Building Lifelong Learning Networks of Teachers for the Development of Competence in Teaching in Small Rural Schools

Pavlos Koulouris & Sofoklis Sotiriou

R&D Department, Ellinogermaniki Agogi, Dim. Panagea Street, 15351 Pallini, Greece
{pkoulouris, sotiriou}@ea.gr

Abstract. This paper reports on ongoing research efforts and discussions about how to enable, through new technologies, the building of lifelong learning networks and the development of competences of teachers who work in small rural schools. Teachers of such schools are confronted with significant challenges, needing to develop personal competences falling beyond the established initial and in-service teacher training curricula. The notion of communities of practice (Wenger, 1998) is proposed as a conceptual tool in the endeavour to better understand the issues emerging.

1 Multigrade schools: The 'Borderers' of the Education System

In many primary schools of the Greek provinces there is not one teacher available for each of the six grades: the low number of students statutorily justifies the employment of less than six teachers –even of one or two–, who nevertheless are expected to cover the needs of a full school. These schools, known internationally as multigrade schools [1], fulfil a function of national importance, as they provide the children of remote and less accessible areas with the access to education which all children of Greece are entitled to.

1.1 Teachers in Multigrade Schools: Need for, and Obstacles to, Continuous Professional Training and Competence Development

Teachers of multigrade schools are confronted with significant challenges, as they have to teach simultaneously two or more age groups and possibly more than one curriculum subject in the same class. Teachers' initial professional training does not suffice and the need for competence development is 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 and continually improve their expertise in teaching in the demanding context of the multigrade classroom. They need to develop personal competences falling beyond the established initial and in-service teacher training curricula, which are oriented towards conventional monograde teaching, in order to develop and maintain the ability to respond to the challenging circumstances of their professional position.

However, there exist a number challenges in connection to remote rural teachers' need for competence development. On one hand, offering teachers from remote areas conventional professional development provision, such as in-service training seminars, is not easy. 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. On the other hand, the very concept of competence in the context of multigrade teaching may not be as straightforward as it appears. In the field of Human Resources Management competence is usually defined as a standardized requirement for an individual to properly perform a specific job, encompassing a combination of knowledge, skills and behaviour utilised to improve performance. However, whether a teacher is adequately or well 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 –in Greece at least–, through its choices for the preparation of teachers-to-be, does not clearly define what good multigrade teaching is. Teachers are more or less left alone to explore and learn multigrade teaching on their own, through their solitary experiences in remote rural schools. What is worse, teachers at remote schools also suffer the consequences of a widening socioeconomic and digital divide which separates the rural from the urban areas in most parts of the world.

2   Greece: A Case Reflecting International Trends

The above described difficulties of multigrade 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 [2], [3], [4], [5], [6], [7], [8]. However, these problems appear to be in sharp contrast with a growing recognition of multigrade schools as not only a necessary, but indeed a good-quality option for education systems, believed even to have some advantages over single-level classes [9], [10], [11].

2.1   The Use of ICTs

As a response to the obstacles described earlier, 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 [12], [13]. 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 [14], [15], [16], [17], [2]. What is more, in recent years a lot of attention is paid to the role satellite telecommunications can play for the bridging of the digital divide [18], [19], 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 [20]. Significant experience

has already been gained internationally, particularly in the United States and in Australia (e.g. [21], [22], as well as in other less developed countries with populations distributed over large geographical areas (e.g. [23], [24], [25].

3   Our Response to the Challenges so Far

This growing mass of international experience clearly demonstrates that emerging technologies offer promising solutions to the challenges of providing appropriate training and support to rural educators. Adopting this as a proposition in our work in the framework of a number of pioneering European and national research projects, our team has in recent years made efforts to alleviate the isolation of teachers working in remote schools through the provision of distance training, support and networking, using to the full the possibilities offered by new technologies.

The main questions we have addressed in the course of almost six years of consecutive projects, have referred to: a) the appropriate content of the relevant professional development and support activities; b) the appropriateness of the various available and emerging delivery technologies, given the remote and digitally disadvantageous location of the beneficiaries; and c) the possible extensions to conventional e-learning technologies and practices, which could help the geographically disadvantaged rural educators to learn as individuals and to learn from each other, participating in informal learning experiences within a sustainable lifelong learning network.

