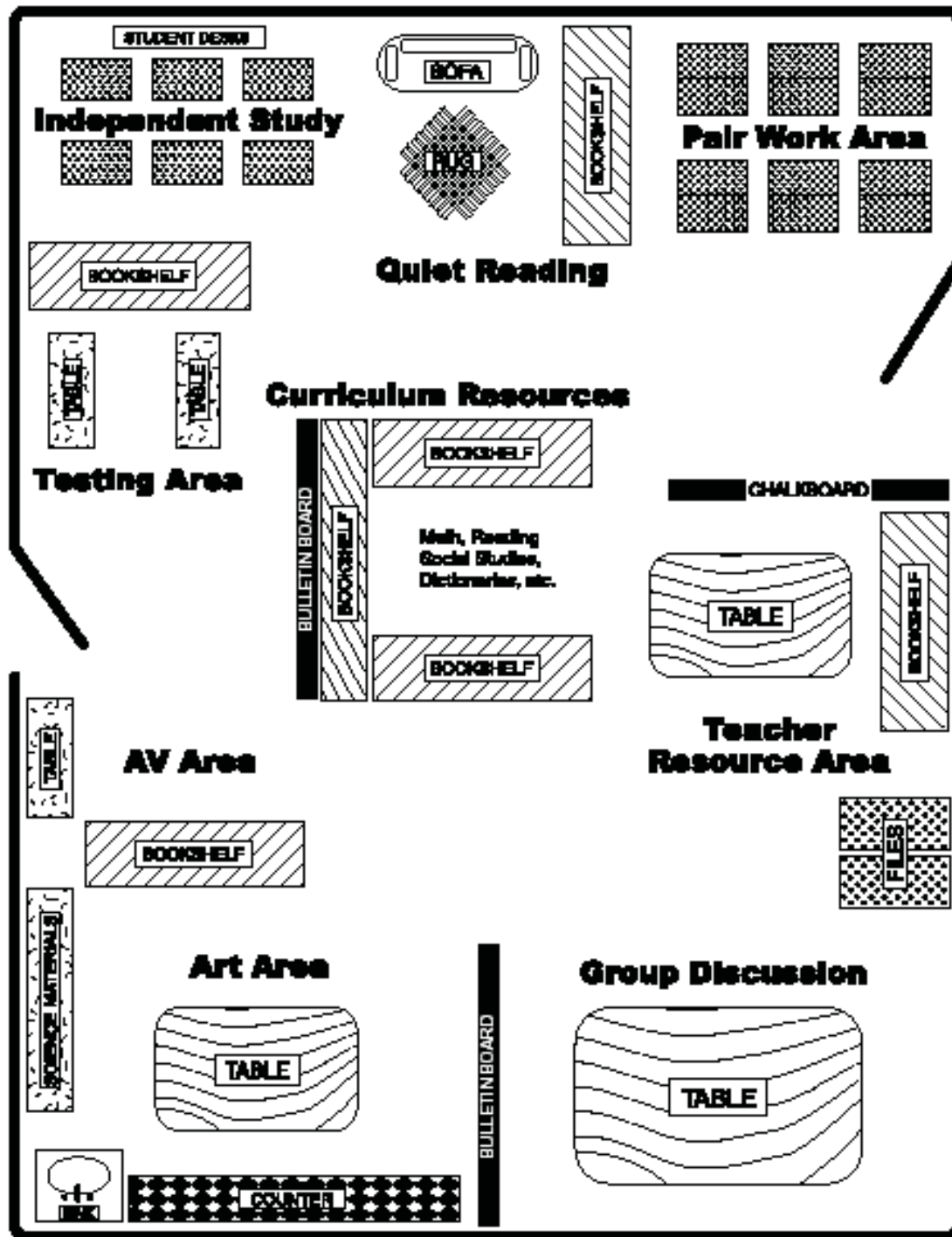


Figure 6.1: Self-Contained Classroom (Organized by Areas of Activity)

Source: "The Multigrade Classroom: A resource handbook for small, rural schools/Book 3: Classroom Management and Discipline", Susan Vincent (ed.), Northwest Regional Educational Laboratory, Portland, Oregon, 1999

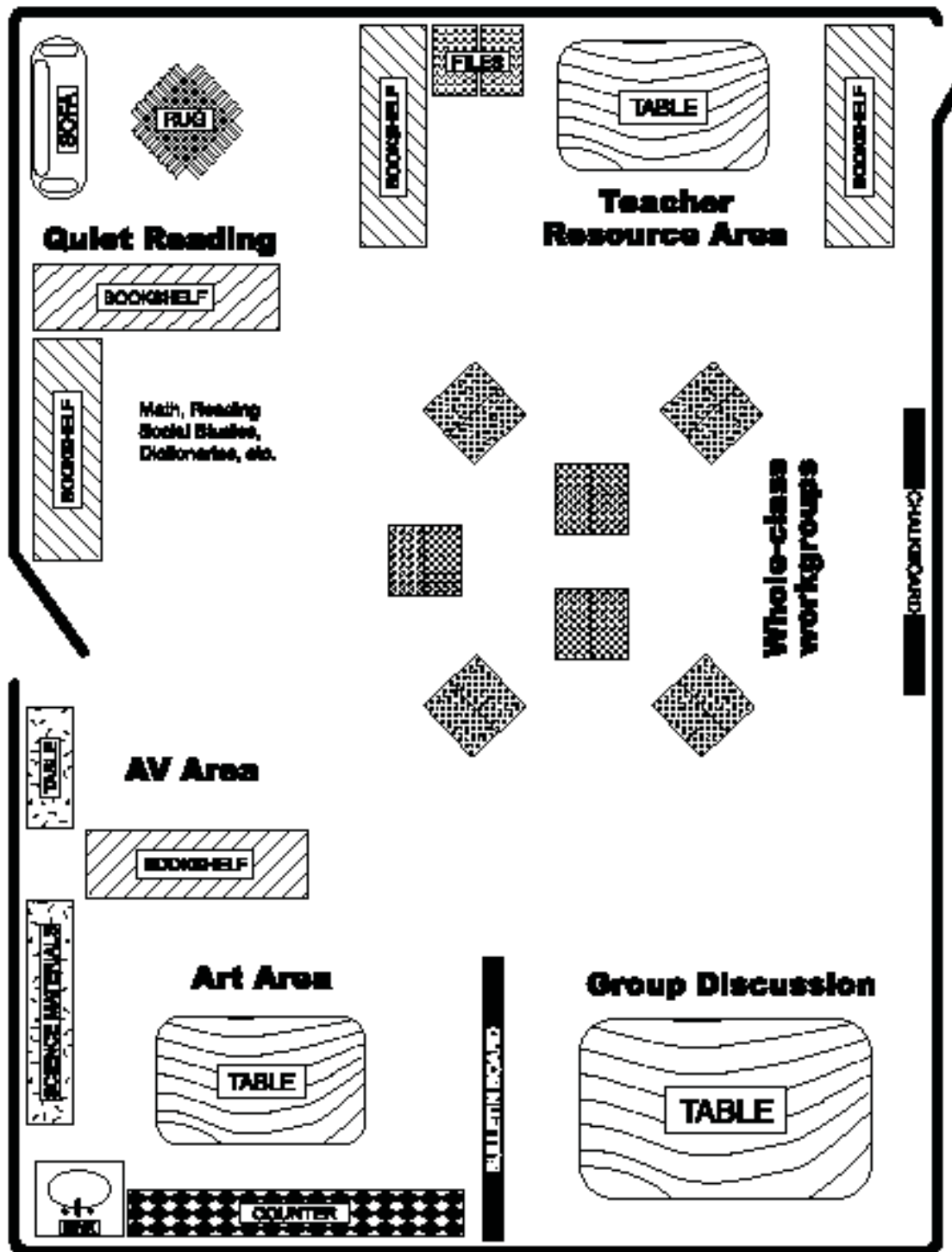


Figure 6.2: Self-Contained Classroom (Organized for Cooperative Learning)

Source: "The Multigrade Classroom: A resource handbook for small, rural schools/Book 3: Classroom Management and Discipline", Susan Vincent (ed.), Northwest Regional Educational Laboratory, Portland, Oregon, 1999

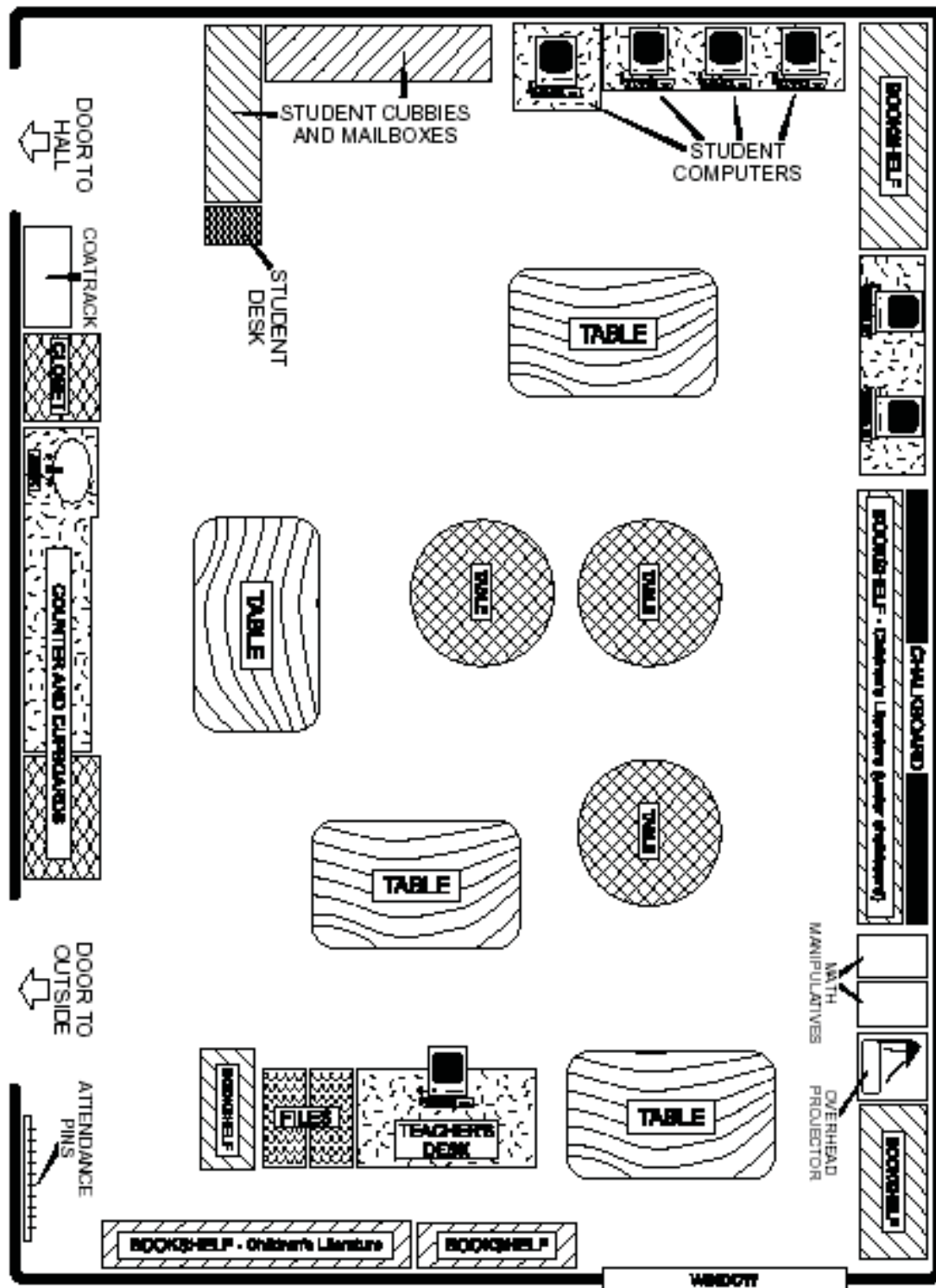


Figure 6.3: Comprehensive Classroom Layout

Source: "The Multigrade Classroom: A resource handbook for small, rural schools/Book 3: Classroom Management and Discipline", Susan Vincent (ed.), Northwest Regional Educational Laboratory, Portland, Oregon, 1999

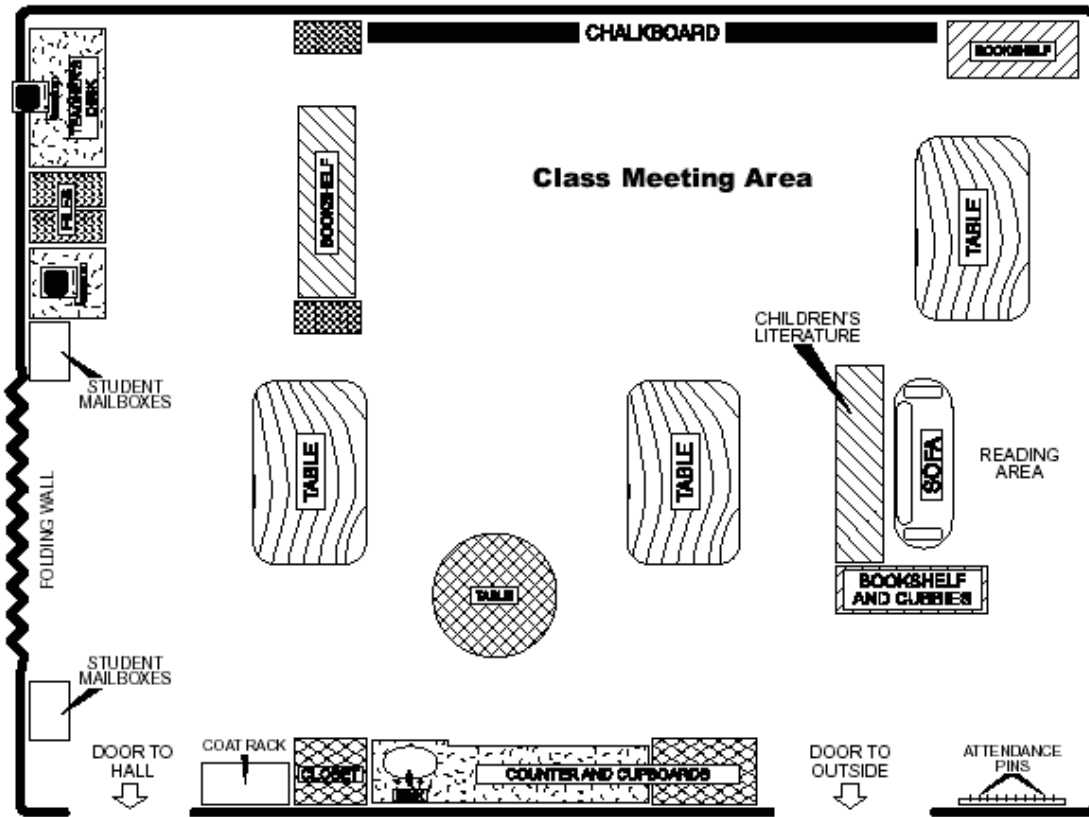
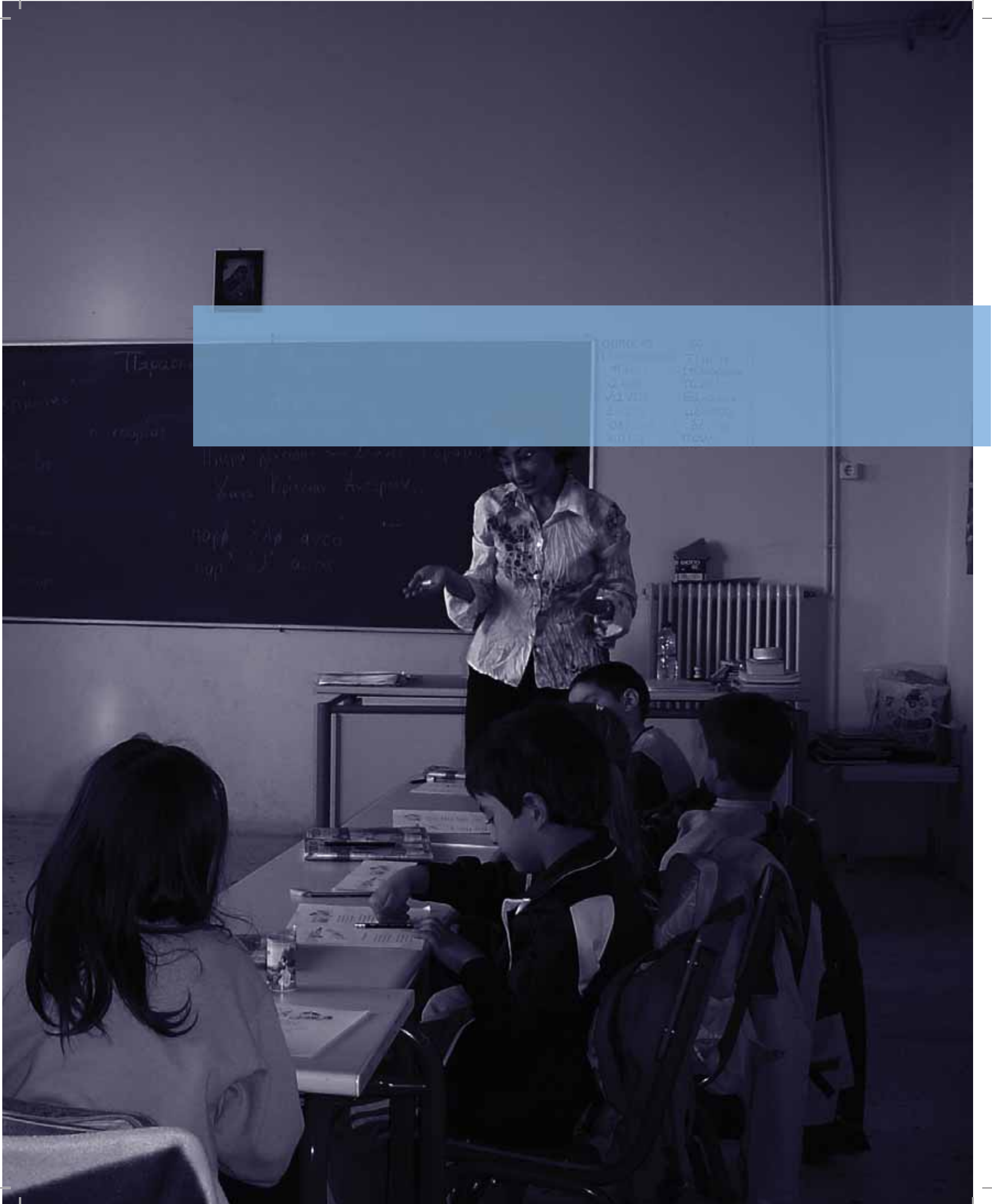


Figure 6.4: Self-Contained Classroom (Organized for Flexibility)

Source: "The Multigrade Classroom: A resource handbook for small, rural schools/Book 3: Classroom Management and Discipline", Susan Vincent (ed.), Northwest Regional Educational Laboratory, Portland, Oregon, 1999



Математика

Курс	Семестр
1	1
1	2
2	1
2	2
3	1
3	2
4	1
4	2
5	1
5	2
6	1
6	2
7	1
7	2
8	1
8	2
9	1
9	2
10	1
10	2
11	1
11	2

CHAPTER 7.

7

Education Process
management

7.1 Education Process Management

Psychological environment in class has an immense impact on both learning and evolving. This environment is the result of a system of parameters that interwork. There is a complex pattern of relation between:

- Teacher and the rest teachers of the school
- Teacher and students
- Students of the same class between them
- Students of different classes
- Each Student – each subject of the curriculum
- Teacher - each subject of the curriculum
- Teacher – service’s problems (lack of satisfaction about the school he/she is appointed....) social/economic/personal problems
- Coercive power (Imposition of penalties to discourage some actions)
- Legitimate power (Obligation of obedience)
- Referent power (Head master functions as a model)
- Expert power (Head master is accepted to have advanced skills)

There are some parameters that evaluate the value of head master. The headmaster is responsible for some important roles:

As one can see the parameters that have a strong influence on the general classroom’s environment are very complicated and difficult to measure.

There is a dominant “culture: in each school unit, which defines morals, principles, routines, interpersonal relations and more. In this point one needs to mention that the role of the headmaster is crucial. He/She is the one responsible for:

- Authority
- Coordination of personnel
- Influence and encouragement
- Facilitation in personnel’s visions and needs
- Creation of a general culture”, massive goals and visions for school
- Reinforcement of collective autonomy
- Handling of frictions
- Enhancement of communication between colleagues
- Actual interest for personnel’s needs/
- Cultivation of the students of feeling that they “belong” to school’s society, which is a separate society
- (Decoration of school, atmosphere of cooperation, school’s participation in competitions, extra-school activities, representation of school in educational, athletic, social and cultural events)
- Simple and clear limitations: all discipline procedures have to be explicit and not to leave possibilities for misunderstanding
- Facilitation and encouragement of learning
- Positive communication with parents and local authorities
- Improvement of building’s condition

According to bibliography a headmaster has several means to exercise his/her role:

- Reward power (These rewards encourage some actions and discourage some more)

The psychological environment in classroom is depended on a wide range of parameters:

- Cohesiveness between students
- Diversity between students
- Formality
- Speed of lesson
- Material environment
- Frictions between persons
- Goal direction
- Favouritism
- Difficulty of subject
- Apathy / indifference
- Democracy
- Cliquishness - factionalism, Formation of dominant groups that do not wish to mix up
- Satisfaction
- Disorganization
- Competitiveness

What school defines as desired attitude is not something that student possesses, it is something that student gradually grasps. Parameters that assist discipline are:

- Teacher's personality
- Interpersonal relationships
- Classroom structure
- Initial impression
- Lesson's quality
- Means that encourage desired attitude
- Teacher's preparation
- Clear expectations as far as teacher's aims
- Connection of lesson with previous knowledge and with extra-school experience

- Creation of enthusiastic atmosphere
- Justification of lesson's utility
- Reassurance of satisfaction/ pleasure during the learning procedure
- Emphasis in understanding gaps that would obstruct future understanding
- Projects, cross-curriculum/interdisciplinary approach
- Multimedia enhanced learning
- Interned based research for location of information

There are special techniques of attracting attention and preserving it:

- Surprise
- Multimedia enhanced teaching
- Humour
- Dilemma questions
- Questions regarding freshly presented material
- Acoustic and vision aims
- Colouring voice
- Keeping motion in class (keep moving in the classroom, avoid sitting on the desk for long time)
- Exploitation of the effect of pause
- Changing teaching rhythms
- Changing teaching tools
- Changing evaluation tools

Although these changes should be embodied in an understandable routine

Reward is a critical means

+	-
It is clearly and personally addressed	When it is vague and general
When there is a strict and fair analogy and classification between the reward and the rewarded action	When this analogy is violated and disproportionate
When the reward timing is close to the rewarded action	When timing is distant from rewarded action
When it is unbiased	When it is the result of favouritism and partialism
When it rewards results compared to abilities	When ignores the personal ability and potentiality
When it rewards not only result, but also effort, willingness, interest, involvement	When it focuses only in result
Has as an aim to improve	Has as an aim to insult
Is made on a friendly, warm tone	Is made aggressively and without control

7.2 Indiscipline Issues Management

Indiscipline events can occur in different timing:

During daily examination	Lack of interest, boredom, noise
During teaching	Indifference, dissipation of mind, absent mindedness
During breaks	Aggressiveness, seeking for negative attention, bad language, isolation...
Negative attitude in general	One student who repeatedly and steadily cause problems of deviant behaviour.
Massive negative attitude	All students in a classroom producing a high level of noise, unwillingness, diminished attention, diminished performance

Reasons for indiscipline

- Boring lesson, unprepared, with repetitions, with loose connection and structure, with low level of participation motivations
- Negative relationships between teacher and student, Insult of student's personality from teacher
- Indifference for the specific lesson, lack of acceptance of the utility of the lesson
- Lack of self respect from the student, antecedent feeling of failure, relinquishment / quitting, boredom, negative behaviour

- Harsh extra-school conditions for the student (Family problems, social, economical problems, racism....)
- General friction with school authorities because of previous and settled negative experiences.