The whole effort started with a rather greater emphasis on teachers' competence development through training content delivered over the web (MUSE project); it gradually moved into testing more advanced technologies for broadband delivery over satellite, while continuing to further develop the content (ZEUS and RURAL WINGS projects). The 'maturity' brought about through the training experiences and the increasing involvement of remote rural teachers led to the development of a network (NEMED) and an increased interest in concepts and tools related to lifelong learning networks (NEMED, RURAL WINGS) (Fig. 1). The projects, their interconnections and outcomes are presented below in more detail.
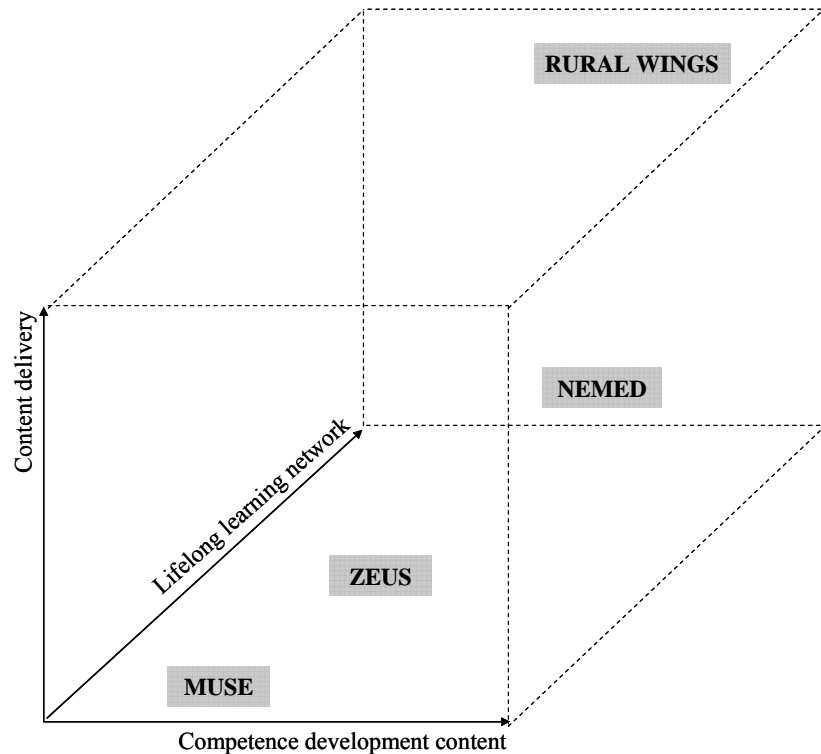
Fig. 1. Positioning of *(projects)* along three *(axes of inquiry)*

A first milestone in our 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 main outcome of that project was a realisation of the need of multigrade teachers in Europe for training in innovative teaching and learning approaches that are well-suited to the multigrade school environment, including the use of ICT in everyday school work, as well as the development of a relevant training programme promoting teachers' professional development in these fields. 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 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. This contact and exchange is taking place within the European network NEMED (NEtwork of Multigrade Education), a trans-national network supported by the Comenius 3 Action of the Socrates Programme (2004-

2007). Through its activities in ten European countries and at pan-European level, the network is currently studying the characteristics and the needs of multigrade schools, is actively promoting the upgrading of questions relating to multigrade education in educational policy-making, is investigating and proposing ways to improve the education provided by multigrade schools, as well as offering support to multigrade school teachers and fostering the development of communication among them. What is more, there is a specific interest of the Network in developing the NEMED web portal, which should foster and enhance the functioning of NEMED as a lifelong learning network for Europe's multigrade teachers. In addition, NEMED regularly organises international workshops and conferences, aiming at the widest possible dissemination of knowledge and experiences accumulating within the network, as well as the sensitization of the world of education towards multigrade schools and their issues.

At the same time, a lot of the energy and attention of our team 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 research in ZEUS focused mainly on the appropriateness of the training content (which built on the MUSE content, extending and enriching it), the development of a distance training organisation and delivery method (which is described further below), and the testing of connectivity through DVB one-way satellite links as a channel for distance training delivery to remote teachers. The outcomes of this project in terms of training content and methodology are described in detail further below. As far as the technology is concerned, the DVB satellite link, demanding the use of non-broadband terrestrial infrastructures (broadband downloading from the satellite, uploading through ISDN telephone line), caused some technical problems and relevant user dissatisfaction, which clearly indicated the way forward.

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, and by fostering the development of lively learning communities in remote schools and the villages hosting them. 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 technological 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.

4   The Training Programmes and the E-learning Technologies

Based on initial analyses of teacher needs, professional development schemes piloted in the above projects aim 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 teaching and learning approaches which are most appropriate for the multigrade classroom.

The corresponding e-learning environments have been 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. Of particular interest in the current context is the NEMED web portal. This is a networking web space serving all network actors by facilitating communication and exchange, sharing of information and conducting of research, as well as provision of professional development and support opportunities to multigrade school teachers. The portal is divided in six identically structured areas, which correspond to the six working groups of the network: ICT for multigrade schools; classroom management in multigrade schools; society, cultures, and the multigrade school; learning modes in the multigrade classroom; educational resources development for the multigrade school; policies for multigrade education.

In a working group area, users can access work relating to research, educational resources, and training materials, as well as participating themselves in ongoing work by uploading their own contributions. Users may also view and download the different Reports of this working group to the whole NEMED Network, while there is also a dedicated area to facilitate communication and exchanges within the group in the form of asynchronous forums. On the whole, the NEMED Networking Portal is meant to be a lively virtual space of structured exchange between network partners, participating teachers and schools, as well as any other users interested in multigrade education.

5   A Model for Training Delivery

It has been a firm belief of the team that, although technical specifications do play a crucial role in a distance-education scenario, the success or not of the effort mainly depends on the underlying pedagogical design [26]. In line with this, the training programmes produced aim to cater for both flexibility and guidance, both interaction with others and self-paced learning. To this end, a comprehensive model for training delivery has been developed and tested in the framework of these projects (mainly ZEUS) (Fig. 2).
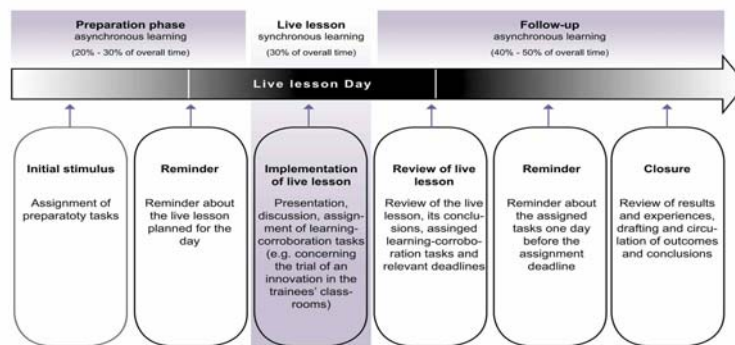

Fig. 2. The *(ZEUS model)* of training delivery

In this model, the central event for each lesson is a live videoconferencing session, using a synchronous e-learning tool, thus covering the need of isolated teachers for communication and real-time interaction with colleagues and instructors [27], stressing the importance of interaction in similar settings). On average, this synchronous e-learning portion of a lesson takes up about 30% of the overall lesson duration.

As can be seen in Fig. 2, however, both before and after the live session there is learning activity taking place independently in the working environment of the 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 applied information to their classroom settings. For each lesson, there is introductory information on the topic covered, 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. The training delivery model has generally been well received by trainers and trainees.

6   Outstanding Questions: Emerging Issues of Lifelong Learning Networks and Competence Development

In all the work described above, two central concepts of this workshop, Life Long Learning Networks and Competence Development, form two major, albeit not always explicitly acknowledged, conceptual pillars.

The various efforts have led us to provide teachers working in remote small rural schools with opportunities for continuous professional development, through a number of different training initiatives, which foster the improvement of personal competences in rural teachers. In parallel, we have been experimenting with methods aiming to develop and foster a learning network of teachers, which will hopefully provide a framework for the acquisition and sharing of knowledge in an informal communication process (informal learning) lying beyond and supplementing teachers' formal professional education.