Controlling indiscipline

There is an escalation in controlling:

	1	2	3	4	5
NON VERBAL	Ignoring Negative attitude	Persistent Stern look	Moving towards as a warning	Light tapping on the shoulder	
VERBAL	Whispering Warning, defining precisely the annoying action (eg Do not use “Please, stop this”, in general, BUT “Please, stop talking to your classmate”	Calling student’s name sternly and firmly OR:	Using a humorous approach	Gentle demand to stop the annoying action	Reminding penalties for the specific deviant action, always respecting privacy and using a low voice tone addressed tactfully to the student
IN ACTION MEASURES	Implementation of penalty (Penalties should also be escalated)				

General Steps to Prevent Indiscipline

1. We record undesired behaviour and we specify it in detail
2. We rely this behaviour to the conditions so that conditions favouring deviant attitude will be distinguished
3. We record the different taken measures
4. We compare the efficiency of these measures
5. We record those of measures which were the most efficient
6. Relinquishment of the non efficient measures
7. We ask from the specific student to be practically involved in the procedure:
 - We ask from the specific student to describe the deviant behavior
 - We ask him/her to describe the possible causes
 - We ask him/her whether they accept that they bring obstacles to the teaching and learning procedures for all the classroom
 - We ask him/her to propose adequate (according his/her opinion) measures
 - We ask him/her to propose adequate (according his/her opinion) rewards if he/she complies.
 - We ask him/her whether he/she would deal with this attitude if he/she was a teacher
 - We discuss with him/her our findings about the frequency, the intensity of the negative behaviour,

the attribution of this behaviour to specific factors, the solution of this behaviour due to specific measures

- We proceed to an “gentlemen’s agreement” about keeping some rules, rights and rewards

If all that fails:

- We involve rest teachers of the personnel with an experience of the specific student
- We involve school’s headmaster
- We involve student’s parents
- We call a psychologist consultant to support the student

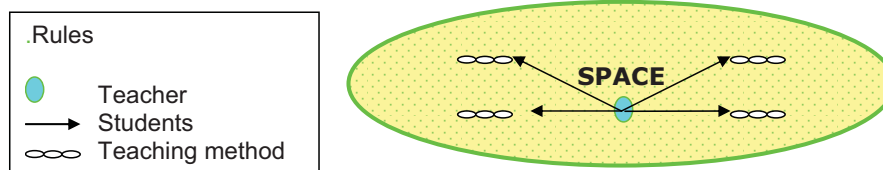
Comparison of the approaches

Suggested attitude	Non suggested attitude
(+) Rewarding positive behaviour	(-) Punishment of negative behaviour
(0) Ignoring negative behaviour	(0) Ignoring positive behaviour

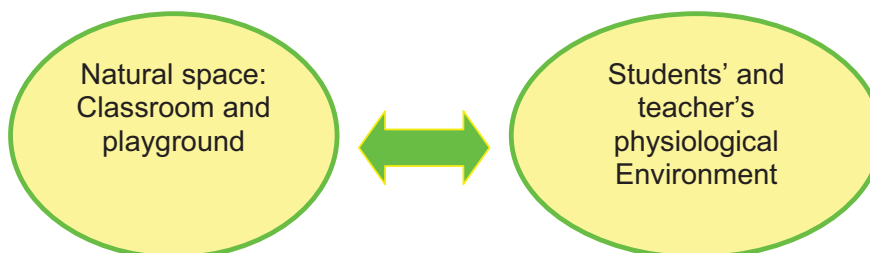
It is obvious that first column maintains positive behaviour by rewarding it and gradually eradicates negative behaviour by ignoring it. On the contrary, the second column tends to eradicate positive behaviour by ignoring it and by not rewarding it, while it tends to maintain negative behaviour for at least these students who seek for attention.

7.3 Classroom viewed as an ecosystem

Classroom resembles an ecosystem according the following scheme:



According the following scheme there are two spaces in a school that a managing teacher should regulate and control:



Natural space is measurable and stable, whereas psychological environment is difficult to measure

and dynamic. Two spaces may interact since natural area has an impact on the psychology of people working in it.

7.4 The psychological parameters that preserve discipline

- Evaluate yourself: Are you well prepared? Are you providing a well structured lesson avoiding “dead” curves? If you were a student, would you be satisfied? Are you warm, friendly and enthusiastic? Do you share teaching time equally among students? Do you avoid a strongly teacher-centered lesson?
- Evaluate lesson’s parameters: Are your expectations clear? Have you managed to connect current teaching hour with previous experiences of the students? Have you managed to persuade your students for the specific lesson’s utility?
- Discuss about your fears and plans with people you trust: Not always is sufficient teaching feasible. There are so many parameters that transforming teaching procedure into a non predictable situation. So, occasional frustration is inevitable. But, keep discussing about the issues in hand with experienced people you trust and respect their opinion. School’s headmaster, old colleagues, educators and academics can help you keep your faith trying and keep you orientated in the methodologies routes you implement. Success can not be a constant situation in teaching.
- Never overlook to get students’ parents involved. There are many occasions that parents should be aware. Not even for constant and severe misbehaviour, not only for constantly low performance, but also for positive reasons. Call home to let parents know that there are reasons to be proud of their children. That boosts a student immensely.
- Be consistent: Keep your promises, keep your treats. Be fair, be unpredictable making a pleasant surprise, BUT be predictable in the ways you react, after you are committed: that is keep your commitment to keep your respect.
- Never lose your temper! Keep a quiet, pleasant voice tone, no matter how annoying the situation is. Do not raise your voice, do not ever use hard language or diminishing comments. Try to make your criticism as positive as possible. Do not condemn. Suggest alternatives. Suggest tangible methods to reach these alternatives. If you reject a student he/she will reject you back. And that can not be repaired easily.
- Show actual interest for your students. It is essential that you learn their names as soon as possible. It is crucial that you take an interest in their hobbies, extra-school activities etc. If they care to start a conversation, never let them down, even if it is your very valuable break. It is the best method to get a healthy bridge into their psychology so that they will try to reach the aims you set. If some are absent, do call home to say they were missed and to fill them briefly in with what they’ve lost. Be a good listener and show you care.

7.5 Typical Teaching Outline

1. Administrative: 1-5 minutes

Write the title of the lesson on the board.

Ask from your students to write one paragraph regarding this title and their expectations. That way you get them involved. Not all titles are adequate for this request though.

2. Connection with previous lesson: 2-5 minutes

Repeat generalizations and help students exploit their previous knowledge

3. Create anticipation: 2-5 minutes

Make what will follow interesting, giving your lesson some artistic dimension (Relevant music, songs, possible instructions for handicrafts at home, etc

4. Lesson development: 25-35 minutes

Try while teaching to exploit as many different teaching methods as feasible.

Try to implement as many different in class tasks to help students practice what you lecture. Try as

many different learning approaches as the learning styles of your students.

Try to exploit ICT as much as possible in your teaching.

Trust multimedia applications, educational CD ROMs, educational web platforms.

5. Closure/review: 2-5 minutes

Repeat the quintessence of the lesson

Connect the title of the lesson with the final conclusions after the lesson is over

Inform students about topic of next lesson

Remind students of homework assignment

Trust web resources for your student's assignment

6. Evaluation/Assessment: 2-5 minutes

This phase can be embodied in brief sections during teaching or left for the end of the procedure.

7.6 Create Time Tables Using Microsoft Word

Create weekly time table

1. Insert a table with 6 columns (one for each day + one for hours column) and 6 lines (one for each hour)

2. Plan and organize

3. Type, adding the classes to which you refer
4. Use big, easy to read characters

5. Add colours to shade everything that needs to catch attention
6. Create a repeated colour that has a stable meaning, for example pink for the lessons referring only to A class, yellow for combined lessons referring to more than one class etc
7. Use happy, intense colours
8. Enlarge it so that it will cover all the extend of an A4 paper and suspend it on the wall. Big size will help students to read it while seated.
9. Share this schedule to each one of them
10. Add happy sections in at least one cell of the table. Mark them with separate border to catch the eye

8 -9	Maths for A class				
9 -10	Language for class A + B				
10-11					
11-12					
12-13					
13-14					20 minutes maths exam for all/ 20 Game time



CHAPTER 8.

8

Effective School leadership and
multigrade schools

8.1 Introduction

This piece of research is part of a larger research project on the effective principalship which is currently under way at the Open University of Cyprus. Research is already being carried out on what constitutes an effective school (in Europe, in Australia and in the U.S.A.) and, subsequently, what kind of behaviors an educational leader of such a school should exhibit (Brookover and Lezotte, 1977; Brookover and others, 1979; Edmonds, 1979; Edmonds and Fredericksen, 1978; Fuller, 1987; Levine and Lezotte, 1990; Lezotte, 1989; Mortimore et al, 1988; Reynolds and Cuttance, 1992; Rutter et al, 1979; Walberg, 1991).

Based on findings of the effective schools research so far, a semi-structured interview questionnaire was constructed in order to be used with this part of the project. Even though observational and survey data were collected, this particular article is based solely on interview data gathered from the principals who participated in the project. Therefore, the main aim of this article was to present the characteristics and qualities (both personal and professional) of an effective principal as these principals perceive them. The views presented here are the perceptions of these primary school principals about their job in the hope that, through content analysis of the interview data, the qualities and behaviors that made these principals effective would be uncovered.

Most of primary school principals in Cyprus are in their late 50s and nearing retirement (which is age 60). This is so because of the way the Cyprus educational system works. Teachers are promoted

to principals based, primarily, on their age (more or less) after having served for about 25 years in the classroom. In theory, the promotion is supposedly based on evaluations of their performance as teachers, however, there is an inflation of points earned through these evaluations (almost all teachers are rated as excellent), and, therefore, the only important factor for promotion becomes experience which is translated into age. By the time these teachers reach administrative positions (assistant principals, principals), they are already burned out. The vast majority, about 88% have graduated from the Pedagogical Academy of Cyprus (which until 1992 used to be the Teachers' Training Institution on the island)⁴. A very small percentage (about 10%) has a first University degree and the rest (about 2.2%) have a Masters. This distribution of degrees is not unusual for Cyprus since the only teacher institution on the island was the Pedagogical Academy of Cyprus (a non-university institution) and no other degree is required for someone to be promoted to administrative positions within the system (therefore, there is no incentive for someone to earn a higher degree). The only requirement is that to become an Inspector of Primary Education, one needs to have at least a first University degree (not necessarily in Educational Management, however, the degree should be related to Education in general).

The Leaders in this Study

A total of 49 principals were interviewed and observed in the context of this study: thirty-six male and 13 female principals. The great majority of these principals are aged between 50 and 59 years⁵.

4 As mentioned earlier, this is not a surprising figure for the Cyprus educational system since teachers are promoted to the post of principal after having served for an average of about 25-30 years in the classroom. This is one of the greatest shortcomings of the whole system because almost nobody gets an opportunity to serve from the post of principal except when one is close to retirement, which is age 60.

5 After the Turkish invasion of Cyprus in 1974, one third of the Greek population (about 200,000 persons) were uprooted from their homes and villages in the northern part of the island and were forced to resettle in the southern areas which are controlled by the government of the Republic of Cyprus. Therefore, most of our schools have indigenous student populations as well as refugee students from the occupied areas.

Another sample characteristic is that the majority were educated only at the level of the Pedagogical Academy of Cyprus (the Teachers' Training Institute), and only a few hold a Bachelor's or a Master's degree. Thus, this sample of principals is very similar to the whole population of primary school principals in Cyprus in terms of age and level of

education. What is different about this sample is that it was chosen by a panel of inspectors of the Cyprus educational system on the basis of their perceived effectiveness. Thus, these principals are regarded as being the most effective primary school principals in Cyprus. They serve in both large and multi-grade schools.

8.2 Research Methodology

The case study method (in combination with other qualitative techniques such as life history and shadowing) was chosen. The researcher spent between 10 and 15 hours with each one of those principals characterized as effective, observing, interviewing, and shadowing them. Most of the time was spent interviewing the principals using the semi-structured interview method (Burgess, 1982; Glesne and Peshkin, 1992). The principals were also prompted to tell their professional life history and to recall important key dates during their professional life. In this way, a more accurate profile of the principal could be constructed and their professional career path could be observed.

It was assumed that the case study methodology (semi-structured interviews, life histories, observation and shadowing) would provide rich information because the principals were being observed and interviewed in their actual work places, thus providing a more authentic environment for a more realistic description of the characteristics which prompted the panel of school inspectors to characterize them as effective. The visits at the school and the interviewing and shadowing took place from September 1994 to December 1995. As mentioned earlier, it should be borne in mind that this article is based solely on the interview data, the principals' narrative and their perceptions about their job and not on the observational or quantitative data which were gathered. Another interesting

fact which should be noted here is that almost all the interviews with female principals would begin with something like this: **"Only about 20% of women teachers in Cyprus are principals. Gender does count in Cyprus. Only it counts from the opposite side. Who you know and who you are friends with is what really counts"**. Obviously, female primary school principals in Cyprus are very conscious of the fact that they are indeed very few and constitute only a small proportion of the total number of principals in comparison with their male counterparts. This fact (women's underrepresentation in leadership positions), has been explained by research and can be summarized as follows: (1) discrimination in promotion practices; (2) socialization patterns that do not provide women with the skills and behaviors needed for administrative success; (3) women's lack of networking as males do; (4) lack of mentorship and training; and (5) pure avoidance of the job because of possible conflicts the principalship may produce with their other important roles such as being a wife and a mother (Edson, 1988; Fauth, 1984; Biklen, 1980)

Sample School Demographics

The schools visited are situated all over the island of Cyprus. The SES in these schools ranges from middle to upper middle income persons. A percentage of the student population in all the schools visited are refugees⁶. Most of the schools had an average of about 200 students and about 10 teach-

⁶ After the Turkish invasion of Cyprus in 1974, one third of the Greek population (about 200,000 persons) were uprooted from their homes and villages in the northern part of the island and were forced to resettle in the southern areas which are controlled by the government of the Republic of Cyprus. Therefore, most of our schools have indigenous student populations as well as refugee students from the occupied areas.

ers who taught all grades. Moreover, the majority of the schools were urban or suburban and a few were situated in the countryside. It must be stressed that the schools are similar in many ways and at least

in terms of student and personnel numbers, thus, making comparisons and generalizations about the principal's role in the school more meaningful.

8.3 Presentation of Results

The general information which was presented above sets the stage for a closer examination of the perceptions of the primary school principals involved in this piece of research. When the interview data were examined, certain themes kept coming up and patterns began to form. It is these recurrent themes that will be presented in the form of characteristics that these principals indicated as part of their daily routine in the school. Therefore, the sections and sub-sections which follow are those that emerged from the data based on the principals' narrative. Overall, it seems that the data could be divided into three main sections or dimensions: The first section deals with the more general perceptions of these principals about their job and their own career paths. The second section deals with the principals' perceptions on the professional aspects of their job. The third section is a collection of these principals' personal beliefs on being an effective principal. Thus, the results are presented under the following three dimensions:

- A. The career dimension which includes the following sub-sections: (1) important tasks of the principal, (2) career paths: on becoming a teacher and a principal, and (3) the apprenticeship model of advancement to the principalship.
- B. The professional dimension which includes the following sub-sections: (1) leadership philosophy, (2) teacher supervision and (3) school-parents relations.
- C. The personal dimension which includes the following sub-sections: (1) concern for students, (2) being a risk taker, (3) having national stan-

dards, and (4) keeping abreast of new developments.

A. Career Dimension Important Tasks of the principal

First, the principals were asked what they thought their most important duties or tasks were. In what follows, a principal tried to describe what she considers to be the most important tasks of the principalship:

Organizing (getting organized) so that the school can function in a normal fashion. I want to have all audiovisual aids, classrooms, teachers and students ready. Then, I look at my teachers and think: What kind of people are they? What are their strengths and their weaknesses? I ask them to tell me what kind of class (grade) and/or subjects they prefer to teach and I always try to take into account their wishes and personal feelings. I cannot always succeed in that, but I try.

The above comments are representative of most principals interviewed. It seems that this principal would make every effort to create an effective and well-functioning school. She tried to have the school building and other necessary supplies ready for use so that time was not wasted and was mostly devoted to instruction. Effective schools research indicates that when instructional time is maximized a school becomes more effective (Edmonds, 1979). At the same time, she tries to be well-informed

about the human-power in her school. The above comments indicate that organizing the school as a learning center and then being able to communicate effectively are two of the most important tasks of the principalship. It is interesting to note here that most of the principals indicated that they preferred verbal and face-to-face communication with their staff. They mentioned with emphasis that they disliked and avoided written communication. It must be stressed, however, that, on the average, these principals had about 10-12 teachers to deal with and, thus, verbal communication was not a problem. The qualities mentioned above are characteristics of effective educational leaders as other research indicates (Acker, 1990; Adler et al., 1993; Buell, 1992).

Career paths: on becoming a teacher and a principal

Next, the principals were asked to give the reason for which they entered the teaching profession in the first place: Here is what one principal said:

Since the times I was little, I wanted to become a teacher and I guess I was influenced by my family environment. Before myself, I had three other brothers and sisters who became teachers. My grandfather also was the first village teacher. So my environment really pushed me to become a teacher. Since the times I was little, I remember playing teachers with my friends. I used to take pieces of chalk from school and I would teach them at home.

The reasons stated above were again characteristic of most principals in the sample. The principals were also asked to recount key-dates and critical stages in their careers. After the analysis of their career paths, it seemed that they all had varied, diverse and very strong experiences and took chances with their careers. They all made strong efforts to further their education in order to enhance their options for advancement in the educational system. Some of them went to the Cyprus Educational Mission in the U.K., others were placed in the Curriculum Development Unit or in special positions in other Ministries of the Republic for a number of years before returning to the schools. Others earned scholarships and traveled abroad to further their studies. At any rate, they all went through different positions and experiences and they had usually spent about 15-20 years in the classroom and

then moved into the principal's role. Very similar are also the reasons for which they wanted to get into the principalship: (a) ambition, (b) higher salary, (c) the feeling of being able to give more, (d) prestige. Here is what a principal said:

There are many factors for wanting to get into the principalship. One reason is salary and that goes without saying. However, what is most important is that if you stay as a teacher you worry on a daily basis for a specific classroom at specific time intervals. This is not the ideal situation. When I want to give something that comes right out of me, from my inner self, I want to give it to many people and influence several teachers and students and that makes me feel good. Yes, you can influence from this position and this is good.

However, wanting to become a principal was not enough as almost all of the principals interviewed mentioned. Most principals expressed the idea that one needs to be borne a leader and to really want it (the principalship) in order to achieve it. With these kind of remarks it is easy to realize that most of these effective principals believed in the trait theory of leadership (Stogdill, 1974). Even when they were asked specifically about being trained for leadership positions, they suggested that this is a good idea but, "if you do not have it (leadership ability) when you are born, then no training and no education can do it for you". This could be viewed as a strange and unexpected remark, however, one possible explanation is that all of these principals entered the principalship without any training and mainly because they had the drive and the ambition to do it. In essence, they were not aware of what is out there, in terms of educational leadership training, that would enhance their chances of being an excellent leader.

It is also interesting to note that all the principals interviewed said that they loved being teachers at the beginning of their careers and then getting into the principalship, and that, if they had the chance to start from the beginning, they would do it exactly the same way. They seemed to be genuinely in love with the teaching profession. Most of them seemed to be nostalgic for the times when they were teachers. Two of them even said that they regretted leaving the classroom. Based on these comments, one could assume that in order to become an effective principal, one needs to have been an effective

teacher in the first place.

B. Professional Dimension Leadership Philosophy

Most of the principals had a clear view of their leadership philosophy and, therefore, some of their ideas are presented verbatim. The following is a representative sample of what most of them quoted as their leadership philosophy. Here is what a female principal said:

I wanted to become a principal because as a principal you can offer so much more. When I was a teacher, my principals delegated a lot of responsibilities to me for different things that needed to be done at school. In this way, I enhanced my self-esteem and started believing in myself and I wasn't afraid to express myself. I do exactly the same thing for my young teachers now if they are interested. I listen to teachers' views and, if I agree, they can proceed without any further delay. However, if I disagree, I think about it for a while and then I produce alternatives with them. I am the leader type. I am also democratic. I accept suggestions and other peoples' views, however, I do not go far away from my own views. I accept what the majority has to say. However, I do have a way to do my own thing without being seen as forcing my opinions on to everybody else. I am not afraid to speak the truth and, without intending to hurt anyone on a personal basis, I speak out my opinion.

From her own words, it follows that this principal could be characterized as a consultative autocratic leader (Likert, 1967). She is a consultative leader because she listens to other opinions before making a decision. She is also autocratic because it is mostly her own decision and nobody else's, after some consultation has taken place. However, her autocratic style is benevolent in nature because she consults with fellow teachers and takes other persons' feelings into account when trying to make a

decision. Most of the principals interviewed had similar views on this matter. Even though they would describe their leadership style as democratic, they gave the impression that they wanted most powers concentrated on them and they were not very eager to let others share some of their power.

At the same time, she indicated some of the main characteristics of effective educational leaders that were found in similar pieces of research (Acker, 1990; Adler et al., 1993; Buell, 1992). She was a leader who listened attentively, even though she had her own ideas and her own vision; she knew where she was heading and found ways to weave her thinking through. She tried to create a positive environment and to build collaboration with her teachers in planning activities for the school. As research has shown, an excellent school leader is usually the principal who can effectively convey the school's mission to teachers, students, parents, and the community at large. Furthermore, high quality school management exists when expectations are made clear to the staff involved (Kimbrough and Burkett, 1990; Poplin, 1992; Sapra, 1993).

Teacher Supervision

Furthermore, most principals in this study indicated that they were keen on evaluating their staff constantly in an effort to share teaching methodologies with them and also in an effort to become the instructional leader in the school, which is one of the major characteristics of effective educational leaders as other research has indicated (Caldwell, 1992; Hallinger, 1992; Johnson, 1993; Kerry and Murdoch, 1992a; 1992b; 1993) The principals were also asked to comment on the current status of teacher supervision in Cyprus today. The following excerpts are representative of what most of them thought. One principal said:

I disagree with the way teacher supervision is done today⁷. The inspectors can offer very little or nothing to teachers. On the contrary, the inspectors I know don't say anything to teachers and just rely on what I tell them about them. They come, watch teachers teaching and say nothing to them. Howev-

7 It must be mentioned that her views on teacher supervision in Cyprus are very representative of the views of most teachers and principals in Cyprus. This is why the Ministry of Education is currently in dialogue with the Teachers' Unions and University Professors to produce a new Teacher Supervision scheme for the island.

er, teachers want to know. I believe that when the principal is well-educated and knowledgeable and has some esteem among teachers is in a better position to assist a teacher than the inspector, and in this way the principal becomes the change agent.

Here is how another principal viewed teacher supervision as a form of coaching:

I take initiatives in this regard by assisting young teachers and by indicating to them what the right ways of teaching are. The new comers have the tendency to put children down and do their lesson from the teacher's desk, whereas, I believe that the teacher should become a baby, an actor. The way I do it is by getting into a classroom, I take up a lesson and do it, and then I watch the teacher teach and make comments. In general, I consult teachers in an honest, genuine and friendly manner and I mainly tell them that they should love children.

The above comments are indicative of a principal who is forthcoming and honest with teachers and who is eager to see them improve through a developmental and formative approach to teacher supervision (Harris, 1986; Pashiardis, 1994). At the same time, most of the principals interviewed mentioned that they do not have enough time to be the kind of instructional leader they want because of the many unimportant tasks they need to perform on a daily basis (such as fix broken windows, type letters, make payments, etc.) and also due to the fact that they have to teach part of the day.⁸ The combination of the above factors take up most of their time leaving them with little time to make classroom visits.

Apprenticeship Model of Advancement to the Principalship

All the principals interviewed seemed to be very **keen observers** of behavior as it became obvious with what they said above about classroom observations. In essence, what follows is indicative of what the majority of them believes about how they were prepared to become principals without ever going through any formal training (almost no principal in Cyprus has any form of preparation for

the principalship. As mentioned before, advancement to the principalship is mainly through seniority). When the question was posed whether they felt they were well prepared to become a principal, here is what one principal said:

I think I was (well prepared), because I kept watching my previous principals and kept learning from them. I learned what to do and what to avoid. Therefore, I felt quite comfortable and didn't have to ask for many opinions on how to do things. Once I became a principal myself, I had ideas and I organized the school the way I wanted.

The above comments (which are representative of the whole group) indicate that the principals interviewed learned how to be a principal through the apprenticeship model. They had an excellent role model with whom they identified and learned from, since there was no formal training before their advancement to the principalship. Moreover, they observed and analysed the behaviours of their principals and decided what qualities they liked and what they did not. In this way, they had already built the ideal model of the principal they wanted to become.

School-Parents Relations

Another important aspect of a principal's job is dealing with parents. This fact came up several times during the course of discussions with most of the principals in this sample. All of them stressed the fact that dealing with parents was a very difficult task but one that the principal needed to win because otherwise he/she would not be able to function. They all invited parents at least 3 or 4 times a year to have refreshments together and discuss about issues of mutual concern. Their impression was that parents were responsive if they realized that the principal did not call them only when it was time to ask for money for the school. They also stressed the fact that if parents knew what we were doing in the schools, they would be our best advocates and supporters when it was time to ask for pay raises or other professional benefits that the teachers' union might demand from the government. This is what one principal said:

⁸ It must be mentioned that the government does not pay to have school secretaries. Wherever there is one, she/he is paid by the Parents' Association and primarily serves them. Only if there is free time will the secretary help the principal.

I create the circumstances for parents to visit the school. I will bring them in and show teachers that they are not here to interfere or as antagonists to our work but they are here to cooperate for the mutual benefit of our students and the school in general. I try to succeed in creating this atmosphere through daily organized visits of parents, through lectures to them, and by, subtly, indicating to them where they can interfere and where they cannot. I also act as the buffer zone between my teachers and the parents of their students.

This principal was able to create a positive environment and was sensitive to parents' thoughts and emotions. In other words, he had the ability to create a warm, positive climate between parents and the school which was conducive to learning. When a principal creates this kind of climate, a warm self-image of the school is generated. Also, other pieces of school/parents relations research have indicated that a close collaboration between parents and the school has very beneficial results on student achievement and the overall climate (Golding, 1990; 1993). It seems that the principals interviewed were well-aware of this and they stressed the fact that children, in general, improved their behavior (especially if they had discipline problems) in school once they sensed that their parents had a close interaction with their teachers and the school principal.

C. Personal Dimension Concern for Students

Furthermore, all principals seemed to be knowledgeable of learning and instructional problems around the school and were well-informed about students' progress. They all had a personal feeling of responsibility for school results and they were aware of the impact the school had on their students. They all seemed to be results-oriented and pushed to make things happen. This is again one of the strongest indications of an effective educational leader as other research indicates (Fauth, 1984; Ferguson, 1984). The feeling of being personally involved with children who are failing in an almost motherly way comes out in the following quotation:

I am sensitive both with teacher and students (especially those that are weak in their academic achievements). I feel sorry for these children and I often bring them into my office and talk with them and try to assist them because I always have a feeling of anxiety for these children and of what will become of them in the future. I am always with them even for their personal and family problems.

Furthermore, most principals seemed to be eager to find ways to reward students and encourage good behavior, special talents, etc. They had a deep conviction that rewards of any kind are needed in order to promote and sustain high standards and achievement. One principal said that every Christmas they have a competition among students at school to prepare the best Christmas card. The card which was chosen was printed and became the official card for the school and was sold during the Christmas bazaar. Children loved this competition and the reward was that they saw their idea in print. The principal concluded by saying that, "we need more of these kind of rewards, i.e., not material but moral and intrinsic rewards which are so few in our society. Most students get used to material rewards from both the parents and the school and are easily distracted from what it really means to feel good on the inside".

Risk taker

All of the principals interviewed indicated that they would be willing to take risks if they felt it was for the improvement of their school, their teaching staff and their students, even against the directives from the Ministry of Education. One principal said:

I have never ordered anyone to do anything. I even have their birthdates and always give a little present to the teacher who is celebrating. Also, with my responsibility, I give permission to teachers (who have stayed at school longer at other times) to take time off without being afraid to do it.

From her first statements, (I take initiative, I give permission to teachers to leave), it became obvious that she had an attitude that dangers were there so that one took risks and that they were not to be avoided. Giving teachers permission to leave the school before the day was over in a highly centralized system such as Cyprus' is very risky business. The principal risked his/her credibility with the bu-

reaucracy and this could jeopardize his/her chances for further advancement. Another principal told me an interesting story of defiance towards the bureaucracy:

Before I became a principal, when I was a teacher, my wife got a scholarship (note: she is also a teacher), to study in America. I went for one month to visit her and since she was busy I looked around some of their schools. I saw some ideas that I liked. When I returned to Cyprus I was placed at a small two-teacher school. I was the oldest of the two in the service and I became an acting principal. I decided to implement the idea of the open school, the school without classrooms (note: the story happened in the early 70s). All the children were in one room and we had activity corners according to the kids' interests without any fixed or rigid schedules and a lot of flexibility. I didn't think to ask for permission from any one even though this was a major move on my part. Somehow, they found out in the Ministry of Education what was happening and one month later three inspectors came in and asked what I was doing. I explained, I gave some valid reasons and I convinced them even though they came prepared to reprimand me. They gave me permission to work on this experiment for one year. The results were excellent and they gave me permission for another year. Our 6th grade students were very successful at the exams to enter high school and everybody congratulated us.

This principal was definitely a risk-taker which is another one of the characteristics of effective educational leaders. Most of the teachers I interviewed had many similar stories to tell. They all had some ideas which differed from those of the Ministry and went ahead and implemented some of them even since the times they were teachers. They were forceful, innovative, and liked experimentation. Listen to this principal:

We have a young teacher at our school who is willing and knowledgeable enough to teach computers⁹. He started teaching the other teachers at the school during their free time and everybody loved it. We

even tried teaching our 6th grade students and we reworked the school schedule to accommodate that since there is no computer course in the primary school curriculum. Thank god nobody from the bureaucracy of the Ministry interfered and now we have a small Computer Lab with 8 computers that were bought with the assistance of the parents in our school.

The above was indeed a very bold action on the part of the principal because the centralized system in Cyprus prohibits initiatives such as this one unless they have been ordered from above by the hierarchy. However, most of the principals interviewed indicated that they would take initiatives for innovations and experimentation and that they expected their teachers to do this as well. The principals often mentioned that they would even create an atmosphere for experimentation and innovation in their schools.

Having Comparable National Standards

Cyprus doesn't have any standardized exams and, therefore, teachers and principals don't really know if they are doing a good job. It is basically through intuition and through conversations they had with colleagues in other schools that they knew. It is interesting to note that **all** of the principals interviewed indicated that they wanted to have standardized exams and to be compared with other schools. As one principal put it:

I want to be able to say if I am satisfied or not with the work that is being done at my school. I make my own tests which I don't think are absolutely valid, but they give me an indication as to where I stand. If I find that my students are not good at comprehension, then we will give more emphasis on comprehension. Now we give emphasis on what we think is important for the school inspector. This is not right. Whereas, if I have some scientific results I can say that this is the area we need to improve.

Keeping abreast of new developments

In another question about reading new research

⁹ *This is a rare quality for an elementary school teacher in Cyprus because computers and computer literacy is just beginning to get into the primary schools of Cyprus. Introduction of computers at schools is still at an experimental stage and most teachers are afraid of them. A computer literacy course is compulsory in the Teacher Preparation Program of the University of Cyprus which prepares teachers now. The first graduates went in the schools in September 1996. It is expected that their knowledge will help the Ministry of Education expand this pilot program on computer literacy.*

and subscribing to journals on Educational Administration in order to keep abreast of new developments, as well as disseminating this information to their staff, here is what one principal said:

I follow any in-service course that the Pedagogical Institute offers for principals or teachers. I want to keep abreast of new developments and I will spare my free time to do this. Unfortunately, there isn't always the time I need to do this on a regular basis, but I try. I also try to have book or article presentations by teachers during faculty meetings and we have a short discussion on what was presented. In this way, the staff keeps informed and we all benefit instead of having those boring faculty meetings where we only read directives that come from the Ministry.

The above comments were in accordance with other research findings which indicated that effective principals have high expectations first of themselves and then of others in terms of keeping abreast of new research in their field (U.S. Department of Education, 1987). Effective principals are life-long learners. In general, the teaching staff of an effective school was never satisfied with their school's achievement and always tried for some-

thing better through the incorporation of more research findings into their everyday practice. As mentioned by Johnson and Johnson (1989), "experience is not something gained and enjoyed for ever. It is a continuous process" (p. 7). Through some of the above remarks, it can be seen that these principals were searching for something new, they were restless and tried to keep informed, albeit, in a haphazard and non-systematic way. This was true of most principals in Cyprus who do not have many ways of getting research reports or new ideas mostly because they are not aware of what exists. It has been my experience, that once these principals are made aware of existing journals or other resources, they would subscribe to at least one source and they would try to keep updated because the drive for constant improvement was there. However, there is also a more realistic reason as to why principals in Cyprus should keep abreast of new developments: A great number of young Cypriot teachers earn Bachelors' and Masters' degrees because there are more opportunities available than there used to be. Thus, the principalship is being shaken due to the lack of academic and other credentials that older principals do not possess. Therefore, it is a matter of survival for them to keep current.

8.4 Concluding Remarks

In summarizing some of the main points that came out of the analysis of the interview data of this project, one could argue that effective primary school educational leaders in Cyprus:

1. Have great love and ambition for their profession which they regard as a sacred and holy duty. In fact, all of them mentioned that they always wanted to become teachers and/or school principals and never felt tired of the profession. Furthermore, they insisted that if they had to

choose from the beginning, they would again become teachers.

2. Are deep thinkers and constant learners (they participated in any in-service course which was available). They would read any journal or magazine with topics related to their profession once they became aware of their existence.
3. Have the deep conviction that they could influence much more from a position of leadership such as the principalship than any other position

in the school system. This was a major reason why they wanted to enter the principalship in the first place. In addition, they wanted the challenge and the opportunity to assist people.

4. Are risk-takers and are not afraid to “express their inner thoughts freely”. They were definitely not a “yes” person. Sometimes, they would take risks even against the will of the ministry of Education (which is considered a heresy since the whole system in Cyprus is centralized). They were strong-willed and decisive in this respect and ready to act.
5. View competition with confidence and wanted their schools to be compared with other schools both in Cyprus and abroad. This was so because they were self-confident and knew that they were doing a good job and, therefore, were not afraid to be compared with others.
6. Are honest and truth lovers. They insisted on telling the truth to parents about their children and they told the truth to their teachers about their own performance without trying to “beautify” the situation as most teachers tried to do in Cyprus in order to be liked by parents. They were forthcoming and bold with their ideas.
7. Find innovative ways to reward both their teachers and their students because they strongly believed that rewards (especially not material ones) were an important motivator for people to act.
8. Are ambitious and have the drive for constant improvement and advancement to positions of authority and influence for both personal and professional reasons.
9. Are very keen on creating and maintaining good school-parent relations; they knew how to use parents in constructive ways and had an open-door policy in their schools.
10. Mostly believe in trait-leadership theory even though they acknowledge that they should learn some leadership theories in order to improve their management style. The belief though, was that, “if you don’t have it (i.e., leadership ability) you will not get it”.

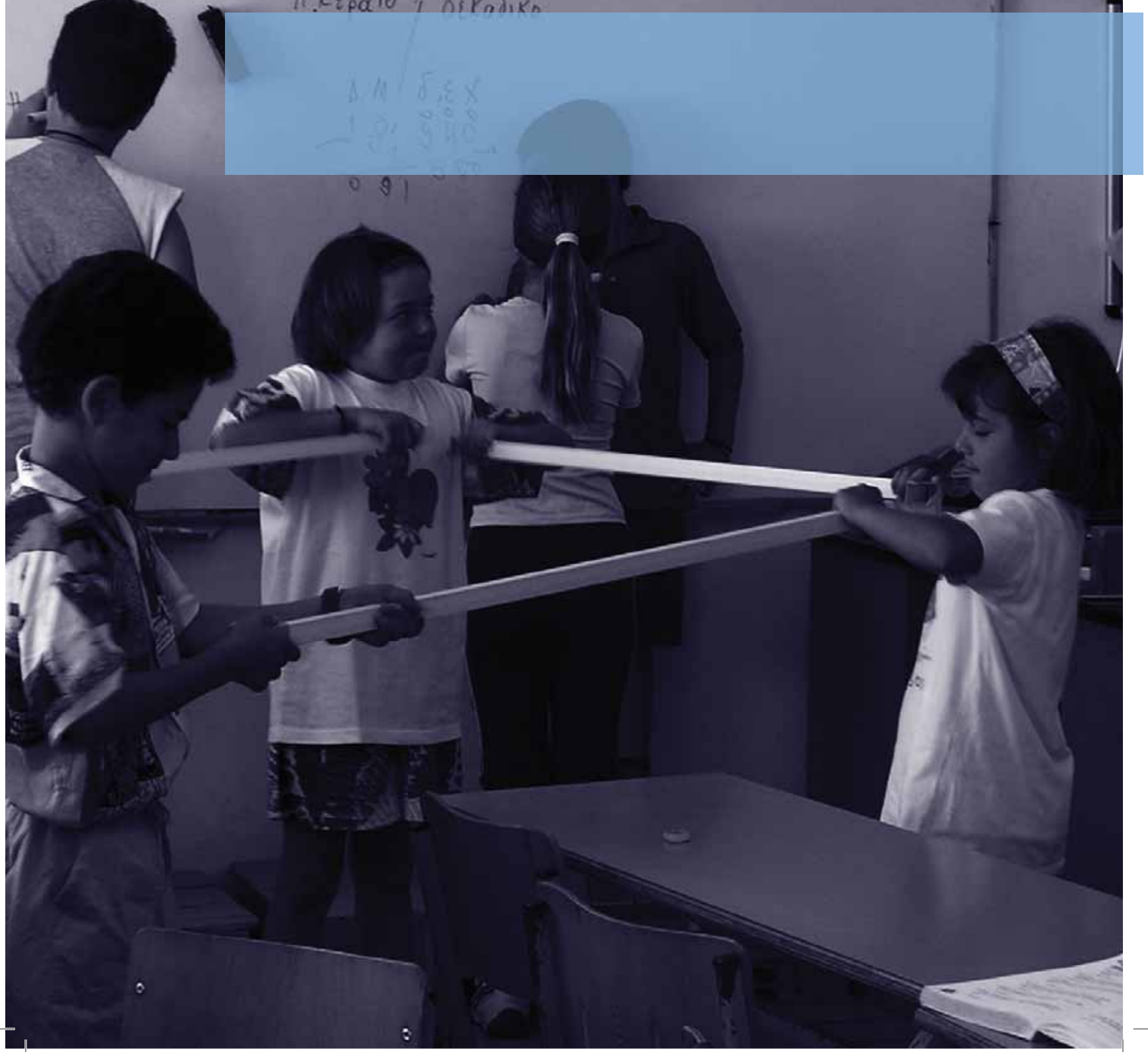
Finally, a theme that kept coming up through all the conversations was that these principals were almost impulsive in their leadership style and, as most of them said, they used their emotions a lot. As one principal put it, “I am an emotional person. I try to lead the school through my feelings and try to make teachers and parents volunteer for things that need to be done instead of me ordering someone to do it. I try to behave as an equal to all of them and have warm personal relations with my staff”. This quote (which, by the way, was made by a male principal) was representative for most of the principals interviewed. The effort of the principal to be seen as an equal with the rest of the teachers in the school was evident in the majority of the principals. The feeling was that all the staff was there for a purpose and everybody had to try and do everything. Nobody espoused the idea that the principal would just sit in his/her office and merely observe what was going on in the school.

The use of their emotions, feelings and sense of egalitarianism in their management style was a recurrent quality which was evident in all the interviews with these principals. Therefore, one would be tempted to say that MBFE was their philosophy: Management By Feelings and Emotions. Actually, it was interesting that what we call “female” qualities (such as caring, sharing, showing emotions and feelings), was evident in all forty-nine principals (both male and female) interviewed. In any case, the word “leadership” in Greek (*ηγεσία-igesia*) is female and, therefore, one would be correct in arguing that leadership is a term which could be described with (mostly) what are regarded as “female” qualities in our society. It seems that one characteristic that these principals had in common was the exaggerated humane and emotional characteristics that they exhibited. Perhaps, more research is needed in this particular area in order to uncover more information about the validity of these findings. In case they are validated, then, some rethinking of our courses in Educational Management programs should take place. The preparation of principals is very important business or, as one principal put it, “the principal is the beginning and the end or the Alpha and the Omega for a school”.



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CHAPTER 9.

9

The Role of Local Society

9.1 Introduction A challenging environment for the teacher

Multigrade rural schools constitute a work environment full of challenges and difficulties for the teacher. Indeed, multigrade school teachers have to teach simultaneously two or more age groups and possibly more than one curriculum subjects in particularly farraginous classes, based on the foundations of a heavily monograde-oriented initial teacher training curriculum, which scarcely makes any special provisions for preparing teacher trainees for the peculiar circumstances of the multigrade classroom. As teachers' initial professional training does not suffice, the need for competence development through in-service training schemes becomes evident – especially in the light of the fact that typically inexperienced, newly-appointed teachers are posted to remote schools for a relatively short term service. Thus the average teacher working in a small rural school needs to acquire new knowledge and skills improving their expertise in multigrade teaching, and generally develop and maintain the ability to respond to the challenging circumstances of their professional position. However, there exist several difficulties in connection to remote rural teachers' continuous professional development. For instance, offering in-service training seminars to teachers from remote small schools is a demanding task for educational authorities, as a teacher's round trips between their remote school and an urban training centre tend to be costly – if not virtually impracticable, given that there may not be a colleague available to replace them during their absence. What is more, the very concept of competence in the context of multigrade teaching is not clear. In the field of Human Resources Management competence is usually defined as a standardized requirement for an individual to properly perform a specific job. However, whether a teacher is adequately qualified so as to have the ability to perform successfully in the multigrade classroom is a question with no official, standardised answer. The educational system, through its choices for the initial and in-service training of teachers, does not

clearly define what good multigrade teaching is. Teachers are more or less left to explore and learn multigrade teaching on their own, through their solitary experiences in remote rural schools.

It should be mentioned that many of the above described difficulties of teachers working in remote areas are not unique to Greece. Internationally, the shortage of teachers in rural and remote areas, and the weaknesses of the education systems in the provision of training and professional support to these teachers, have been well-documented in the literature (Forbush & Morgan, 2004; Helge & Marrs, 1982; Ludlow, 1998; Miller & Sidebottom, 1985; Ankrah-Dove, 1982; Coldevin & Naidu, 1989; Benveniste & McEwan, 2000).

As a response to these obstacles, the use of different forms of technology-supported learning and distance education models have been advocated for the enhancement of quality and accessibility of teacher training programs in rural areas (Squires, 1996; Ludlow, 2001). Relevant attempts have followed the technological trends in the field of computer-supported learning, while the content of training delivered via the different technologies varies greatly, from conventional seminar-type lessons to classroom observations at a distance (Kendal, 1992; McDevitt, 1996; Ludlow & Duff, 2002; Kraft, 2002; Forbush & Morgan, 2004). In recent years a lot of attention is also paid to the role satellite telecommunications can play for the bridging of the digital divide (European Commission, 2003; Cartheron, 2003), and distance education is seen as a major field of application in this area, as this technology provides a delivery option facilitating access to new student populations in distance locations (Littman, 2000). Significant experience has already been gained internationally, particularly in the United States and in Australia (e.g. Boverie et al, 2000; Boylan, Wallace, & Richmond 2000), as well as in other less developed countries with popula-

tions distributed over large geographical areas (e.g. Al-Sharhan, 2000; Cohen, 2002; Lorenzo, 2002).

9.2 A positive challenge: rural schools promoting personal and community development

Despite the many peculiarities and difficulties characterising the operation of the small rural school and the teacher's role in it, there are also positive, or potentially positive, aspects in this form of education which a skilful and devoted teacher may be able to turn into an advantage for his students, himself, the school, as well as the wider local community. To mention the example of multigrade education, the acknowledgment of the various problems associated with multigrade schools is often contrasted by a growing recognition of multigrade classrooms as not only a necessary, but indeed a good-quality option for education systems, believed even to have some advantages over single-level classes (cf. Cook, 2000; Lloyd, 2002; Boss 2000). In addition, what is of more relevance here is a well-established belief in many countries in the diverse roles that the remote rural school can play in collaboration with, and in favour of, the rural community, as an agent promoting local development. Salant & Waller (1998), for instance, providing an account of research and publications on the non-educational impact of schools on rural communities, summarise that the school-community relationship is multifaceted, with schools having positive economic and social impacts, providing a resource for community development, as well as offering a delivery point for social services.