Realising the issues and challenges arising, our team has started investigating further the characteristics of tools and methodologies which can foster the improvement of personal competences in rural teachers (competence development), and encourage and facilitate a teacher's contributions to the development of the other teachers (lifelong learning network). In this context, we are currently revisiting the training delivery model mentioned above (Fig. 2) at the micro level, aiming to identify, adopt and/or adapt methods and tools which could be incorporated in this general model in order to facilitate and support informal learning through peer interaction. In other words, we are currently investigating ways of effectively combining competence development and lifelong learning networking priorities and initiatives.

At the level of technology, too, our team has come to realise the limitations of the conventional e-learning technologies and models, when the issue at stake turns into how to promote and facilitate competence development through networking with peers – a lifelong learning experience of multi-site and episodic nature. What is crucial at this stage is to identify the features and clarify the main issues connected with the technology/-ies which will be able to support rural teachers, both as individuals and as members of teams within the educational system (an 'organisation' in itself), to further develop their competences making use of the distributed knowledge and learning resources available. The NEMED portal is our current attempt in this direction, which has so far managed to develop into a repository of teaching and learning resources connected to multigrade education, jointly created and update by the teacher-members. It clearly needs to be further developed in the light of contemporary advances in social software and in fields such as knowledge organisation, collaborative authoring and learning, discovery and exchange of knowledge resources, personal profiling and ePortfolios, competence assessment and monitoring of change, etc. What is more, the newly-started RURAL WINGS project provides ample opportunity and challenge to organise the numerous learning resources and diverse learners in rural communities worldwide into meaningful, working networks fostering lifelong learning and competence development, within its own learning-enabling portal.

In the endeavour to better understand and enable our vision of lifelong learning networks of rural teachers, we have found the notion of communities of practice [28] to provide a powerful conceptual platform. According to Wenger, communities of practice are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly. We are then aiming in this case to enable the development of a community of practice of rural teachers, which is defined by a shared domain of interest, that of the development of multigrade teaching competences. We need to establish members' commitment to the domain, and facilitate community development by assisting them to engage in joint activities and discussions, help each other, share information and learn from each other, while pursuing their interest in their domain. This will be indeed a community of practice rather than a mere community of interest, as members of the community will be rural teaching practitioners developing a shared repertoire of resources – a shared practice: experiences, stories, tools, ways of addressing recurring problems in their small rural school, etc.

This kind of learning of course takes time and requires sustained interaction – which are some more of the things that the technologies we are envisaging have to afford. Likewise, the technologies will need to support and facilitate a variety of activities through which communities develop their practice, such as problem solving, requests for information, experience seeking, reusing of assets, coordination and synergy, discussion of developments, mapping of knowledge and identification of gaps, etc [28]. How this can be designed and realised given current technological developments remains for us an open challenge.

References

1. Little, A W. *Education for All and Multigrade Teaching: Challenges and Opportunities*. Dordrecht: Springer (2006)
2. Forbush, D E, Morgan, R L. 'Instructional Team Training: Delivering Live, Internet Courses To Teachers and Paraprofessionals in Utah, Idaho and Pennsylvania'. Rural Special Education Quarterly, Spring (2004)
3. Helge, D I, Marrs, L W. 'Personnel recruitment and retention in rural America: A growing problem'. The Pointer, (1982) 26, 2, 28-33
4. Ludlow, B L. 'Preparing special educational personnel for rural schools: Current practices and future directions'. Journal of Research in Rural Education, (1998) 14, 2, 57-57
5. Miller, J, Sidebottom, D. Teachers: Finding and keeping the best in small and rural districts. Alexandria, VA: AASA (1985).
6. Ankrah-Dove, L. 'The Deployment and Training of Teachers for Remote Rural Schools in Less-Developed Countries'. International Review of Education, (1982) 28, 1, 3-27
7. Coldevin, G, Naidu, S. 'In-Service Teacher Education at a Distance: Trends in Third World Development'. Open Learning Journal, (1989) 4, 1, 9-15.
8. Benveniste, L A, McEwan, P J. 'Constraints to Implementing Educational Innovations: The Case of Multigrade Schools'. International Review of Education, (2000) 46, 1-2, 31-48.
9. Cook, M. 'What's So Good about a Small Rural School?...Everything!'. Education in Rural Australia, (2000) 10, 2, 59-62.
10. Lloyd, L. 'Multiage Classes: What Research Tells Us about Their Suitability for Rural Schools'. Education in Rural Australia, (2002) 12, 2, 1-14