Several links can be traced indeed between education and rural development. To mention maybe the most self-evident, education, and particularly educational attainment, is seen as a rural development strategy through which a better educated rural population leads to greater economic growth (Barkley, Henry, & Haizhen, 2005; Beaulieu & Gibbs, 2005). In an era when the demand for workers with

higher educational qualifications rises, educational levels in rural communities are increasingly seen as a critical determinant of job and income growth in their communities. Attracting employers who provide higher skill jobs and encouraging educational gains are seen as complementary components of a high-skill, high-wage development strategy. Recent studies in the USA have indeed shown that rural counties with high educational levels saw more rapid earnings and income growth over the past two decades than counties with lower educational levels. At the same time, the recognition is growing that improving local schools can enhance the economic well-being of rural residents and communities, partly by reversing the tendency of loss of young adults through outmigration ('rural brain drain') (Beaulieu & Gibbs, 2005).

However, community development reflects efforts to improve the economic, social or environmental well-being of the community, and it would be a mistake to focus on economics only while failing to recognize the interdependence of all these dimensions. In this spirit, Miller (1995) explores policy issues and implications related to expanding conceptions of the role schools and youth can play in rural community development, reflecting on efforts since the mid-eighties to help rural schools be more responsive to the growth and survival needs of their communities. The proposition here is that rural schools, working in partnership with local leaders and residents, can have a positive impact on community viability; that is, especially when students, working alongside adults, are given meaningful opportunities to engage in community-based learning that serves the needs of the community while simultaneously addressing the learning needs of students.

9.3 Social capital development

The concept of ‘social capital’ has been used increasingly to describe social organization and resources embedded in the social structure of the

rural communities, which can facilitate coordination and cooperation for mutual benefit, and thus community development.

9.4 Background: the importance of human capital in the rural community

Human capital refers to the knowledge, information, ideas, skills, and health of individuals. This is the “age of human capital” in the sense that human capital is by far the most important form of capital in modern economies. The economic success of individuals, and also of entire economies, depends on how extensively and effectively people invest in themselves (Becker 1992).

The modern economic environment places more a premium on education, training, and other sources of knowledge. This can be inferred from changes in the relation between education and earnings/employment, with greater demand for more skilled workers and large gaps in wage differentials by education in European nations for both men and women. The total investment in schooling, on-the-job training, health, information, and research and development (R&D) is estimated to be over 20 percent of gross domestic products, making modern societies to gravitate toward information-society and knowledge-capital economy. Technology may be the driver of a modern economy, especially of its high-tech sector, but human capital is certainly the fuel (Becker 1992).

We live in a world where new drivers of change

are appearing continually. Most recently, habitation fragmentation and global climate change are occurring so rapidly, that mutualistic networks are likely to be severely affected in many places (Renner 2007). Some of the most important impacts of the climate change will be felt by agriculture because agricultural production is fine-tuned to temperature and moisture conditions in terms of cultivation practices and inputs (Tsigas 1997).

These new drivers of change accentuate the volatile external environment faced by the rural communities, which must also cope with the impacts of the ever-present drivers of global change, such as the globalization process; the revolution in Information Technologies (IT); deregulation; and the global disintermediation, which have been driving the economic and societal transformations so far.

Globalization brings “global networks”, “global supply chains” and other “value chains” and a global nexus of producers, suppliers, and subcontractors. The IT revolution intensifies the urge and accelerates the process of globalization. Global “reach” and “speed” in business and mass communication become catalysts pushing toward the completion of the globalization process, with sup-

portive information technologies, such as wireless internet, streaming technologies, multicasting web conferencing, etc., adding aesthetic, marketing, and perceptual-learning dimensions to the process, thus rendering the global expansion both desirable and inevitable.

Deregulation at the national level signals the strengthening the entrepreneurial forces (and of markets). Disintermediation signals the effect of “connectedness” and the new “immediacy of communication”. The explosion in the creation of dot.coms devoted to “networks”, “auctions”, “exchanges”, and “communities” is indicative of the process of disintermediation.

Advanced levels of human capital as well as social capital are needed to facilitate the transition from insularity to a globally networked world and to mitigate the possible adverse effects of these changes in the years to come. Greater investment in educa-

tion is considered to be an effective way for rural communities to respond, in the longer run, to such volatile environments. Educated persons take a much longer time perspective in their personal decisions (Becker and Mulligan 1997) and, as such, they are more likely to anticipate the incidence of changes when they decide about their activities and they better protect themselves. Avoiding being trapped in competing for a limited resource with limited global information, they will fend-off evolutionary freezing and the possible demise of their community (Johnson et al. 2000).

Although human capital resources are essential to participate in the new globalising economy, local development should focus on more than human capital development (Bollman 1999), on aspects such as regional identity and entrepreneurial climate, public and private networks (von Mayer 1997), in short, aspects relating mainly to the concept of social capital, which is presented in the following section.

9.5 The significance of social capital

Economic performance across countries and regions appear to depend on social capital, a concept, which aggregates empirical variables such as density of social networks, trust in others, honesty etc, and is generally assumed to enhance cooperation and reduce the cost of transacting. Recently, for instance, Woodhouse (2006) has reported the findings of a case study of social capital and economic development conducted in two towns in regional Australia, suggesting that the social capital exerts a positive causal influence on economic development.

Research on the role of social capital and social interactions in financial development, economic growth, workplace behavior, employment and wages, and even criminal behavior, has been growing steadily in the last years. The relation of trust

to economic growth has been investigated in recent research works such as Rafael La Porta's et al. (1997), who document a strong correlation between the trust prevailing in a country and the presence of large organizations, or the work by Stephen Knack and Philip Keefer (1996), who find a correlation between a country's level of trust and its rate of growth. However, the theoretical link between social capital and growth is very indirect (Solow 1995). Putnam (1993) admits that the mechanisms through which “the norms and network of the civic community contribute to economic prosperity” should be investigated further (Guiso et al. 2004).

In trying to explain differences across countries in economic performance, Kumar and Matsusaka (2006) have stipulated the existence of two types of social capital. “Village” capital takes the form

of personal networks, kinship, patron-client relations, and in-depth knowledge about trading partners. “Market” capital takes the form of knowledge about how to use third parties and of trusting “strangers”.

Either type of social capital can be optimal in the right environment. “Village” capital is efficient when economic activity is primarily local, involving transactions between members of the same social network. “Market” capital is effective for transactions between “strangers” (that is, parties outside the local personal networks). The stock and type of social capital also influences the accumulation of social capital by subsequent generations because of learning externalities (children raised in the midst of a dense social network are likely to develop the skills to function in that network).

In another study, Guiso et al. (2004) have investigated the link between the level of social capital and an important factor underlying economic prosperity, namely, financial development. To identify the effect of social capital on financial development, Guiso et al. exploited differences in social capital within Italy. In what the authors name “high social capital areas” (equivalent to “market social capital” of Kumar and Matsusita paper), households are more likely to use checks, invest less in cash and more in stock, have higher access to institutional credit, and make less use of informal credit. The effect of “village social capital” is stronger where legal enforcement is weaker and among less-educated people. These results have also revealed that the behavior of citizens who have changed residence is still affected by the level of social capital of the province where they were born.

9.6 Social capital development and rural multigrade schools

Social capital, indeed, provides a foundation for building conceptual understanding about the strategic role schools and youth can play in community development. According to Miller (1995), the school represents an important element in the community’s social capital, and not merely an educational resource for the community’s youth. By building the social capital of the school and youth, the community not only helps to develop responsible citizens, but also creates opportunities for tomorrow’s leaders to emerge. Rethinking the role of school in the light of this is necessary, aiming to create social capital by building and sustaining strong linkages between the community and the school; rural communities may have a head start in developing these linkages because schools have traditionally played a central role in the life of the communities both as basic education providers and as local cultural centres.

However, Miller (1995) points out, building a

strong partnership with the school for community development purposes remains a major challenge because this is not generally viewed as a traditional element of schooling.

Three approaches to building strong linkages between schools and communities are further identified, each of which reflects learning opportunities and experiences that cross boundaries which have traditionally separated the community as a place of learning from the school:

1. The school as a community centre, serving as both a resource for lifelong learning and as a vehicle for the delivery of a wide range of services. School resources such as facilities, technology, and a well-educated staff can provide a range of educational and retraining opportunities for the community.
2. The community as curriculum, emphasizing the study of community in all its various dimensions.

Students generate information for community development by conducting needs assessments, studying and monitoring environmental and land-use patterns, and by documenting local history through interviews and photo essays.

3. School-based enterprise (SBE), which places a major emphasis on developing entrepreneurial skills whereby students not only identify potential service needs in their rural communities, but actually establish a business to address those needs.

The value of these community-based learning ex-

periences, which reflect a departure from the more traditional ways educators and communities have viewed curriculum, are the long-term benefits of leadership development, a renewed sense of civic responsibility, and a revitalized sense of community (Miller 1995).

Concrete examples of these three approaches have been investigated by the Society and Cultures group, and are presented further below, in the context of a general description of relevant research in which members of our group have been involved in recent years.

9.7 A research focus: rural teacher's changing roles

In the light of this short account of rural education and relevant research and discussions, the Society and Cultures group has looked into aspects of rural multigrade teacher's potential innovative roles, drawing also from experiences of its members from other past and ongoing research in the framework of pioneering projects, which intend to alleviate the isolation of remote schools through the provision of distance teacher training, support and networking, using to the full the possibilities offered by new technologies.

A first milestone in this effort was the European project MUSE (MUltigrade School Education), which was supported by the Socrates Programme – Comenius 2.1 Action (2002-2004). In this project, through close international collaboration between teachers and researchers, an innovative, specialised in-service training programme was developed for teachers working in multigrade schools. The programme promoted teachers' professional development, encouraging them to try innovative teaching and learning approaches that are well-suited to the multigrade school environment, including the use of ICT in their everyday work. Thanks to the

MUSE project, training material specifically designed for multigrade school teachers was for the first time made available to all who may be interested, via the internet. A follow-up of the activity developed within MUSE has been NEMED, as the vehicle for the networking, at the European level, of educationists and school practitioners sharing an interest in multigrade schools, either as a field of research or as a space of educational practice that deserves attention and support. At the same time, a lot of the energy and attention of members of the Group has been devoted to securing better channels for the delivery of rich training and support content, as well as for enhanced communication among isolated teachers, so as to drastically combat the introversion of the digitally deprived remote school. In this context the ZEUS project (2003-2005) timely recognized the crucial role of satellite telecommunications for securing broadband for geographically disadvantaged populations. This project offered to remote teachers a rich distance learning environment for participating in synchronous and asynchronous training via satellite networks. This was an initiative at the national level, supported by the General Secretariat for Research

and Technology within the Concerted Programme for Electronic Learning. The training programme was attended by teachers at ten sites in the extremities of Greece, via satellite installations made by the project at their schools. The corresponding e-learning environments were realised through several technologies, exploiting satellite telecommunications for broadband delivery of rich educational content, in the context of both synchronous (videoconferencing, application sharing, chatting) and asynchronous (web-based learning through structured access to a rich pool of educational content, and networking) activities. A 'child', in many respects, of the ZEUS project, and the peak of the whole effort is RURAL WINGS (2006-2009), an ambitious, large-scale international research project supported by the Directorate-General for Research of the European Commission (Thematic Priority 'Aeronautics and Space' of the 6th Framework Programme). This project takes several decisive steps ahead, not only in the field of technology, but importantly also by carefully addressing the real needs for learning of all citizens living in remote rural areas. On one hand, DVB-RCS technology is used, which allows for two-way communication between the end-user and the satellite lifting the need for any terrestrial telecom infrastructure, thus rendering broadband really available everywhere, even in the most isolated and deprived area. At the same time, the RURAL WINGS project integrates satellite telecommunications with local wireless networks, thus demonstrating the appropriateness of satellite technologies for the provision of fully integrated services and applications to the whole of the remote rural population. What is more, RURAL WINGS builds on the successful approach of the ZEUS project to develop an advanced technologi-

cal environment supporting lifelong learning activities in the school, at work, as well as at home. In this way, familiarization of all citizens with the new technologies is promoted, resulting in a reduced resistance to the use of state-of-the-art opportunities for local development. Teachers working in remote rural schools –the main target group in the pilot applications in Greece– undertake a crucial role in this process. Through further support, professional development and networking, teachers of rural areas are encouraged to evolve into catalysts of change and development, not only within their schools, but more widely within their local communities.

Based on initial analyses of teacher needs, professional development schemes piloted in the earlier of the above projects, aimed mainly at helping multigrade school teachers to develop their professional skills along two main axes:

Use of ICT in their work, both for teaching/learning and administrative purposes. Application of innovative teaching and learning approaches which are most appropriate for the multigrade classroom.

The new technologies, including satellite broadband connections in rural areas, can offer a variety of solutions to the challenges of providing appropriate professional development support to teachers working in remote schools and alleviating their isolation. Two different ways have been tried, in which remote rural teachers can learn as individuals and learn from each other, in realization of a true lifelong learning culture. The first activity refers to rural educators' participation in structured e-training activities, while the second highlights the possibility for their involvement in networking activities with other rural teachers.

9.8 Structured e-training activities for rural teachers:

Teachers are introduced by the organization providing the training into the possibilities offered by the web-based distance learning environment used for the realization of the training. This may differ from country to country, depending on local circumstances, previous work, and availability, but in any case it corresponds to the following principles: it facilitates synchronous and asynchronous training realised through several technologies affording the delivery of broadband educational content:

Synchronously: videoconferencing, application sharing, chatting

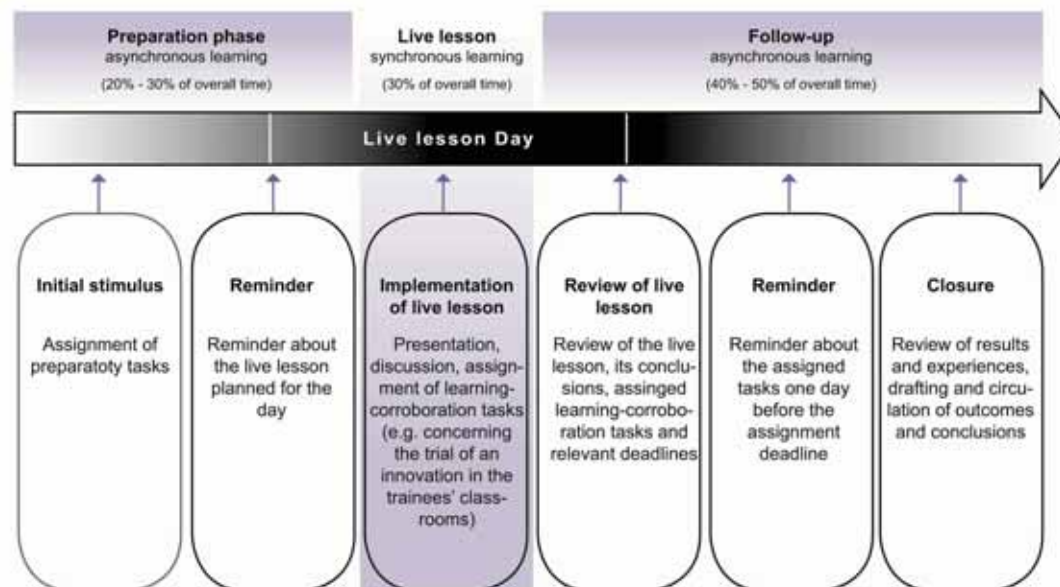
Asynchronously: web-based learning through structured and individualized access to a rich pool of educational content, forums and other asynchronous communication tools.

In addition, teachers from all participating coun-

tries are given access to a common online area, in which they can communicate through forums and chats in English, so as to broaden their views on the challenges and opportunities for rural education through their exposure to information and peer experiences from other countries.

The training programme is organized in such a way, that it can cover diverse needs catering for both flexibility and tutor guidance, both interaction with others and self-paced learning. To this end, the following comprehensive model of training delivery is followed:

In this model, the central event for each lesson is a live videoconferencing session, thus covering the need of isolated teachers for communication and real-time interaction with colleagues and instructors. On average, this synchronous e-learning portion of a lesson takes up about 30% of the overall



The training delivery model

lesson duration.

However, both before and after the live session there is learning activity taking place independently in the working environment of the teacher trainee. Through the use of web-based instruction techniques, course participants are offered on-the-job training opportunities through tasks and materials that allow them to work at their own pace, interact

with the instructor and other practitioners as needed, and receive individual feedback as they apply new practices in their classroom settings. For each lesson, there is introductory information on the topic covered and preparatory activities, the outcome of which are then reported by participants in the web environment and during the live session, as well as post-session consolidation and conclusion activities.

9.9 Teacher participation in a network for rural educators

Rural teachers become registered members of the European Network of Multigrade Education (NEMED), by accessing and filling in the simple registration page available at the web portal of the Network. This is an online space in which educationists and school practitioners from across Europe exchange information, views and content related to multigrade schools. There they can find not only information about policies and research on multigrade education, but importantly also materials for use in multigrade settings, ideas contributed by other teachers, opportunities to propose their own invented solutions for the problems of the small rural school, and more generally ample space for the development of communication and networking with other teachers, from around the world, who teach in similar educational settings. For all these, the teachers will make use of the various functions offered by the NEMED web portal. On the whole, in the NEMED portal the remote rural teacher will find a lively virtual space of structured exchange between network partners, participating teachers and schools, as well as any other users interested in multigrade education.

The rural teacher as change agent and the school as a 'Learning Hub': an example of the 'school as community centre' approach

Our work in the NEMED working group on 'Soci-

ety and Cultures' has set out to challenge the ideas of isolation and decline of the remote multigrade school and investigate ways in which multigrade education is interweaved with issues relating to the societal and cultural characteristics of the local communities in which multigrade schools operate. We have been encouraging teachers of rural areas to evolve into catalysts of change, not only within their schools, but more widely within their local communities, by familiarizing all citizens with the new technologies and reducing their resistance to the use of state-of-the-art opportunities for local development. The teacher is invited to become a change agent catalysing innovation and development in the school and the local community, changing the waning school into a lively node supporting lifelong learning for everyone (cf. 'the school as a community centre', Miller 1995, as described above). They are thus encouraged and supported to invent ways for supporting lifelong learning activities in the school, at work, as well as at home in their particular learning context. In this way, and in coordinating its efforts with the RURAL WINGS project, our Group has added one further important axis in the teacher training curriculum that some of our group members have been developing, as described earlier.

Clearly, new leadership roles are foreseen for the rural school teacher in this context. The teacher is

encouraged to take on a crucial role in the development and implementation of a culture conducive to lifelong learning and innovation in the school and beyond it, while at the same time making efforts to link school life with the school's external environment, helping the school interact with its environments, and creating communities of learning within and outside the school. The aim of any relevant professional development scheme, then, ought to be multi-faceted and rural teacher in-service training should provide teachers with diverse competences: in the area of solutions and opportunities of the Information Society, in the area of pedagogies specifically adaptable to the 'unusual' settings of the small rural school, as well as in areas that are currently scarcely present even in the most progressive teacher training curricula, such as innovation, change management, local and rural community development, etc.

Such a professional development intervention ought to help teachers recognize a new roles for themselves, beyond the conventional realisation of teaching tasks. Indeed, the teacher should start seeing himself as a change agent catalysing innovation and development in the school AND the local community, as an innovator producing and running a small 'revolution' in the rural school and community.

The Society and Cultures working group has assessed the case of making satellite broadband connectivity available to the school (such as in the RURAL WINGS project) as interesting and revealing. The teacher is trained, supported and encouraged to turn this bandwidth into advantage and opportunity for all, promote the development of a new culture among local citizens, disseminate the new potential offered by ICT, and encourage its uptake by the local population. He will be the local person who is necessary in any process that aspires to turn a mere technology into user-centred services and applications practically promoting equal opportunities for lifelong learning for all, economic and social development, and a more democratic access to the Information Society.

In other words, rural teachers in this vision are seen as genuine change agents and change managers, put in charge of driving change in the communities. For doing so, they will need to diagnose and deeply understand the context, the stakeholders, their in-

terests and interrelations, so as to consequently convincing them about the need and benefits of change, tackling possible scepticism. In parallel, he will act as the manager and administrator of a whole community 'Learning Hub', into which he will turn his rural school and its technological infrastructure. This may involve teacher's activity towards matching the lifelong learning opportunities offered with the needs he may diagnose in the local community and in specific individuals, supporting the community members to produce their own local information and content based services, and thus eventually help local citizens become knowledgeable and willing enough to develop their own further projects.

Thus the teacher, already acting as the head of the small school and a prominent member of the isolated community, will further and deepen the significance and prestige of the school as one of the few public establishments, by leading the community into recognizing in his person additional informal roles as a leader. Within the school/Learning Hub, the teacher will be the pedagogic innovator, an instructional leader exploring new ways to improve the quality of teaching and learning. For instance, the teacher can explore the opportunities offered by new technologies and innovative pedagogical approaches aiming to improve the teaching and learning that takes place in the remote small rural school, thus having an impact on the quality of learning and the results of the school. Beyond the walls of the classroom, however, the teacher may develop into a facilitator of communities of learning in, around, and outside, the school, for instance by developing links and synergies between the school, the community and maybe other schools in the area.

An interesting example could be a local project initiated by the teacher, aiming to develop and foster a learning network of rural teachers in the wider area or even more broadly, which could provide a framework for the acquisition and sharing of knowledge in an informal communication process lying beyond and supplementing teachers' formal professional education. This, managed by the teacher/change agent, could develop into a community of practice (Wenger, 1998) of rural teachers, a community defined by a shared domain of interest, e.g. that of the development of multigrade teaching competences, an established members' commitment, with teachers engaging in joint activities and discussions,

helping each other, sharing information and learning from each other, while pursuing their interest in their domain. Members of the community may thus gradually develop a shared repertoire of resources – a shared practice: experiences, stories, tools, ways of addressing recurring problems in their small rural school, etc.

More generally, the rural school teacher is hoped to develop into the manager of change in an informal local ‘reform’, a former and implementer of innovation matching local needs. Using broadband school infrastructure provided in the framework of the Rural Wings project (and the Greek projects ZEUS and HERMES), the teacher information and training programme developed by the group demonstrated how a rural multigrade school acting as a ‘learning hub’ for the whole community will not resemble any of the existing institutional structures, in that it will offer opportunities for learning and creativity to all members of the local community. Teachers have been presented with opportunities

to use existing educational applications, which at a first stage will involve students, but which also will clearly demonstrate to the wider local communities the possibilities offered by the information society. In particular, the working group has promoted two activities among rural multigrade teachers, exemplifying Miller’s (1995) two further approaches to building strong linkages between the school and the local community: the ‘community as curriculum’ and the ‘school-based enterprise’ approach: the ‘rural school WEBTV’ and the ‘AGROWEB rural e-shop’ projects respectively.

Students broadcasting local affairs through their own WebTV programme: an example of the ‘community as curriculum’ approach

In the rural school WEBTV activity, students collaborate to present to the public films created by them, promoting aspects of school life, everyday life, the cultural heritage, and current activities and events taking place in their rural communities.

9.10 Involved actors

Teachers in primary or secondary schools who wish to introduce innovative, student motivating ways of teaching a series of cross-curricular skills and knowledge, bringing school learning in contact with entertainment, the contemporary media culture, and the local community surrounding the school.

Students in the upper grades (age 11-12) of primary school, or in secondary school, who need to acquire the relevant knowledge and skills, and who

are interested in developing innovative activities in the school and in collaboration with the surrounding community.

Local actors, e.g. farmers, entrepreneurs, local community authorities, who wish to get acquainted with the possibilities offered by new technologies for the promotion the area and of local people’s views and needs over the internet.

9.11 Specific goals

To give to remote rural students, teachers, and citizens channels of communication with the world, and in particular ways of reminding urban centres about the existence, needs and creative powers of rural populations.

To bring closer together school education and real world experiences such as the contemporary media,

transferring the production of audiovisual content into the classroom, and exploiting entertainment for educational purposes.

To demonstrate how rural citizens can cooperate towards a common aim such as the promotion of the local area and its assets, and how this effort can be supported through the creation of horizontal links between the school and the local community.

9.12 Sustaining hope and creativity in the small rural community, even when the multigrade school closes

The tendency in many countries nowadays is to close small rural schools, usually due to the small number of students, and merge the small school populations so as to form larger school units in selected rural locations. This policy choice is leaving many school buildings in Europe closed, and, most

importantly, many small rural communities without the institution that for many years has represented knowledge, developmental potential and capacity building in the local context. The Society and Cultures group has paid particular attention to this phenomenon, exploring possibilities and highlighting existing good practices.



10

Learning Modes In The Multigrade Classroom

10.1 heoretical framework: Learning Modes in Multigrade Education

Learning Modes might be defined as the variation observed in the learning process (e.g. learning can be more an individualistic process or more a collaborative one). A student can vary the Learning Mode according to the learning situation and his or her learning needs (e.g. revising by rote learning, for a multiple-choice answer test, or revising by comprehending, for writing for a project).

Therefore, there are a diversity of learning modes which can be more or less adapted to different students and different learning situations.

When a specific learning mode is consistently used by a student, this can become his or her Learning Style.

How many Learning Modes?

In order to answer this question learning modes can be conceptualised across three axes, which reflect various aspects of the learning process:

- Cognitive
- Motivational
- Interpersonal.

Each axe involves different dimensions, reflecting diverse learning modes (e.g. Cognitive axe involves a dimension of memorising versus comprehending).

Each dimension can be conceptualised as discrete opposed poles or as opposed but in a continuum (i.e. as opposite processes or as complementing each other).

Each learning mode can appear in different ways; according to personal and environmental factors (e.g. there are many ways of conducting a self-regulated learning mode, as opposed to an external regulated learning mode)

Moreover, axes can cross, reflecting the interwoven

of different learning modes (e.g. students might self-regulate their learning in a collaborative way)

For each of the three axes, we propose a focus on particular dimensions, taken as nuclear.

Considering the cognitive axe, learning can occur via a surface learning strategy (i.e. mechanically memorizing) versus via a deep-organized learning strategy (i.e. learning focused less in knowing by heart than in trying to understand the meaning of the contents, to relate them with previous knowledge, to be open to new contents and to change personal ideas, to memorise by comprehending, to critically analyse and have an opinion on contents, to be creative as well as organized and sensible to teachers' evaluation) (Biggs, 1987).

Attending to the motivational axe, learning can be based in instrumental motivation (i.e. learning to avoid failure) versus based in intrinsic-achiever motivation (i.e. learning for the pleasure and personal full-filing implicated in learning as well as for success). With such a motivation students normally go beyond what is demanded, perceive tasks as involving, get a lot of satisfaction from learning, strive for good marks and show a lot of involvement (Biggs, 1987).

Taking into account the interpersonal axe learning can be external regulated (i.e. learning is conducted by others or factors besides the learner) versus Self-Regulated (i.e. the process of managing one's own learning) (Zimmerman, 1994). By self-regulating learning learners move from being externally controlled by teachers or others to being active in the control of their own learning processes. This means the attempt to self-control cognitive, motivational, behavioural and environmental aspects involved in learning. Learning can be also more individualistic (i.e. student learns alone, possibly along other students) or more collaborative (i.e. students work together cooperatively in small groups toward a com-

mon goal, taking care of each other's learning as well as their own) (Johnson, Johnson & Holubec, 1991). Trough collaborative learning students can discuss and help, share, encourage, explain or teach each other.

Figure 10.1 depicts the three axes, with their referred learning modes.

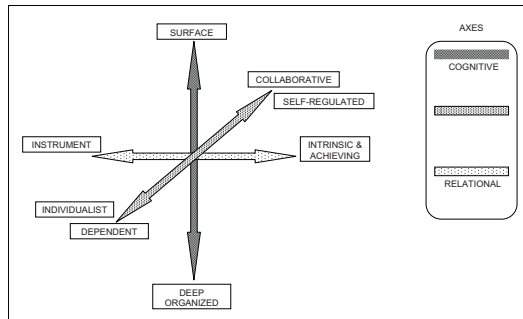


Figure 10.1: Learning modes in three dimensions (axes) of the learning process

Each of these learning modes is reflected in specific forms when learning in particular tasks.

Regarding the potential of ICT for education, we will consider how the learning modes of the cognitive axis are reflected in ICT-based learning.

Basically, ICT-based learning can happen as learning from ICT (i.e. students are instructed by ICT) versus learning with ICT (i.e. students construct knowledge with the help of ICT by representing their knowledge in different, meaningful ways and by engaging in critical thinking about the content) (Jonassen, 2000).

Figure 10.2 illustrates reflection of cognitive axis learning modes in ICT-based learning.

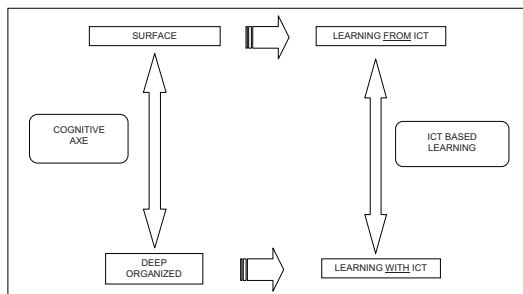


Figure 10.2: Cognitive axis learning modes in ICT-based learning

A teacher can develop, encourage or/and constrain the use of specific learning modes, according to educational goals and the nature of different learning situations.

What are the practical implications of the existence of different learning modes?

We think it is possible to view this issue according to, at least, two perspectives.

The first perspective is that students improve by using preferred learning modes (e.g. visual learning) or they benefit from using a variety of learning modes (e.g. visual and auditory learning). In either case, the practical implication would be that a variation of teaching practices might be a good way of reaching more students.

The second perspective is that in any class, but especially in a multigrade class, where individual variation is higher and teachers must often attend separately to various sub-groups, students must be particularly able to: independently self-regulate their learning; to be intrinsically motivated to learn and achieve; to actively comprehend contents in an organised way; to learn in a collaborative way. Furthermore, a mode of active learning with ICT can be especially helpful in this context. There are a variety of “ways” (practices) a teacher can use to promote such learning modes. These “ways” might depend on previous training, personal experience, knowledge, competency, culture references, etc.

Figure 10.3 presents the two stated perspectives regarding practical implications of the existence of different learning modes.

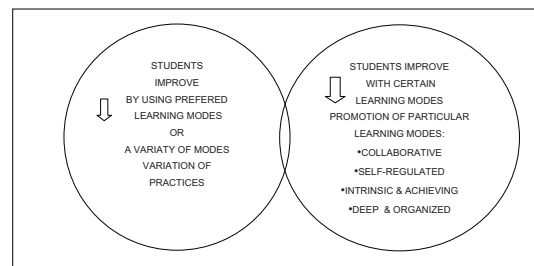


Figure 10.3: Two perspectives on practical implications of different learning modes.

10.2 Survey of teacher's practices for dealing with learning modes in multigrade classes

The goal of this survey was to know and systematize information about practices for dealing with learning modes that could be shared among multigrade teachers. Namely, the goal was to inventor how multigrade teachers vary their teaching practices according to the observed variety of their pupils learning modes; what learning modes they elect, if any, as more suitable to their classrooms; and what teaching practices they use for promoting particular learning modes (i.e. deep-organized; intrinsically-achieving motivated; self-regulated; collaborative; active ICT-based).

In order to inquire teachers on their practices for dealing with learning modes in the multigrade classroom a semi-structured interview script was written. Interview questions address variation of teaching practices according to diversity of pupils learning modes, elected learning modes and personal teaching practices (especially ones felt as more successful) for promoting particular learning modes (i.e. deep-organized; intrinsically-achieving motivated; self-regulated; collaborative; active ICT-based).

The interview was introduced to teachers as a mean of gathering potentially useful ideas, considering that there are not "wrong" or "right" practices that can be shared later with other multigrade teachers.

The interview script was tested with a group of six elementary multigrade teachers from Portugal and Finland and an informal first analysis of answers was conducted (i.e. list of mentioned teaching practices and elected learning modes).

Concerning the way they vary their teaching according to their pupils' variety of learning modes; teachers reported the use of personalized-teaching and of attending alternatively to small groups, while other groups work autonomously.

Interviewed teachers elected cooperative learning, autonomous learning and personalized-teaching based learning as most suitable learning modes for the multigrade classroom. Teachers referred as best practices for developing a collaborative learning mode the setting of: collective reading and writing situations; group problems; group projects; and collective games.

Regarding teaching practices for encouraging self-regulated learning mode the following ones were referred: having several open thematic spaces/areas in the classroom; setting of problems; distribution of tasks and delegation of responsibilities; support of autonomous learning or of task definition; defining tasks; prompting of planning and of joint work evaluation.

Teachers also mentioned several practices for promoting an intrinsic and achieving motivated learning mode: allowing free-choice of activities; setting of open problems; using familiar examples and tasks; using easy tasks for pupils with difficulties and using challenging tasks for more competent pupils; encouraging knowledge appliance; demonstrating enthusiasm and optimism; reading dramatically; setting situations of reciprocal teaching; inviting parents and guests to the classroom; encouraging task involvement and self-evaluation; using positive reinforcement; setting home works that demand assistance.

Taking in account teaching practices for stimulating a deep and organized learning mode, interviewed teachers referred to the use: of opportunities for tactile-kinaesthetic learning; of situations of learning by discovery; of open tasks; of tasks of reciprocal teaching and of writing.

Finally, considering teaching practices for developing an active ICT-based learning mode, teachers mentioned prompting their pupils for computer-based search, organization, transformation and

presentation of information as well as setting of small-group work and communication situations via the computer.

Testing of the developed interview allowed a first impression on ways multigrade teachers deal with learning modes. Namely, teachers seem to vary their practices to deal with different learning modes. Teachers can also identify preferred learning modes for multigrade classrooms. Furthermore, teachers mention the use of diversified practices for promoting a collaborative, self-regulated, intrinsically and achieving motivated, deep and organized, active ICT-based learning mode in multigrade classrooms.

How teachers vary their practices in multigrade classes, in function of pupils' learning modes?

- By personalized-teaching
- By attending alternatively to small groups (while others work autonomously)
- By differentiating contents, methods and materials (e.g. more concrete or more abstract)

Which learning modes teachers elect for multigrade classes?

- Autonomous Learning
- Cooperative Learning
- Personalized-teaching based learning

Which practices teachers use for developing positive motivation based learning in multigrade classes?

- Free-choice activities
- Open problems
- Teacher use of familiar examples
- Familiar tasks; Easy tasks (for those with difficulties) or Challenging tasks (for more competent pupils)
- Teacher encouragement of knowledge application
- Teacher enthusiasm & optimism
- Teacher expression of confidence in pupils' capacity to learn

- Teacher dramatic reading
- Reciprocal teaching
- Inviting parents & guests
- Teacher encouragement & positive reinforcement
- Self-evaluation
- Mapping tasks pupils' are responsible for
- Setting of projects to be developed by the pupils'
- Setting of assistance demanding home-works

Which practices teachers use for developing active learning in multigrade classes?

- Tactile-kinesthetic learning
- Discovery learning
- Open tasks
- Reciprocal teaching
- Writing tasks
- Teacher questioning & empirical testing of pupils' conceptions (*conceptual change*)
- Teacher questioning, explaining and discussing with the pupils
- Teacher use of pupils' language
- Relating curricular contents with pupils' personal experiences
- Introducing pupils to a rationale for the learning tasks
- Demanding pupils to develop their learning means (e.g. learning materials)

Which practices teachers use for developing cooperative learning in multigrade classes?

- Collective reading & writing
- Group problems
- Group projects
- Collective games

- Development of moral thinking and citizenship

Which practices teachers use for developing multi-sensorial based learning in multigrade classes?

- Study visits
- Practical situations for contact with real objects
- Activities for exploring and discover
- Using films or slideshows to support learning
- Arranging opportunities for smelling different odors related to content
- Inviting guests for presenting information in a multi-sensorial way
- Demanding verbal descriptions of touched objects
- Organizing dramatic expression of contents
- Demanding pupils' expression or presentation of information in a multi-sensorial way

Which practices teachers use for developing autonomous learning in multigrade classes?

- Open activities or thematic areas in the classroom pupils can choose
- Problems to solve

Concerning the way they vary their teaching according to their pupils' variety of learning modes; teachers reported the use of personalized-teaching and of attending alternatively to small groups, while other groups work autonomously.

Interviewed teachers elected cooperative learning, autonomous learning and personalized-teaching based learning as most suitable learning modes for the multigrade classroom. Teachers referred as best practices for developing

- Teacher distribution of tasks and delegation of responsibilities

- Teacher encouragement of autonomous learning or of task definition

- Teacher communication of task definition

- Planning and joint work evaluation

- Teacher regulation of pupils' learning (planning, evaluating, etc.) I a way they learn to self-regulate

Which practices teachers use for developing active ICT based learning in multigrade classes?

Prompting computer-based search, organization, transformation & presentation of information

Small-group work with the computer

Arranging opportunities for communication with other pupils via computer

These results would be later edited, as training materials and educational resources on how to deal with learning modes in the multigrade classroom, in a training module of NEMED. By sharing these practices among multigrade teachers we hope to contribute to the improvement of teaching and learning in this context.

10.3 Results

a collaborative learning mode the setting of: collective reading and writing situations; group problems; group projects; and collective games.

Regarding teaching practices for encouraging self-regulated learning mode the following ones were referred: having several open thematic spaces/areas in the classroom; setting of problems; distribution of tasks and delegation of responsibilities; support of autonomous learning or of task definition; defining tasks; prompting of planning and of joint

work evaluation.

Teachers also mentioned several practices for promoting an intrinsic and achieving motivated learning mode: allowing free-choice of activities; setting of open problems; using familiar examples and tasks; using easy tasks for pupils with difficulties and using challenging tasks for more competent pupils; encouraging knowledge appliance; demonstrating enthusiasm and optimism; reading dramatically; setting situations of reciprocal teaching; inviting parents and guests to the classroom; encouraging task involvement and self-evaluation; using positive reinforcement; setting home works that demand assistance.

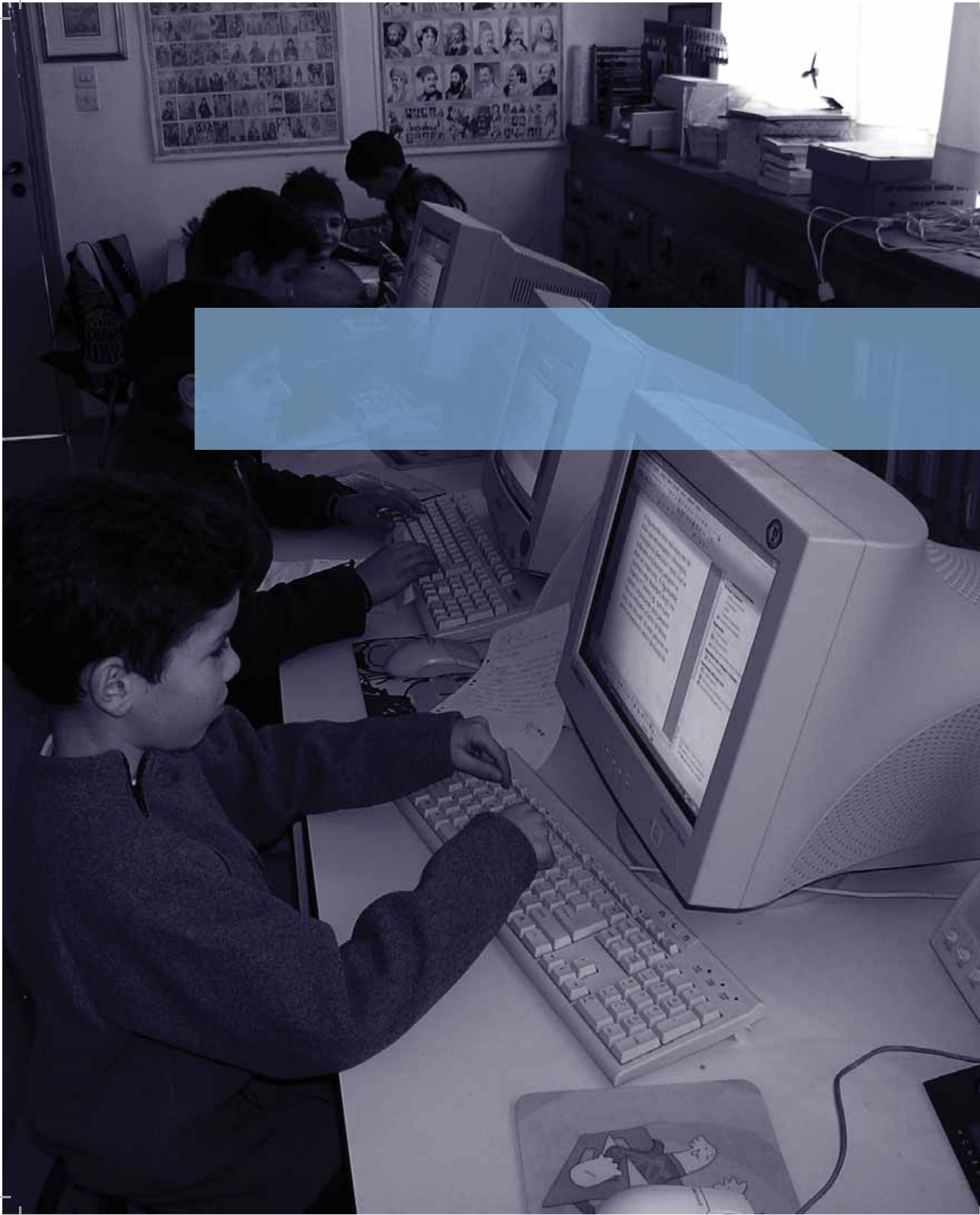
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Finally, considering teaching practices for developing an active ICT-based learning mode, teachers mentioned prompting their pupils for computer-based search, organization, transformation and presentation of information as well as setting of small-group work and communication situations via the computer.

10.4 Conclusions

Testing of the developed interview allowed a first impression on ways multigrade teachers deal with learning modes. Namely, teachers seem to vary their practices to deal with different learning modes. Teachers can also identify preferred learning modes for multigrade classrooms. Furthermore, teachers mention the use of diversified practices for promoting a collaborative, self-regulated, intrinsically and achieving motivated, deep and organized, active ICT-based learning mode in multigrade classrooms.

Based on this test, the interview script was revised and is now ready for future appliance to a sample of European multigrade teachers. Results of this appliance will be edited, as training materials and educational resources on how to deal with learning modes in the multigrade classroom, in a training module of NEMED (Network of Multigrade Education). By sharing these practices among multigrade teachers we hope to contribute to the improvement of teaching and learning in this context.



11

Policies for Multigrade Schools

11.1 Definition of Educational Policy (What is meant by “educational policy”?)

A policy is a deliberate plan of action that guides decisions and actions aiming to achieve rational outcome(s). “Policy” is exercised by international organizations and unions, national governments, regional and local authorities, public organizations, private organizations and units, groups of people and individuals.

Educational policy is a framework that sets the targets and goals of the educational system and defines strategies, plans, measures and actions that –if implemented- are expected to lead to the achievement of specific educational goals. It works as an input-output process, in the sense that it proposes the use of several factors, such as human capital, physical capital, laws and institutions, technology, information, ideas etc that, under appropriate use, lead to a, more or less, predetermined outcome. Thus, educational policy is the means by which authorized units (policymakers) respond to both the society’s demand for education and the need to supply education for pedagogical, economic, socio-cultural and developmental reasons. Educational policy includes plans and strategies referring to the primary, secondary and tertiary levels of education and focuses on the function of educational systems and the transmission of knowledge – including administration, pedagogy, curriculum, and access (Levin 2001). Educational policy is a political matter. It depends on ideologies and wider political choices influenced to a great extent by global trends, national and local characteristics,

economic, social and cultural parameters and other factors. Educational policy is integrated within the general framework of governmental policy; it influences all other sectors of the economy and is influenced by them.

One should distinguish between ‘the educational policy’ and ‘educational policies’. The educational policy is the general frame or the strategy concerning the entire educational system. Educational policies are many actions, measures and activities, planned and implemented within the adopted framework of the educational policy.

The outcome of the educational policy is the educational system, which, up to now, refers mainly to formal education. Lately, the current development of the concept of lifelong learning as a holistic system that includes any action which produces knowledge seems to provide a new paradigm in education. This promises a new general framework which incorporates educational policies referring not only to formal education but also to other activities and plans, related directly but also indirectly to education.

Multigrade Schools (MS) certainly form an educational phenomenon that operates as a part of the educational strategy. MS comprise also a field where many educational policies and measures can be developed and applied. At this stage reference should be made to rural schools. Rural Schools are schools that operate in rural areas. In most cases rural schools are multigrade schools.

11.2 The levels of Educational Policy (who makes educational policy?)

In most countries the educational system is centralized. The institution usually authorized for planning and implementing educational policy and policies is the Ministry of Education either on its own or in collaboration with other levels of policy making, among which regional and local authorities. There are some cases in which educational planning is the responsibility primarily of the local authorities, thus providing a decentralized educational system. The degree of centralisation or decentralisation of the educational policy making differs from country to country. It should be mentioned however that, once the adopted, targets of education are in favour of mass rather than eclectic education, the central character of educational planning becomes more appropriate. It is easier to ascertain equal educational opportunities for all regions and areas in a country, if educational planning is centralized.

Globalisation as well as europeanisation and the increasing need of human capital movements has increased the need for an international and/or European educational policy. This does not reduce the importance of central national authorities in the process of educational planning but certainly sets a new level of educational policy making, which schematically is presented below.

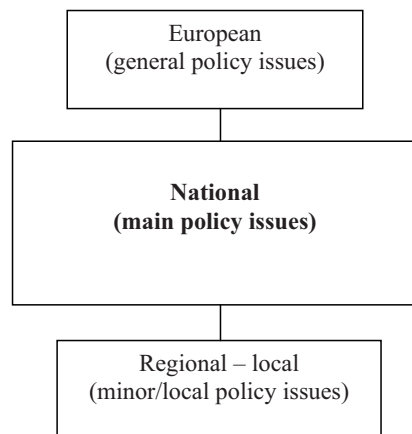


Diagram 1: Levels of Educational Policy

Educational planning seems to be a rather complex matter. An attempt to clarify it leads to distinguishing two levels of planning: (a) a trans-sectoral and (b) an in-sectoral one.