11. Boss, S. 'Big Sky Legacy. In Montana, Small Schools Aren't a Bold New Idea. They're a Way of Life'. Northwest Education Journal, (2000) 6, 2, 34-42.

12. Squires, J. 'Preparing personnel in rural areas'. In D Bricker & A Widerstrom (eds), Preparing personnel to work with infants mid young children and their families: A team approach. Baltimore, MD: Brookes (1996) 253-272

13. Ludlow, B L. 'Technology and teacher education in special education: disaster or deliverance?'. Teacher Education and Special Education, (2001) 24, 2, 143-163

14. Kendal, R M. 'Evaluating the benefits of a computer based telecommunications network: Telementoring and teletraining for educators in rural areas'. Journal of Research in Rural Education, (1992) 8, 1, 41-46

15. McDevitt, M A. 'A virtual view: Classroom observations at a distance'. Journal of Teacher Education, (1996) 47(3), 191-195

16. Ludlow, B L, Duff, M C. 'Webcasting: A New Technology for Training Special Educators in Rural Areas'. No Child Left Behind: The Vital Role of Rural Schools. Annual National Conference Proceedings of the American Council on Rural Special Education (ACRES) Nevada, March 7-9 (2002)

17. Falconer, K B, Lignugaris-Kraft, B. 'A Qualitative Analysis of the Benefits and Limitations of Using Two-way Conferencing Technology to Supervise Preservice Teachers in Remote Locations'. Teacher Education and Special Education, 25, 4, (2002) 368-384.

18. European Commission. White Paper: Space: A New European Frontier For An Expanding Union: An action plan for implementing the European Space Policy. Luxembourg: Office for Official Publications of the European Communities (2003)

19. Cohendet, P. The Digital Divide in the European Enlarged Economic Scenario: An Assessment of the Socio-economic Effects. Strasbourg: University Louis Pasteur (2003)

20. Littman, M K. 'Satellite Communications in the Telelearning Environment: Innovative Delivery Options for Distance Learning'. Journal of Online Learning, (2000) 11, 2, 5-11

21. Boverie, P, Gunawardena, C, Lowe, C, Murrell, W M G, Zittle, R H, Zittle, F. 'Designing Satellite Instruction for Elementary Students: Importance of the Classroom Teacher.' International Journal of Educational Telecommunications, (2000) 6, 2, 107-22.

22. Boylan, C, Wallace, A, Richmond, W. 'Remote Student Access to Education via Satellite Delivery'. Education in Rural Australia, (2000) 10, 1, 2-12.

23. Al-Sharhan, J. 'Education and the Satellite: Possibilities for Saudi Arabia?'. International Journal of Instructional Media, (2000) 27, 1, 51-56.
    Cartheron, R (2003). Reducing the Digital Divide in Europe: Competitiveness of Satellite among Broadband Access Technologies. Paris: Vista Advisers.

24. Cohen, D. 'Satellite-Based Computer Network Serves Students on Remote Pacific Islands'. Chronicle of Higher Education, 48, 18, (2002) A41-A42.

25. Lorenzo, G. 'World Bank's Global Development Learning Network: Sharing Knowledge Electronically between Nations to "Fight Poverty"'. USDLA Journal, (2002) 16, 5.

26. Lim, D H 'Perceived Differences between Classroom and Distance Education: Seeking Instructional Strategies for Learning Applications'. International Journal of Educational Technology, (2002) 3, 1

27. Shrestha, G M, Sutphin, H. 'Relationship between Interaction and Acceptance in Satellite Video-Conferencing'. Journal of Educational Technology Systems, 28, 1, (2000) 43-58.

28. Wenger, E. Communities of practice: learning, meaning, and identity. Cambridge: Cambridge University Press (1998)