With respect to (a), educational planning is decided in competition with other sectors' planning. Education depends usually on funding from the budget –which reflects the targets of economic policy in general. In this sense propositions of the Ministry of Education can become part of the educational policy only if they are in harmonization with the policy of the Ministry of National Economy/Finance. Given the competition for funds among Ministries, it may easily be understood why educational policy is highly related with policies of other sectors and is formed as part of a process of integrated planning. Thus, extra funds for education means probably less funds for Health or Defence and this explains why education gets a limited share of the budget.

With respect to (b), educational policies are decided within the sector of education itself. Once the general frame of educational policy is agreed in conjunction with other sectors' policies, specific educational policies can be a matter of internal decisions in the sense that they concern the educational sector itself. Rational educational policy ideally is produced as the result in a decision making process in which priorities are set and procedures of optimization under restrictions take place. Since educational needs are practically infinite while means for satisfying them are limited, the contents of educational policy are the outcome in a problem of choice: It should be decided which needs are to be met and which are to be left unsatisfied. The urgency of the needs is a good guide in this choice process, although usually it is difficult to evaluate the degree of such urgency.

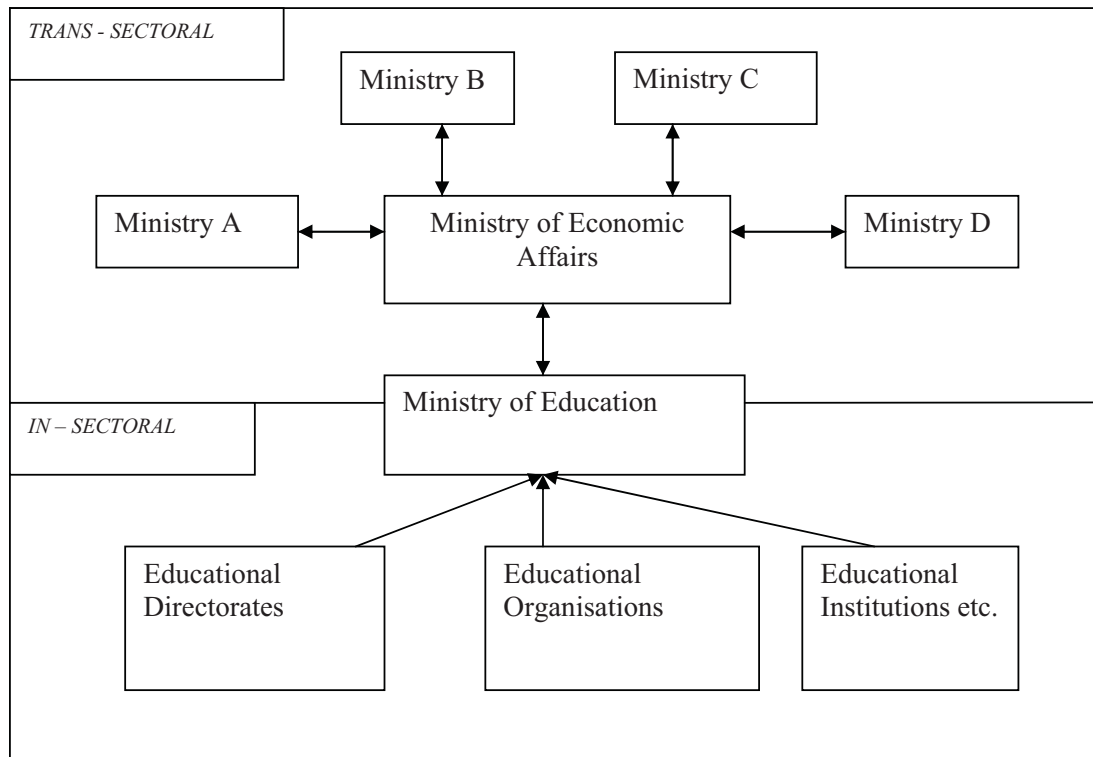


Diagram 2: Levels of National Educational Policy Making

Apart from the main policy making authorities, there are many organized pressure groups, within the educational sector, that influence directly or indirectly decision making in education-related matters. Such groups are the following:

- Teachers Unions
- Parents Associations
- Research Centres and Universities
- Individual Teachers

Outside the educational sector, there are also many groups, organizations and institutions that, while working for their own goals and targets, may affect in one or other way educational decisions.

The involvement of authorities, groups of people and individuals makes educational policy a wide political issue.

MS are a specific case in educational policy making. They are schools that usually operate in low inhabited, remote and isolated areas. Being “marginal”

educational institutions, it is common for nationwide educational policy not to consider them as top priority issues. At the same time, they seem to play an important role in the local area and they develop strong links with local communities, which however have not per se a strong voice in the process of educational policy making. To the extent that they create a case that is present in all member states and worth protecting, the European Union, acknowledging their role, can propose general policy rules for them, in collaboration with local and regional authorities, groups of people interested in them and research organisations that provide evidence for their effectiveness.

With respect to such policies concerning MS two difficulties are met:

The first difficulty refers to the lack of convergence among the specific educational targets of the three partners (local, national, European). Although attempts are made towards an alignment of goals and targets of the three parts, when it comes to specific policies as the one concerning MS, it is not sure if European, state and local policies work towards the same ends. It is often the case that these three policy levels in the case of MS differ dramatically!

The importance of the MS on the micro-level of a remote and isolated area could be highly devaluated on a macro-level.

The second difficulty is related to the centralised character of educational policy. The fact that decisions concerning schools are made centrally inevitably leads to an adaptation of educational policies to the 'average' mode of school. Such an average certainly keeps distances from MS which form an extreme case in education.

Consequently, the following requirements should be met as prerequisites for the development and the adoption of any policy plans and actions for MS:

MS reality should be a common subject in the educational policy agendas.

Consensus should be developed over the basic principles that refer to the role, the importance and the prospects of MS, on local, national and European level.

MS should become a matter for specific educational policies, possibly annexed to the main educational strategy, yet forming a specific self-standing case.

Research on MS should be encouraged so as to shed light in efficiency and effectiveness issues.

Once these prerequisites are met, one can talk about a vector of different educational policies in respect to MS lying between two extremes: doing nothing about them on the one edge and considering them as an important model-type of school that can play a considerable role in many areas.

11.3 Dimensions of educational policy. (Which goals are served by educational policy?)

Formal learning takes place in schools or school-like environments and in this sense schools form the heart of the educational system. The role of schools is multidimensional including: (a) transmission of accumulated knowledge of a society, (b) development of values and beliefs, (c) socialisation of young children and preparation for citizenship and entrance in the labour market. The content of formal education, its duration, and the question who receives it have varied widely from culture to culture and age to age, as has the philosophy of education.

In developing countries' cultures there is often little formal education; children learn from their environment and activities, and the adults around them act as teachers. In more complex societies, where there is more knowledge to be passed on, a more selective and efficient means of transmission — the school and teacher — are necessary.

Nowadays, the increasing rate of new knowledge production, the rising competition in the labour market and the social life and the continuous urgent demand for education, resulted in transferring importance from formal education to a new con-

cept known as Lifelong Learning (LLL). Lifelong learning can be defined in various ways. In a narrow sense it is related to continuing learning activities that supplement formal education, scoping to the individual's personal and professional development. In some works, particularly in those dealing with costs of LLL, it appears as including all 'extensions' to the existing provisions of education (Mc Mahon, 1998). As Levin states many writers and policy-makers consider LLL as continuous learning after the phase of initial education and 'therefore concentrate on post-compulsory or post-secondary learning activities' (Levin, 1998). In a wide sense, LLL includes any type of purposeful learning process, undertaken on an ongoing lifelong basis, aiming to improve knowledge, skills and competence (European Commission, 2000, ELWA, 2001–2003). Along these lines LLL seems to be the integration of all learning activities in a life cycle that enrich the individual's knowledge, skills and competence, undertaken for implementing personal, social, societal and professional perspectives (European Council). In this sense, LLL constituents are formal, non formal and informal learning, the latter including workplace learning as well as skills, knowledge, at-

titudes and behaviours that people acquire in their day-to-day experiences (The Scottish Executive, 2000).

Either in the form of formal education or as life-long learning, education serves multiple goals. It serves primarily educational-pedagogical goals but also a series of economic, social and cultural ones. One could group economic, social and cultural goals as developmental ones.

The educational – pedagogical goals exist because any individual should acquire knowledge (transmitted or constructed by educational processes), be socialized mainly in a school environment and get appropriate preparation for citizenship and smooth entrance in the labour market. These goals are the most straightforward and direct goals in the field of education.

Less evident, yet very important, are the economic goals: Knowledge is considered as improving quality of human capital which is a function of the knowledge, skills and experiences. Quality of human capital affects productivity, i.e. production per unit of time. To the extent that productivity is a determinant of wage, more education results in higher income. An improvement in the quality of human capital means for the individual higher returns in a life-time and for the society a higher rate of increase in per capita income –i.e. higher growth rate. Consequently there are strong economic reasons for an individual or a society to be well educated.

Equally important are the socio-cultural goals that education serves. More education is related to a series of externalities reflecting behaviour in the family and the society, as well as the development of ethics, norms and ideas that promote progress

and socio- cultural development. Together with the economic effects, socio-cultural dimensions multiply the educational benefits; hence increase the importance of the sector of education in the socio-economic environment.

Educational policy is made along the axes of these goals. In this sense, one could distinguish multiple dimensions in educational policy, categorised as educational-pedagogical, economic, and the socio-cultural ones. The multiple dimensions of educational policy provide strong arguments in favour of education, increase the interaction of the sector of education with the rest of the sectors of economic and social life and make the educational sector one of the most important in the society.

Usually, educational policy is designed so as to serve all dimensions. However there are cases in which educational policy is undertaken in order to meet a certain goal which is in priority for specific reasons.

With respect to MS, it should be noted that they form cases in which the educational dimensions are more distinct than in other schools. Thus:

They offer education –hence serve educational-pedagogical goals in areas where no other institution can do this.

They promote development of human capital, thus serve economic goals, in areas where human capital as well as other productive factors are scarce.

They are key-institutions for socio-cultural development.

They are the sole institutions in the areas they operate, that have relevance to LLL.

Ignore MS, exclude them from any policy making and concentrate in monograde schools;	Negative option
Make some minor, non-dynamic improvements so that they keep offering marginal education in remote areas;	Moderate option
Decide to close them down and find alternative solutions for providing education to local students;	Intermediate options
Organise them in groups so as to find ways to produce scale economies;	
Consider them as highly positive cases but keep them in a limited number for specific areas;	
Introduce them as compatible alternatives to monograde schools;	Positive option
Create a system of solutions by adopting more than one options.	Mixed option

Table 1: Different policy options for MS

11.4 The policy options for MS (What can be done for MS?)

It seems that, under the existing circumstances, MS create an issue that needs specific attention from local authorities, national governments and the European Union. MS form a case for the development and implementation of specific policies. Hence the first and greatest step towards a policy for MS is the recognition of the need to have a policy and policies for these schools.

It is true that the situation in the existing educational systems does not favour MS. Given the trends for urbanization, *ceteris paribus*, the number of MS all over the world is diminishing and is expected to diminish further. Moreover educational systems are designed with mono-grade schools as model schools; educational policy is planned and implemented basically for them, leaving MS at the margin. These act as a non-ending cycle. Quality of education offered in MS is low, the low scale makes them relatively an expensive solution, parents are sceptical in sending their children to MS, teachers do not prefer them, and this results in a further deterioration of their quality and an increase in their marginalisation. Monograde schools are the top preference of both educators and learners and of course are more attractive to policymakers.

However, MS are a reality that exists all over the world. Their presence in remote and isolated areas is expected to last for long. It is almost sure that, even those who oppose MS, considering them as institutions that provide marginal quality of education, do not have a straight answer to the question how education can be supplied in areas that are low-inhabited and difficult to reach. Small, low-inhabited islands create strong cases that ascertain that MS will not cease to exist.

In addition, monograde schools, though the most attractive type of school, do not necessarily contain a successful paradigm. After so many years of operation, their effectiveness and efficiency still remains an open matter.

Hence, we confront a situation in which MS create an educational phenomenon that cannot be ignored. The options that policymakers have in their hands for these schools create a series of options ranging from negative to positive ones as follows:

It should be noted that from the above options (1) is the negative options while all the rest create cases in which policy makers respond positively to MS.

11.5 The negative option for MS vs the positive ones (Why any policy is better than no policy at all?)

The negative reaction, available to policy-makers, is to do nothing about MS. This is equivalent to accepting that these schools: (a) offer much less than they cost, (b) provide an old-fashioned way of educating pupils, (c) produce education of dubious

quality, (d) education offered by any alternative is better than that offered in MS.

These form arguments for abandoning any policy for MS, allowing them to operate marginally, at low

funding, not prioritizing any of their needs and not solving any of their problems. In such a case MS gradually are degraded and become the schools of those unlucky learners that have to choose between MS and no schools at all. Given the dependence of schools on central authorities for getting funds and for solving their problems, the future of such abandoned MS is disappointing. Sooner or later they will

cease to exist, either because parents will chose to move from the area for the sake of offering their children a better quality of education or because any alternative, such as travelling everyday to/from school, sounds better than MS. It is worth noting that the 'do nothing' reaction has some political cost which is relatively low, since it does not mean any drastic decision.

11.6 Evaluation of the negative option vs the positive ones

The negative option vs. the positive ones are assessed below along the educational-pedagogical, economic and socio-cultural goals that MS may serve in the areas where they are established.

Pedagogical goals against and in favour of a policy for MS

It is well accepted that the role of school is to generate and transmit knowledge, to help pupils in socialisation and to prepare them for their future entrance in the labour market and economic life.

With respect to these, the quality of education provided by multi-grade schools is many times questioned, providing a case against equal educational opportunities on the primary level. There is a number of parameters that act against multi-grade schools' educational quality, such as:

The application in these schools of a centrally designed analytical programme that is developed with the aim to meet the requirements mostly of mono-grade and not of multigrade schools;

The geographic and social isolation of remote and geographically isolated areas puts multigrade schools at the low end of teachers' preferences. This means frequent transfers of schoolteachers from the area, inexperienced teachers and limited chances for professional development;

The multidimensional job that a MS teacher has to do in order to meet the educational, social and

managerial needs of his school. These needs are dictated by (a) the educational system in general and (b) the specific school itself. The fact that the teacher shares with no other (of unfavourably few) colleagues these duties makes his/her job very difficult.

The unavoidable pressure of teaching time, the unfair learning time per student compared to conventional schools, the weak antagonistic learning environment, the absence of specialized teaching subjects (music, foreign languages, sports, technology related subjects, arts etc)

In spite of these disadvantages, there is a range of characteristics that act in favour of multi-grade schools. Among them one should point out the following:

Development of self adjustment and self –learning skills in a greater extent than in other schools

High coherence in the relations between students and the teacher

Adaptability of teachers and pupils to a more demanding environment and to an alternative pedagogical practice

Relatively fast and more effective pupils' socialization and integration in a small society

Stronger bonds of the school community with the local community

More specifically, with respect to knowledge transmittance, the efficiency of MS is debated. Yet any inefficiency may be attributed to the fact that these schools operate following a curriculum that has been developed to fit mono-grade schools and adopting traditional, classical didactic and pedagogical methods. However, it is often the case that such a curriculum and such educational methods are criticised, their effectiveness is doubted and the introduction of alternative methods is proposed, as expressions of the need to change the traditional school. Thus innovative educational approaches that promote creative and cooperative learning, with the use of Information and Communication Technology (ICT), interdisciplinary learning, other learning modes (see earlier chapters) etc, are investigated for efficiency and some of them seem to provide successful alternatives that fit in MS. As an example one could mention that extensive use of ICT that in the case of MS provides a good time management solution for all grade pupils, apart from those with whom the teacher works at any one time.

With respect to socialisation, the small size of the MS and of the school community facilitates the creation of a friendly, small-scale environment that helps pupils to develop good relationships among themselves. In addition, the co-existence in the same classroom of pupils of different age and grade makes easier for pupils the adjustment to a diversified social environment. Further, socialisation of the members of the school community is facilitated due to the strong bonds between the school and the local community, attributed to the fact that the school in a remote and isolated area is one of the few institutions that exist hence plays an important part in the area's public and social life.

Finally, MS if properly upgraded can provide preparation of pupils for their future economic and social life. This is so, not only because education in any school –hence in MS- upgrades the quality of human capital, but also because MS acts as a lever of social, cultural and economic development, as seen below.

Therefore, an evaluation of the above-mentioned features of MS, may lead to the conclusion that these schools could have disadvantages in some contexts, but could be competent as far as other roles are concerned.

The above conclusion is supported at least partially by the findings of several research projects that refer to MS (Little, 2004). These include works that either assess the educational-pedagogical achievements of MS pupils or evaluates the MS teachers' perceptions about the benefits and challenges of teaching and learning in MS.

Little (2004, 1995) refers to several research projects that were carried out with the aim of evaluating the effectiveness of MS on a cognitive level. The results with respect to developed countries (USA, and Canada) were mixed in the sense that learners in some MS seemed to perform better in maths and reading and other worse. The results with respect to less developed countries seem to favour overwhelmingly MS. Thus, the research on the cognitive achievement evaluated in Burkina Faso, Togo and Colombia as well as in the Turks and Caicos islands and Indonesia found that learners in multigrade classes performed better than those in monograde ones. It was only in Pakistan that the relevant research found that monograde learners performed better.

With respect to the teachers' perceptions about MS, the results seem to favour monograde schools as the desirable norm. This is particularly evident in the less developed countries (Nepal, Peruvian Amazon, Sri Lanka, Turks and Caicos Islands). These results could be attributed, however, to the fact that in the developing countries the conditions in MS are very bad and the comparison should not be made between MS and monograde schools but rather between MS and no school at all.

Similar research in England has reported that teachers believe in a number of positive 'opportunities' offered in multigrade classrooms.

Along a similar context, Cotton (2001) examines the results of research on MS on two bases: (a) the relationship between child development and learning and (b) the assessment of MS cognitive achievement vs that of monograde schools. With respect to (a), it is found that chronological and mental age do not always correspond while differences in talents, personality etc could favour non-graded class. With respect to be (b) the results seem to support overwhelmingly MS education –provided of course that support and assistance is offered to multigrade teachers.

11.7 Economic goals against and in favour of a policy MS

The usual argument against any policy for MS is that these schools, due to the low number of pupils, do not produce scale economies and remain an expensive solution. Against this argument, one could deploy the strong links between MS and economic development which lead to positive economic returns on investment in MS. These links can be investigated on a theoretical basis under the umbrella of the well-established theories of human capital, as described below.

The term “development” in economics is used to denote the enlargement of the potential production, which is equivalent to an increase in income generation of an economy and is described quantitatively by means of Gross National Product (GNP) and Gross Domestic Product (GDP) per capita. Development consists of four factors (Samuelson, 1998)

Human resources (supply of labour, education, motives)

Physical resources (land, minerals, energy, environment)

Real capital formation (machines and equipment, premises, transportation infrastructure etc)

Technology (innovation, technological applications, entrepreneurship, management)

Any positive change in one (or more) of these factors increases potential production hence boosts development.

Through the prism of such a definition, human capital seems to be one of the major factors that determine economic development and this pro-

vides a link between education and economic growth. According to Descy and Tessaring (2001) human capital is the knowledge, skills, competences and other attributes embodied in individuals or groups of individuals acquired during their life and used to produce goods, services or ideas in market circumstances. In a similar definition Begg (1998) accepts that human capital as the sum of dexterities and knowledge that exists in a society and states that any improvement in education and expertise and any enrichment of the society with new experiences contributes significantly in an increase of the labour force’s product, given the level of the other factors.

In places where MS exist, tangible factors of production are scarce. Land, capital and endogenous labour is limited, hence any mode of increasing intangible factors –such as human capital becomes of high importance. In these cases MS offers a lot mainly for two reasons: By offering formal education it ascertains quality of future human capital. Also –under a specific policy frame, this school may become a lifelong learning institution and as such it can help the community to improve its human capital irrespective of age or profession.

It should be noted that research on cost efficiency and effectiveness of MS is very little (Little, 2004). In spite of the policy documentation that emphasise that MS operate at high costs, the very few studies on this matter yield conclusions that multi-grade strategy is not a high cost one. In most cases the main cost element is the teacher’s salary and the fixed costs –mostly responsible for scale diseconomies in MS are limited.

11.8 Social goals against and in favour of a policy for MS

The social role of MS cannot be doubted, hence any policy against them contradicts acknowledgement of such a role. If MS are left without any policy, the social benefits from their presence will cease to exist. This would probably mean that not only economic but also social development is retarded. In an attempt to provide a widening of the classical economic definition of development, there is a long discussion concentrated in the issue that development is something more than just an increase in potential production. There are several approaches as to what can be defined as socio-economic development. As pointed by Pomfret (1997), Kuznets states that this additional item in development could be the structural transformation of an economy and the shifts of production from agriculture to other activities in connection with changes in the scale and technology of production. According to Seers (1972), development is achieved if economic changes are followed by a reduction in poverty, unemployment and inequality. Sen (1983) considers as an important developmental target the people's capability to control their own lives—a target that may be accomplished by means of a good quality of communal care and a good level of public provision of health services. Furthermore, a dialogue exists on the significance respect to natural and cultural environment (Sen, 1983) and promotion of sustainable development.

Irrespective of which of the approaches responds better to a socio-economic consideration of development, it seems that, if such a consideration is adopted, the link between education, human capital and productivity is not any more adequate to explain significantly socio-economic development. Under such circumstances it becomes necessary to:

- (a) Extend the scope of education so as to include not only knowledge transmittance but also transmittance of culture, communication abilities and the ability of adjustment to innovation

and change.

- (b) Substitute the term human capital by the wider term intellectual capital; this may be defined as the capital resource that comes from relationships between members of an organisation's groups of people, from the organization's ability to innovate and manage change, from its infrastructure and from the knowledge, experience and transferable competencies of its staff (Kelly, 2004). Intellectual capital in a school contains the intangible resources not only in the form of knowledge but also in the form of ability to communicate and cooperate, respect for culture and environment, ability to produce and/or to adjust to change and to manage innovations. These are transmitted to the pupils during the educational process with the aim to improve their own intellectual capital—part of which will become the local society's future intellectual capital. These items are expected not only to increase labour productivity but also to promote cultural and social development. Any effective attempt towards this aim can be seen as a highly productive investment: It means better knowledge and dexterities for future members of the local rural society; higher productivity of the society's working potential, higher expected income levels and higher gross domestic product. It also means the opening of the society to new progressive ideas, innovations and changes and to the rejection of stereotypes, prejudices and old mentalities.
- (c) Add to productivity some appropriate supplementary indices of development such as the sectoral distribution of production, some environmental variables, the rate of poverty and unemployment, illiteracy rate and the rate of life expectancy.
- (d) Consider as educational benefits, not only purely economic returns but also 'externalities', i.e. indirect effects of education on several soci-

etal issues. These externalities are listed below grouped for the individual and the society as a whole (McMahon, 1998).

It should be noted that each of these externalities needs a specific approach for proxy measuring. Unless such measurements are made for MS, no-one can say for sure that the educational benefits from MS are negative or insignificant. The relationship between human capital and economic growth and the relation between intellectual capital and cultural and socio-economic development makes education a key parameter in any economy/ society. Improving education is considered one of the most direct ways for improving quality of human and intellectual capital hence for enhancing development. To the extent that development is a critical strategic target for remote and isolated areas, attempts should be concentrated in upgrading the quality of MS hence also of the quality of the endogenous human capital.

The direct and indirect contribution of education in development forms a strong argument in support of MS, particularly since:

An area's MS is one of a very few –if not the sole- educational institution in a remote and isolated area,

Education is linked to an upgrading of the area's human and intellectual capital which are important resources for any society but mostly for small societies,

Human capital is an important productive factor and investing in it is expected to enhance the area's economic development,

Intellectual capital is an important factor helping not only economic but also the area's cultural and social development,

Factors of production in remote and isolated areas

are scarce.

These lead to the conclusion that MS can function as strategic focal points for a remote and isolated area's cultural and socio-economic development and should attract special attention. The argument that MS form a high cost - low benefit investment seems rational. However, even if one finds that measurement of costs of MS is possible, there are such difficulties in measuring benefits from education that it is doubted whether one can be sure that the net benefit from education offered in MS is negative. More specifically, the returns from schooling can be separated into direct and indirect ones. Direct returns are measured by means of the expected increase in the future income of learners over a life-time and it is easily understood that such a valuation is not an easy task. Moreover, even if one succeeds in making a realistic forecast of future incomes, the evaluation of the indirect benefits from education remains a problem. Such indirect benefits for the individual and the society are many and still an open matter in the field of economics of education. Indicatively such benefits –known as 'externalities' – are the following:

With respect to the old-fashioned mode of education and the dubious quality of education offered by such schools, it should be mentioned that these stands if one considers the already existing educational approach towards MS. Up to now, MS are considered of marginal importance and have not attracted the attention of many educational policy maker. In other words up to now MS were not given many chances to reveal their potential. Both, the type and quality of education offered in these schools could alter dramatically if new learning methods and innovative educational instruments are applied. ICT could play an important role in this case.

It should be noted that with respect to social benefits from MS no research is available (Little, 2004).

Private Externalities	Public social benefits
1. Health effects	1. Population and health effects
- reduced infant mortality	Lower fertility rates
- lower illness rates	Lower net population growth rates
- greater longevity	Public health
2. Human capital produced in the home	2. Democratization
- Children's education enhanced	Democratic ideas
	Human rights
3. More efficient household management	Political stability
- higher returns on financial assets	
- more efficient household purchasing	3. Poverty reduction and crime
	Poverty reduction
4. Labour force participation rates	Homicide rates
- higher female labour force participation rate	Property crime rates
- Reduced unemployment rate	
- More part-time employment after retirement	4. Environmental Effects
	Deforestation
5. LL adaptation and continued learning	Water pollution
- Use of technologies within the household	Air pollution
- Obsolescence: human capital replacement investment	
- Curiosity and educational reading; educational TV; radio	5. Family structure
- Utilisation of adult education programmes	Higher divorce rates
	Later retirement
6. Motivational attributes	More work after retirement
- Productivity of non-cognitive skills	
- Selective mating effects	6. Community service effects of education
- Divorce and remarriage (potentially negative returns)	Time volunteered to community service
7. Non-monetary job satisfaction	Generous financial giving
8. Pure current consumption effects	Knowledge dissemination
Enjoyment of classroom experiences	
Leisure time enjoyments while in school	
Child care benefits to the parents	
Hot lunch and school community activities.	

Table 2: Non-monetary returns (externalities) on investment in education

11.9 Cultural goals in favour and against a policy for MS

The role of MS as institutional levers for cultural and socio - economic development can be expanded in remote and isolated areas if the interaction between the school community and the local society is strengthened. This interaction –which in remote and isolated areas is closer than in other areas, as mentioned earlier, can be achieved in many ways, among which the following:

Involvement of MS in training programmes for the local population.

Introduction of new technologies into the area and undertaking of initiatives that help in the creation of the “culture for technology”.

Cooperation with local community in educational programmes that aim to promote local cultural production, local art, entrepreneurship and active citizenship.

Promotion and dispersion of new ideas, beyond stereotypes, concerning multicultural societies, environment, gender equality etc.

Participation in cultural activities.

It should be noted that this interaction is not some-

thing new for schools in general and for MS specifically. Thus, it is often the case that multigrade teachers organize training seminars for adults, theatrical plays with the contribution and participation of locals, sports activities etc, in an attempt to offer education and culture to the local society. Teaching ICT skills and participation in educational projects concerning environment and culture are common examples of these practices.

Furthermore, schools could act as institutions for the dispersion of new ideas concerning sustainability or multicultural issues. With respect to this role it should be noted that it is easier for pupils originated from emigrant families to feel welcome in a small school, where each pupil is a considerable part of the school’s community. Moreover in a multi-grade school, where pupils learn to respect classmates who are different in grade and age, it is easier to respect also different cultures. In this sense differentiation does not act as an obstacle either for the pupil’s adjustment to the new environment or for the classroom’s efficiency, while cultivating (through projects or through an extensive use of ICT) a holistic identity of European identity is a healthy way to help foreign student to adapt easily and efficiently.

11.10 Specification of non-negative policy options

Moderate option:

It provides some minor, non-dynamic improvements so that they MS keep offering marginal education in remote areas;

Actions and measures

Small interventions mainly will help the teacher to be more efficient in his/her job

Introduction of ICT

Teachers' training

Advantages: Low cost, low political cost, easy implementation, moderate improvement of pedagogical-educational effects

Disadvantages: Low efficiency, low effectiveness, low improvement, limited social and cultural effects.

Intermediate options: It concerns the following cases:

(a) Decide to close all of them down and find alternative solutions for providing education to local students;

(b) Create groups of MS so as to find ways to produce scale economies;

More specifically:

(a) The 'closing down' reaction assumes drastic moves concentrated in decisions made for a direct closing of MS. The usual ways for it are:

The deployment of high thresholds of student numbers which is equivalent to an increasing closing rate

The establishment of Centre (hub) schools which absorb pupils of MS.

The reduction can be planned with the aid of policies for closing down MS helped by impartial technology.

It should be noted that the closing down option is many times avoided since it has high political costs: All sorts of political interventions, public pressure, vote fishing or sentimental reasons can be used in order to alter a decision for MS to close down!

(b) The group option is based on the fact that by forming groups of MS, with appropriate coordination, some of the scale economies usually found in big schools will be produced. Thus by forming groups of neighbouring schools, is possible to have teachers travelling to reach them. In Spain there is extensive practice of that.

Actions and measures

Consider MS as schools that should improve in quality

Develop and apply different educational and didactic procedure

Provide incentives for teachers in MS

Give opportunities for teachers' in-service training

Promote school networks

Introduce extensive ICT applications

Include MS teaching in the curriculum of the Education Departments of Universities

Give emphasis to management in education

Encourage extensive research for MS

Advantages: relatively low cost, realistic implementation, high educational efficiency and effectiveness.

Disadvantages: High political cost, difficult decisions to make, questionable pedagogical effects, limited social and cultural effects

The positive option:

According to this option MS are considered as compatible alternatives to monograde schools;

Possible actions and measures:

Re-design the educational system considering MS as model schools. This means

Develop and apply different curriculum for MS

Develop and apply different educational and didactic procedure

Provide incentives for teachers in MS

Give opportunities for teachers' in-service training

Promote school networks

Introduce extensive ICT applications

Include MS in the curriculum of the Education Departments of Universities

Give emphasis to management in education

Encourage the use of school facilities for LLL in the community

Encourage the use of school facilities for social and cultural activities

Encourage networking with other institutions directly or indirectly related to education and the area.

Encourage extensive research for MS

Advantages: High educational efficiency and effectiveness, high pedagogical effects high social and cultural results, innovative approach, emphasis in regional development, solution to problems of isolation, political gains

Disadvantages: High cost, difficult in planning and implementation, difficult to convince about its feasibility.

Mixed option

It accepts the multidimensional role of MS, but it does not consider that their number should necessarily remain constant. The actions and measures are as in the positive option but not to the same extent.

11.11 Conclusions

Education is a field that depends heavily on policy and policies. MS form a specific case that exists and operates at the margin of a centrally designed and planned educational system. Their present situation is dubious. On one hand they are considered as forming “problematic” units and the quality of the service they offer is many times doubted. On the other hand they exist and provide education in problematic areas almost everywhere in the world.

Furthermore teachers do not seem to support MS existence and policymakers say that they form an expensive way of providing education. However, research provides evidence in support of them on cognitive and cost grounds. Finally there is a large potential with regard to their contribution in social, cultural and economic development. Under such circumstances MS should attract specific attention and be included in the agendas of policy makers, otherwise it is as if policy makers ignore reality.

The options available form a range from highly negative to highly positive. Nowadays the educational system provides means that can help the multigrade school to operate efficiently and effectively as an educational institution that plays an important role in the area’s socio-economic and cultural development. What seems to be needed is to systematise all the activities that can be undertaken by a MS in a MS-centric strategy, which could include the

following:

- Development and application of a MS policies that will take advantage of the positive features that such a school has
- Wide application of ICT and innovative educational methods
- Evaluation of the educational quality offered by a MS
- Encouragement of initiatives concerning MS

A MS-centric policy is expected to upgrade educational quality of MS, hence to work directly towards the implementation of equal educational opportunities for all. This strategy, focusing in new roles for the school and the teacher and adopting innovative educational methods and approaches, if viewed holistically, could provide a basis for an alternative paradigm in education. Finally, but equally important, it will help remote and isolated areas to benefit from technology and innovation and to improve the quality of human capital, hence to promote social, cultural and economic development.

As for the option that should be chosen, there is no dogmatic answer. It is a matter to be pursued in every country by authorities that know the spe-

cific situation of the area, the priorities, resources needs etc.

The most appropriate solution for policy makers, legislators etc is to work along a sectored master plan including MS. This master plan should not reject any of the options –apart from the negative one (hopefully). According to this plan it is possible that in some cases some MS should be closed down if an alternative solution proves to be efficient and effective in any aspect. In the same plan, some grouping of MS could be beneficial. In any case, for those schools that will continue to be mul-

tigrade, support and assistance is essential. Innovations in every sector –hence also in education- cannot be justified better than in cases where there are needs for improvement; and the need for improving MS is urgent.

Finally, given the high importance that is attributed to MS in the development of rural areas it is necessary to include the MS issue as a part of integrated regional planning. As such MS will be considered as a significant instrument for development and this is a role for which further research should be carried out.



4

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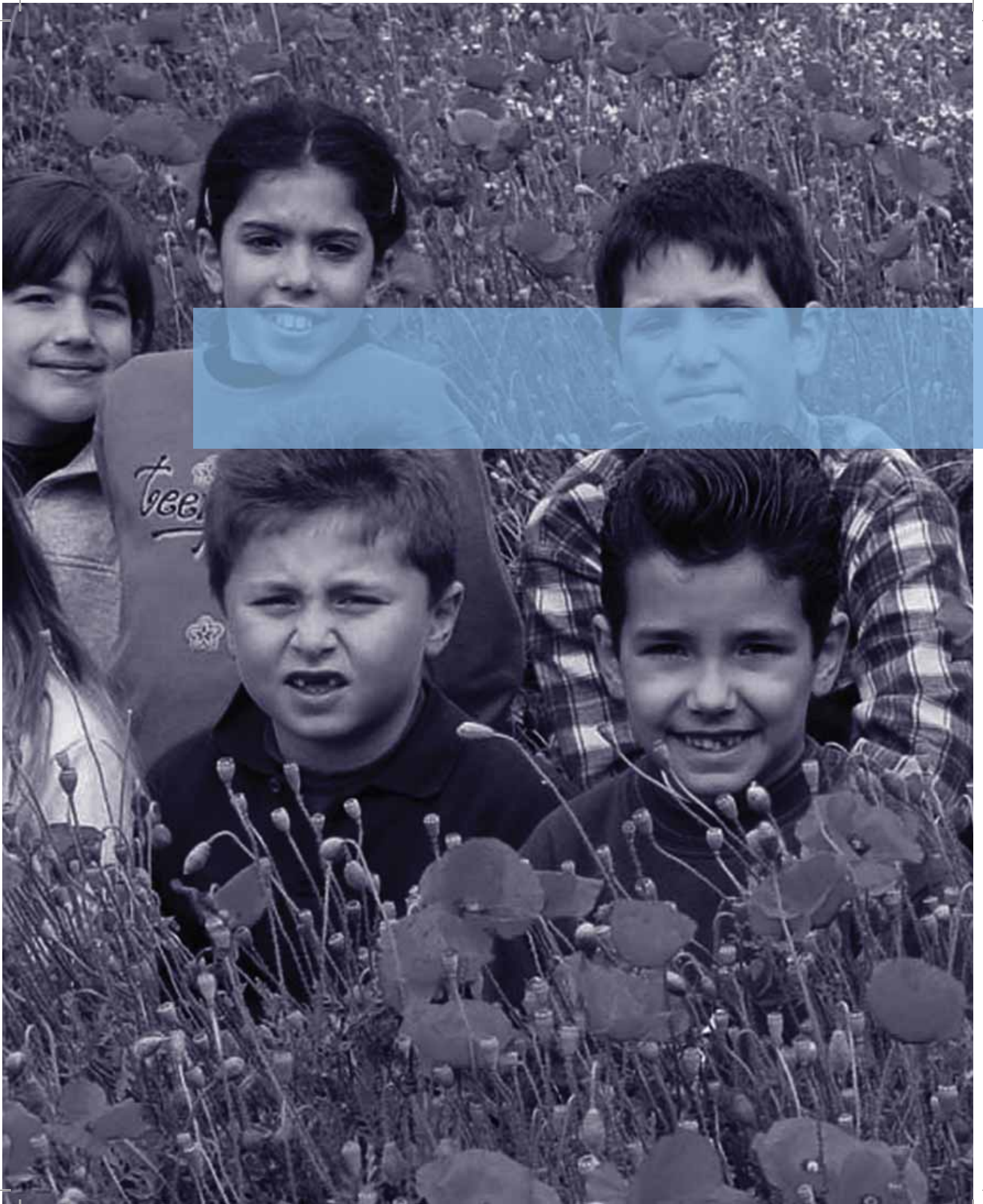
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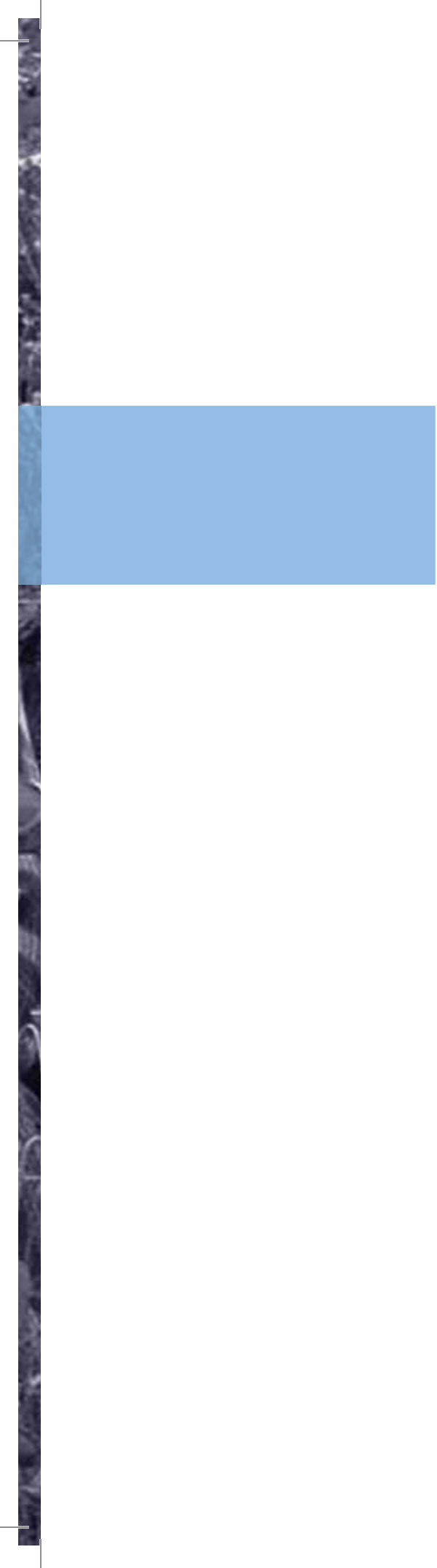
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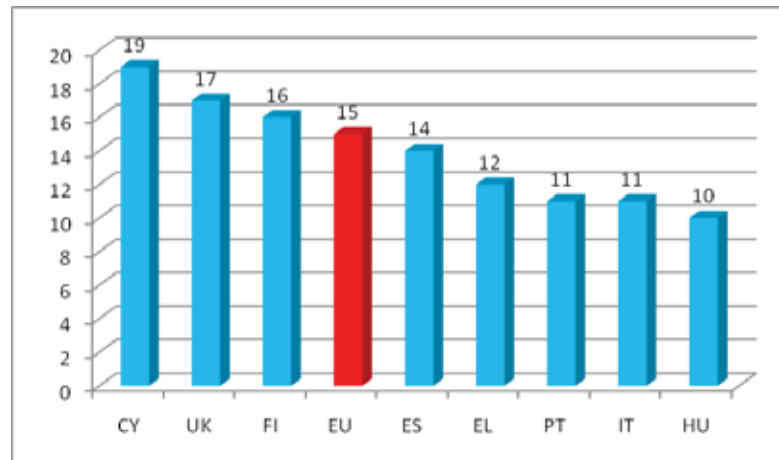


Annex
ICT in Education in NEMED
Countries

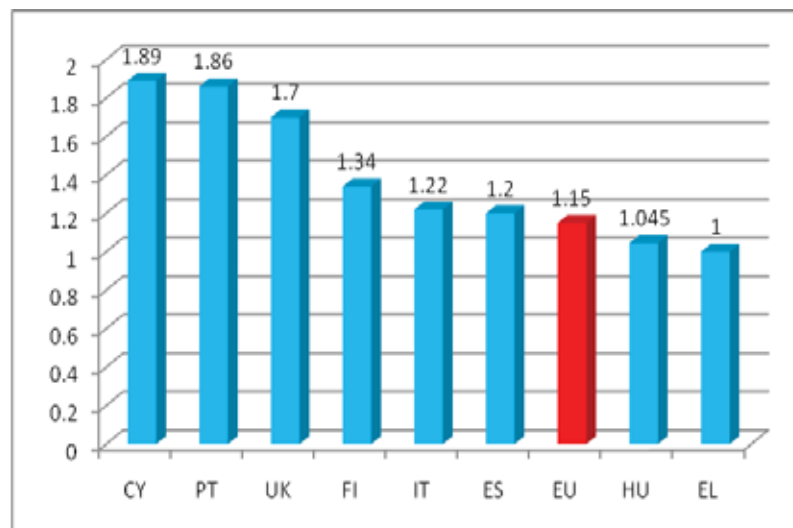
Students/teacher in primary education	
CY	19
PT	11
UK	17
FI	16
IT	11
ES	14
EU	15
HU	10
EL	12

Public expenditure for primary education as % of GDP	
CY	1.89
UK	1.7
FI	1.34
EU	1.15
ES	1.2
EL	1
PT	1.86
IT	1.22
HU	1.045

Students/teacher in primary education



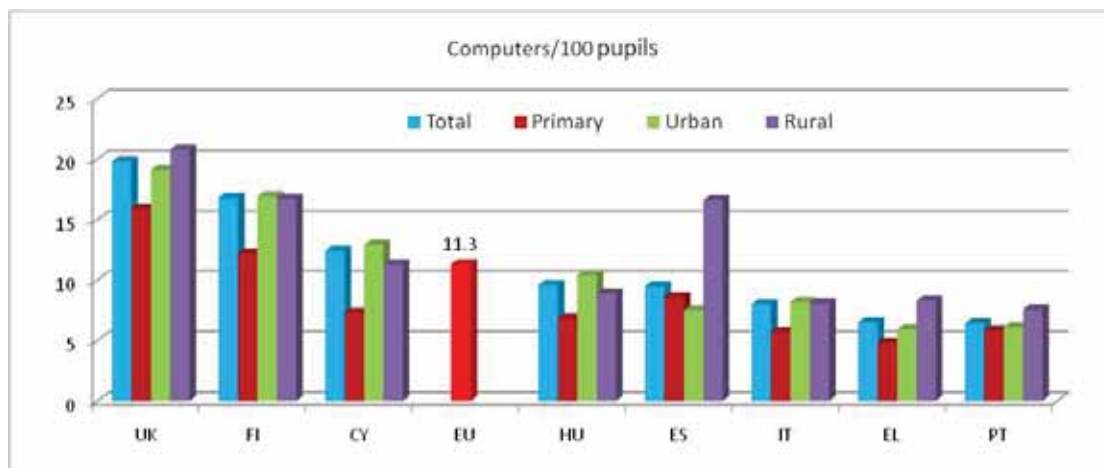
Public expenditure for primary education as % of GDP

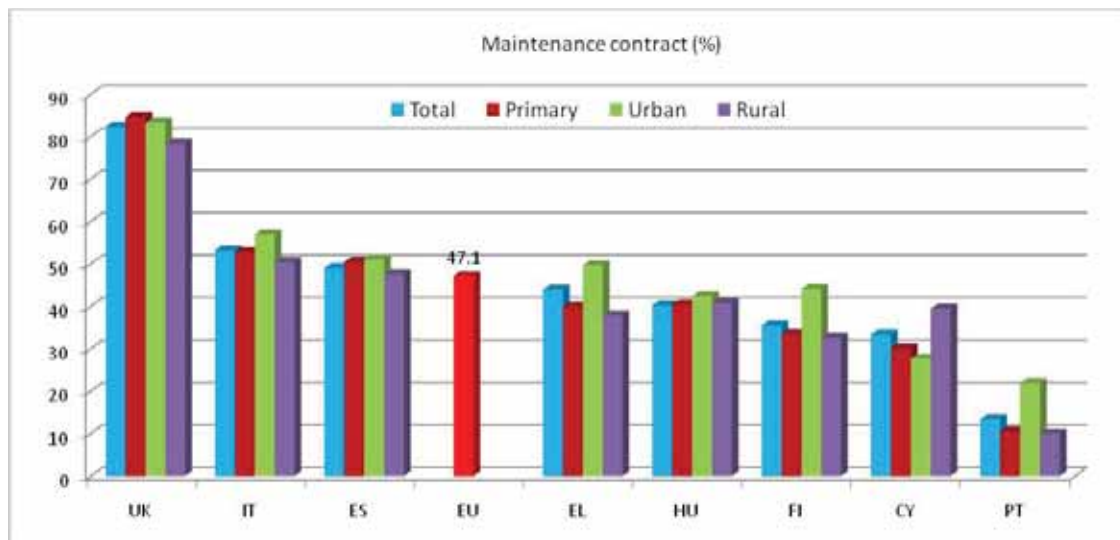
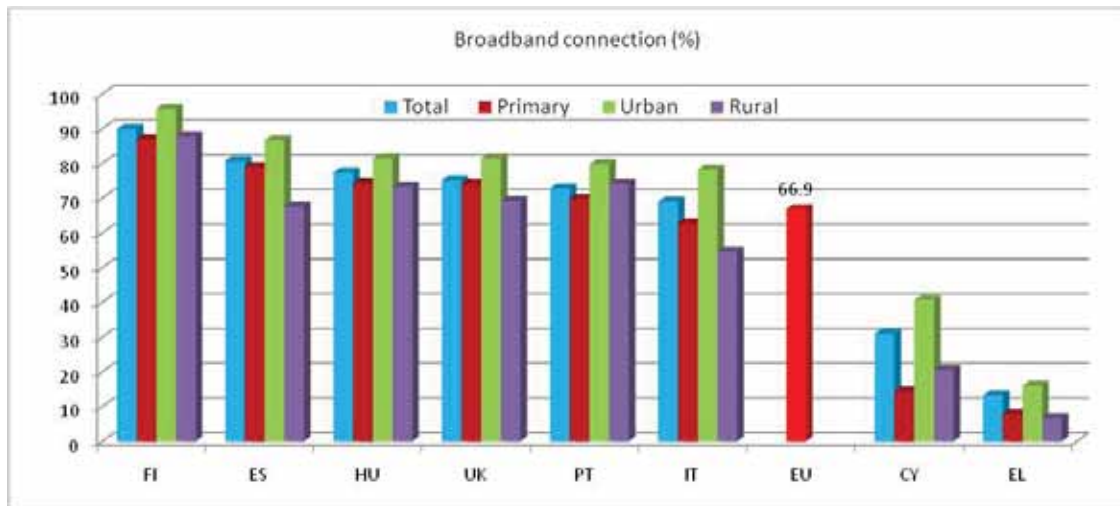


Computers/100 students				
	Total	Primary	Urban	Rural
UK	19.8	15.9	19.1	20.8
FI	16.8	12.2	16.9	16.7
CY	12.4	7.3	12.9	11.3
EU	11.3			
HU	9.6	6.8	10.4	8.9
ES	9.5	8.6	7.5	16.6
IT	8	5.7	8.2	8.1
EL	6.5	4.8	5.9	8.3
PT	6.4	5.8	6.1	7.6

Broadband connections (%)				
	Total	Primary	Urban	Rural
FI	89.9	87	95.7	87.9
ES	80.7	79	86.7	67.6
HU	77.4	74.3	81.4	73.3
UK	75.1	74.1	81.4	69.2
PT	72.8	69.8	79.8	74.1
IT	69	62.8	78.2	54.5
EU	66.9			
CY	31	14.3	40.7	20.6
EL	13.2	7.8	15.9	6.7

Maintenance contract (%)				
	Total	Primary	Urban	Rural
UK	82.3	84.6	83.3	78.3
IT	53.2	52.8	56.9	50.4
ES	49	50.4	51	47.6
EU	47.1			
EL	43.9	39.9	49.6	37.8
HU	40.2	40.4	42.3	40.7
FI	35.5	33.4	44.1	32.6
CY	33.3	30.1	27.7	39.4
PT	13.4	10.5	21.9	10

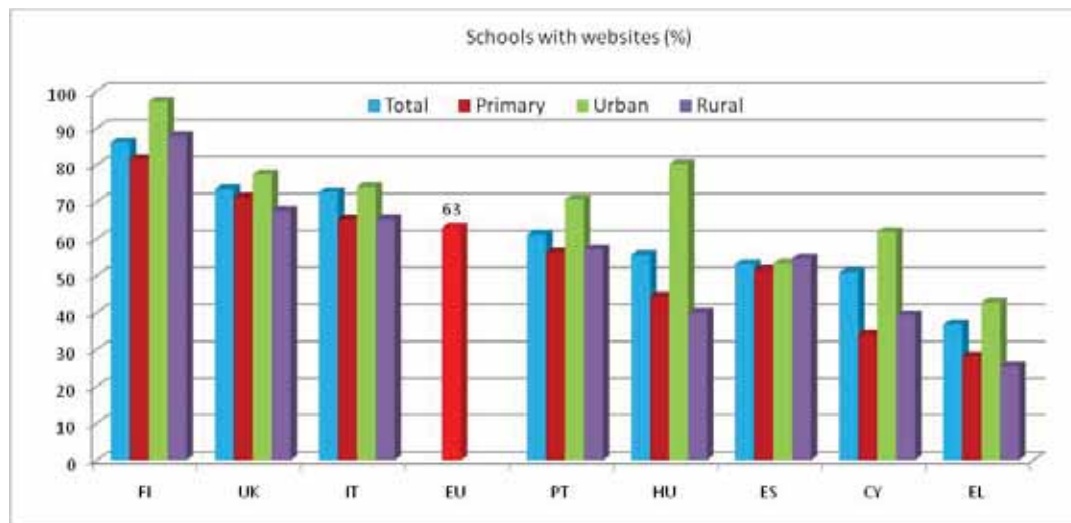


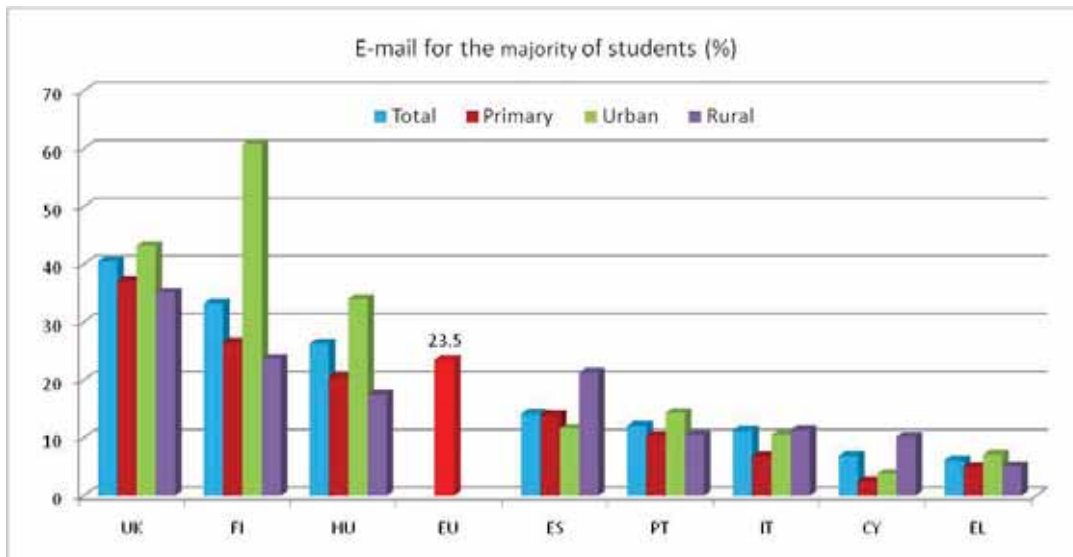
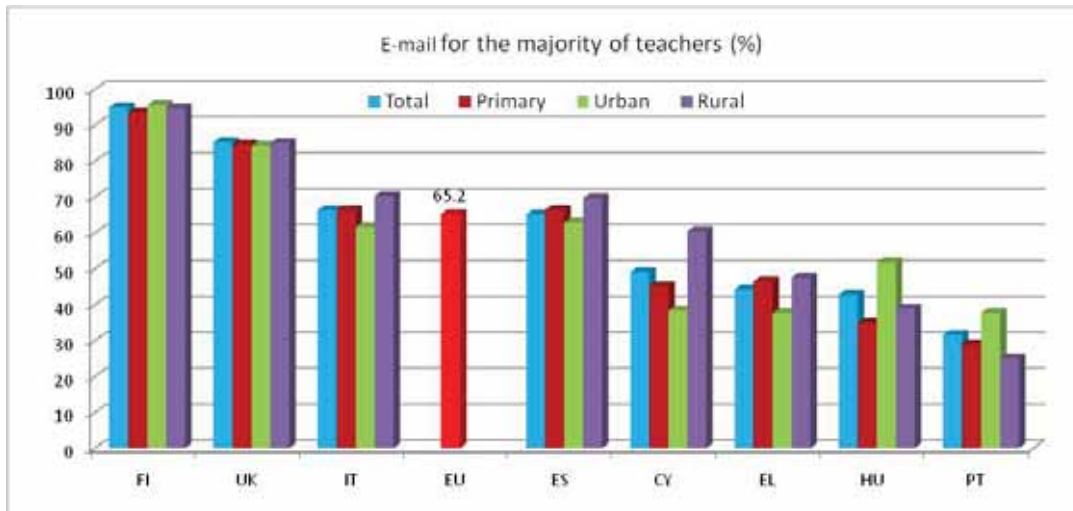


Schools with websites (%)				
	Total	Primary	Urban	Rural
FI	86.1	81.6	97.2	87.9
UK	73.4	71.2	77.5	67.6
IT	72.6	65.2	74.1	65.3
EU	63			
PT	61.2	56.3	70.6	57.2
HU	55.6	44.4	80.2	40
ES	53.2	51.6	53.3	54.7
CY	50.9	34	61.85	39.3
EL	36.8	28.1	42.7	25.5

E-mail for teachers (%)				
	Total	Primary	Urban	Rural
FI	95	93.5	95.6	94.8
UK	85.3	84.6	84.3	85.1
IT	66.3	66.3	61.7	70.3
EU	65.2			
ES	65.1	66.4	62.9	69.7
CY	49.1	45.1	38.3	60.5
EL	44.2	46.5	37.7	47.6
HU	42.8	34.9	51.8	38.9
PT	31.6	28.9	37.7	25.1

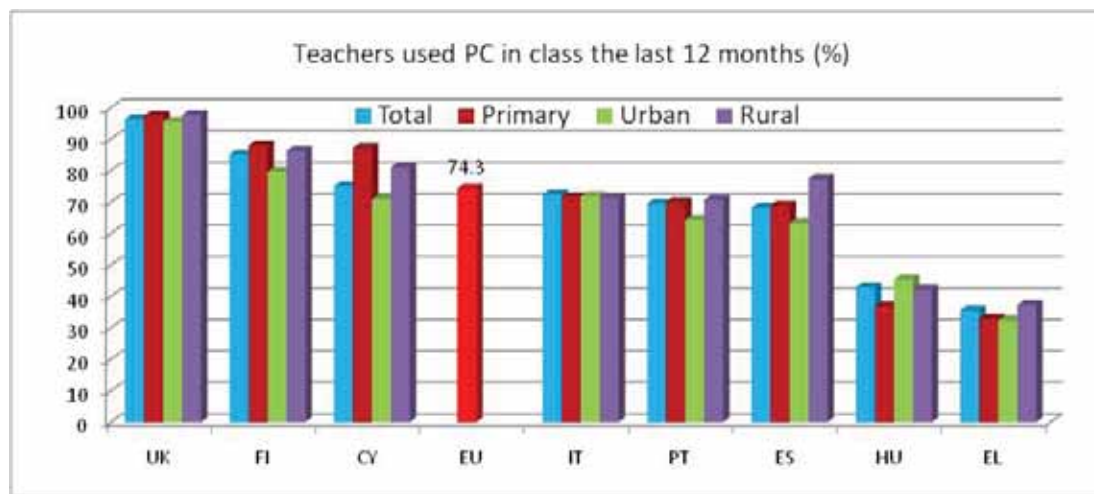
E-mail for students (%)				
	Total	Primary	Urban	Rural
UK	40.5	37.1	43.2	35.1
FI	33.2	26.5	60.8	23.7
HU	26.3	20.5	34	17.5
EU	23.5			
ES	14.2	14	11.6	21.3
PT	12.1	10.3	14.3	10.5
IT	11.3	6.8	10.5	11.4
CY	6.9	2.5	3.8	10.2
EL	6.1	5	7.1	5.1

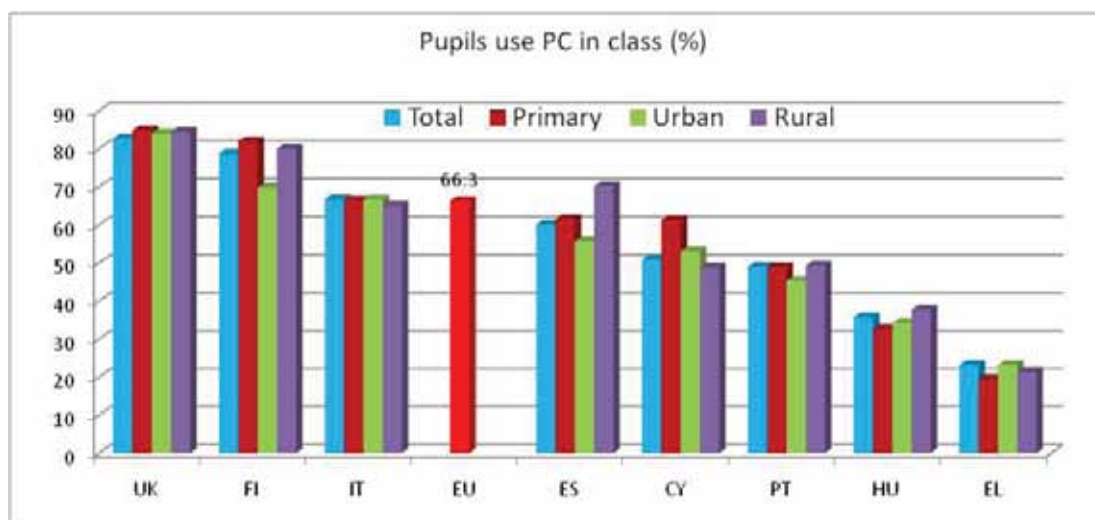




Used PC in class last 12 months								
	Total	Primary	Urban	Rural	<5	5-9	10-19	20+
UK	96.4	97.4	95.6	97.7	96.7	95.9	98.3	95
FI	85.1	88	79.7	86.3	86.5	83.8	82.9	87
CY	75	87.2	70.9	81.1	75.2	79.4	78.1	60
EU	74.3							
IT	72.4	71.6	71.9	71.5	59.6	65.6	73.9	73
PT	69.5	70	64.4	70.7	67.5	74.9	72.8	65
ES	68.2	68.9	63.4	77.5	72.5	73.4	69.9	64
HU	42.8	36.8	45.4	42.2	44.2	48.4	50.8	37
EL	35.6	32.8	32.4	37.3	49.6	44.3	41.9	26

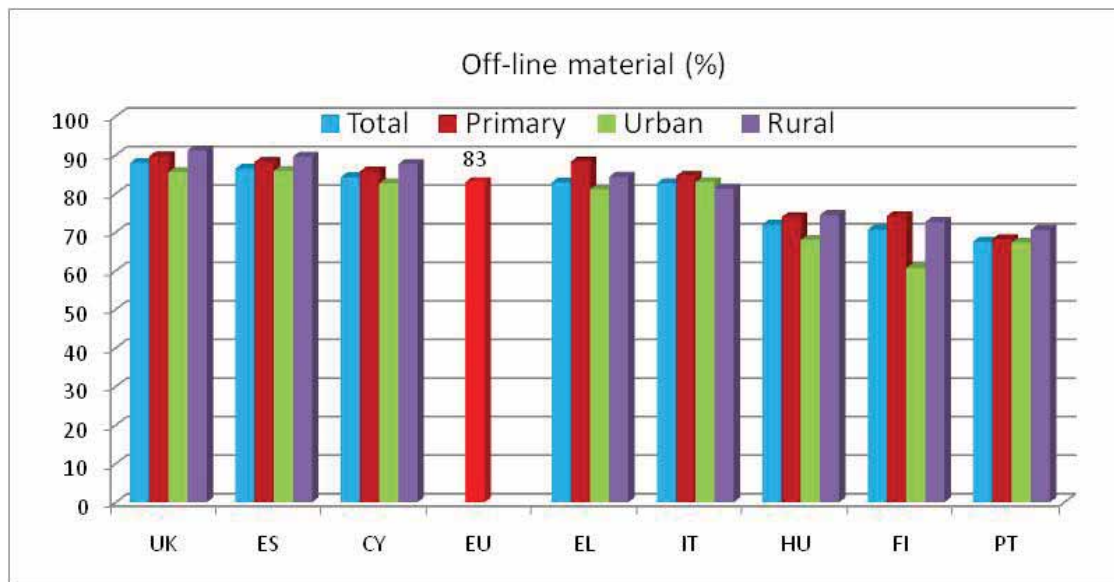
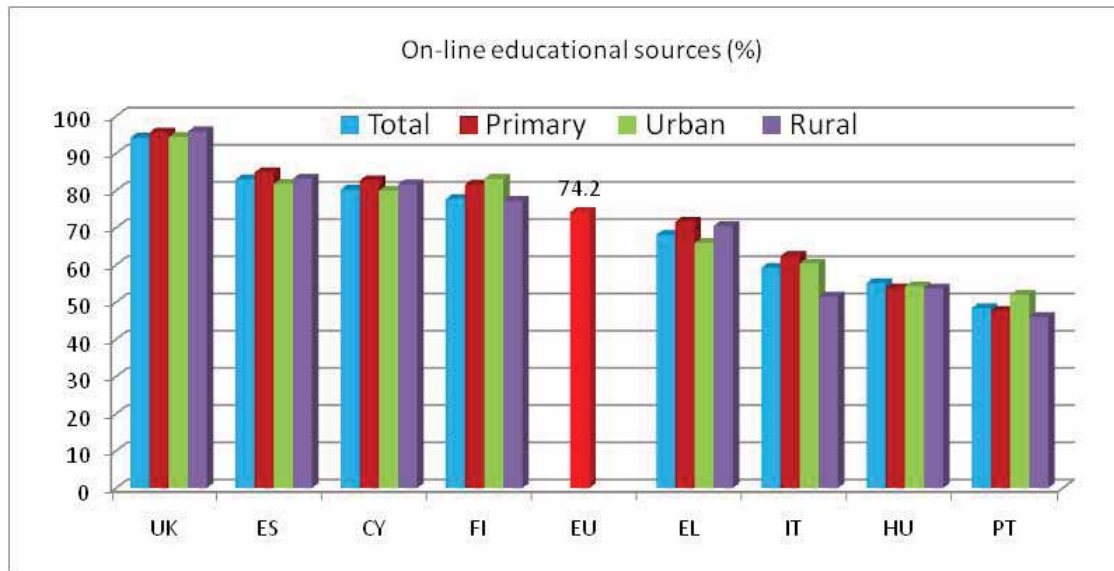
Pupils use PCs in class (%)								
	Total	Primary	Urban	Rural	<5	5-9	10-19	20+
UK	82.8	84.9	84.1	84.5	79.8	86	81.6	84
FI	78.8	82	69.8	80	80.7	75.4	78.5	80
IT	66.8	66.5	66.7	65.1	53.1	62.9	68.8	67
EU	66.3							
ES	60.1	61.6	55.8	70.2	60.4	60.2	64.7	57
CY	50.9	61.3	53.1	48.8	44.9	49.2	60.5	40
PT	49	48.9	45.3	49.3	48.4	53.6	48.8	47
HU	35.8	32.7	34.2	37.7	37.4	37.3	40.7	33
EL	23.1	19.6	23.1	21.4	32.7	26.5	28.6	17





Teachers used on-line educational sources (%)				
	Total	Primary	Urban	Rural
UK	94.2	95.6	94.4	95.9
ES	83	84.9	81.8	83.2
CY	80.3	82.7	80	81.7
FI	77.7	81.6	83.2	77.3
EU	74.2			
EL	68.1	71.6	65.9	70.5
IT	59.2	62.4	60.4	51.5
HU	55.1	53.7	54.2	53.7
PT	48.4	47.6	52	46

Teachers used off-line material (%)				
	Total	Primary	Urban	Rural
UK	88	89.7	85.6	91.2
ES	86.5	88.2	85.9	89.6
CY	84.3	85.8	82.7	87.7
EU	83			
EL	82.9	88.3	81.1	84.4
IT	82.7	84.6	83	81.3
HU	72	73.9	68	74.5
FI	70.7	74.2	60.7	72.7
PT	67.6	68.2	67.3	70.6



Lack of computers (%)				
	Total	Primary	Urban	Rural
CY	57.2	49.1	58.7	48.8
EL	49.5	53.4	54.3	42.6
EU	48.8			
HU	48.5	50.7	52.9	45.9
ES	48.3	47.8	48.6	47.1
PT	48.1	46.8	48.9	46.7
FI	47.6	51	37.8	47.9
UK	31	20	38.4	
IT	30.8	30.4	29.3	26.6

Lack of material (%)				
	Total	Primary	Urban	Rural
PT	23.7	26	16.4	38.4
ES	22.9	22.1	20	24.3
CY	20.5	12	24	11.2
EU	20.3			
FI	18.8	18.3	25.8	18
EL	16.7	16.4	17.1	17.8
IT	16.7	16.5	16.3	18.9
HU	9.7	9.4	11.6	9
UK	4.2	0	3.6	

Lack of material in national language (%)				
	Total	Primary	Urban	Rural
ES	8.8	11.3	8.1	8.3
EU	8.6			
IT	6.7	7.5	6.1	8.7
PT	5.6	5.2	6.6	4.9
EL	4	3.5	2.3	5.6
CY	2.8	2	1.7	1.1
HU	2.6	2.2	4.3	2.2
FI	1	0	0	1.4
UK	0	0	0	

Lack of skills (%)				
	Total	Primary	Urban	Rural
EL	31.7	31.5	30.9	34.2
FI	24.2	28.5	44.3	18.6
EU	22.5			
IT	16.3	19.8	14.4	19.3
ES	14.7	15	12.7	20
CY	14	12	15.6	10.5
PT	11.3	12.7	11.3	15.3
UK	10.7	8.8	5.5	
HU	9.3	9.9	7.9	10.5

Unclear benefits (%)				
	Total	Primary	Urban	Rural
FI	24.2	25.6	34.2	22.3
EU	16.2			
ES	11.9	8.4	13.6	8.9
HU	7.3	6.5	10.9	6.4
IT	5.4	2.5	4.8	8.4
UK	5.2	8.5	0	
EL	3.4	3.2	2.9	3.3
PT	2.3	2.2	3.3	0
CY	0.5	0	0.9	0

Lack of interest (%)				
	Total	Primary	Urban	Rural
FI	13.5	15.6	15.1	14.1
IT	12.6	12.3	12.1	9.8
EU	8.9			
ES	6.1	6.8	6.8	5.5
PT	5.8	5.4	6.5	7.1
EL	5.3	5.3	6.1	3.3
CY	4.7	8.9	2.9	8.3
HU	3.4	3.4	5.1	3.5
UK	0	0	0	

