
DEPLOYING BROADBAND-BASED INFRASTRUCTURE AND E-LEARNING SERVICES TO ENHANCE SOCIAL NETWORKING AND TEACHERS PROFESSIONAL DEVELOPMENT IN REMOTE RURAL SCHOOLS

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Abstract

State-of-the-art widespread ICT networking tools and platforms have the potential to enable individuals to enhance their social networking, and in this way, potentially also enhance their learning. Groups at risk of exclusion may benefit from such technologies by getting the means for connecting themselves to public services, learning and civic engagement. The Rural Wings project aims to investigate the potential for enhanced lifelong learning offered by social networking tools and platforms to those living in geographically and socio-economically disadvantaged rural areas. Experimental learning approaches are developed and implemented, examining the potential offered by these innovative approaches and tools for the alleviation of the disadvantage suffered by such populations in Europe through the enhancement of opportunities for effective and meaningful lifelong learning. The project brings together and further develops content, services, pedagogies and practices for social lifelong learning in rural areas, formulating specific scenarios of use of social networking tools and platforms which are tested with real learners and their teachers in disadvantaged rural areas, and evaluated in terms of their impact on learning (self-learning, informal peer-learning, formal learning) and inclusion (development of e-skills and competences, linking up of learning communities, building up of new partnerships), consolidating thus an evidence base on the added-value and impact of social networking tools and platforms for rural learning, with a particular attention to institutional as well as pedagogical innovation and change. Several technological solutions are tried including weblogs, wikis, podcasts, e-portfolios, social software, virtual social sites, and various usage schemes in the various sectors of lifelong learning, both formal (school, higher education, VET, adult education) and informal. Options for citizens' access to the digital resources are examined, making use of good practice examples in areas of work such as the operation of "learning hubs" in disadvantaged areas, the use of satellite broadband in remote rural areas, as well as other open and distant access approaches. This paper describes the vision for the use of social networking tools and platforms for teachers' professional development in rural schools, which can proactively be incorporated into policy making and the design of efficient education and training systems, aiming to achieve a multiplier effect across rural Europe. A clear lifelong learning position is delineated, addressing multiple sectors including school education, higher education, adult education and professional development. An indicative use case, currently implemented in the Rural Wings school network is presented in the last section of the paper.

The Rural Wings project

The Rural Wings project www.ruralwings-project.org (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), is our latest and most ambitious addition in a series of projects (MUSE www.ea.gr/ep/muse, ZEUS www.dias.ea.gr, NEMED www.nemed-network.org, HERMES www.ea.gr/ep/hermes) seeking to enable the development of advanced professional competences and a lifelong learning culture in teachers working in small rural schools (Sotiriou et al. 2007). Recognizing the crucial role of satellite telecommunications for securing broadband for geographically disadvantaged populations, 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. 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, and thus rendering broadband available really everywhere, even in the most isolated and deprived area. At the same time, the 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, the Rural Wings project develops 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.

Supporting Rural Communities and Social Networking

Rural development traditionally forms an important pillar of EU’s policies and an issue of priority for many European countries, as rural communities form a proportion of the overall EU population that cannot be neglected. Despite the strong urbanisation tendencies since the 1950’s, the rural population in Europe in 2000 was still 39 million, and it is expected to be 27 million by 2030 (United Nations Population Division, World Urbanization Prospects: The 2001 Revision). What is more, despite the decline of the primary sector of economy over the last years, rural production is an important aspect of European economy. However, the viability of rural areas needs more than agriculture alone. Rural development policies need to place agriculture in a broader context including enhanced quality of life in rural areas, and, eventually, attractiveness of rural areas to young farmers and new residents. Among prerequisites for these EU already recognises knowledge transfer and investment in human capital (Rural Development Community Strategic Guidelines 2007-2013). Clearly, the role that education and lifelong learning can play in this direction is crucial: better educated rural citizens of all ages and backgrounds, with ample life-long learning opportunities and access to the contemporary resources of the Information Society and the Knowledge Economy, can resist urbanisation tendencies, protect the natural and human resources of the countryside, understand the new challenges for rural Europe and respond to them with new initiatives, flexibility and adaptability. In face of this evident need for the promotion of “rural learning”, all levels of education and all forms of learning have to respond in a coherent and creative fashion. What is more, for rural learning, just as for rural development more generally, a strengthened bottom-up approach is needed, which can better tune rural learning programmes to local needs. However, citizens living in rural areas are excluded from the lifelong learning

and personal and professional development opportunities offered in our “urban” Information Society and Knowledge Economy. They are typically excluded, suffering the consequences of the digital and socio-economic gap between rural and urban Europe. At the same time, in the policies of the EU there is an increasing recognition of the fact that for Europe to become a truly knowledge-based economy widespread availability and usage of broadband Internet throughout the EU is considered necessary. Nevertheless, the digital divide in Europe remains large, and for more than fourteen million European households in remote areas the digital divide is actually growing. The proportions of rural populations living in geographically disadvantaged areas and suffering from the digital divide are significantly higher in the new Member States and accession countries, which results in significant socio-economic effects and challenges (Cohendet, 2003). It is therefore a stated strategic priority for Europe to use to the full the potential offered by all available broadband technologies to bridge the digital divide (European Commission, 2003, White Paper: Space: A New European Frontier For An Expanding Union: An action plan for implementing the European Space Policy).

At the same time, in recent decades there has been a fast growing recognition that learning is a predominantly social process – and that state-of-the-art ICT in the form of widespread and popular networking tools and platforms has the potential to enable individuals to enhance their social networking, and in this way, potentially also enhance their learning. In particular, it is often claimed that groups at risk of exclusion may benefit greatly from such technologies, by getting the means for connecting themselves to public services, learning and civic engagement. Web 2.0 has been in recent years a fast growing trend in the use of World Wide Web technology and web design that aims to facilitate creativity, information sharing, and, most notably, collaboration among users. These concepts have led to the development and evolution of web-based communities and hosted services which are often referred to collectively as social media. This term refers thus to the various activities that integrate technology, social interaction, and the construction of words and pictures. This technological genre uses the “wisdom of crowds” to connect information in a collaborative manner. It has a number of characteristics that make it fundamentally different from traditional media such as newspapers, television, books, and radio. Primarily, social media depend on interactions between people as the discussion and integration of words builds shared-meaning, using technology as a conduit. Social media is not finite: there is not a set number of pages or hours. The audience can participate in social media by adding comments or even editing the stories themselves. This interaction, and the manner in which information is presented, depends on the varied perspectives and “building” of shared meaning, as people share their stories, and understandings. Social media can take many different forms, including Internet forums, message boards, weblogs, wikis, podcasts, picture-sharing, music-sharing, and video blogs (vlogs), email, instant messaging, voice over IP, to name a few. Functions of particular interest for learning are being identified by pedagogues more and more frequently: reference (e.g. Wikipedia), social networking (e.g. Facebook, MySpace), virtual reality (e.g. Second Life), online gaming (e.g. World of Warcraft), video sharing (e.g. YouTube), livecasting (e.g. Justin.tv). Buzzwords such as wiki, blogs, social networking and folksonomies are invading the territory of education and lifelong learning.

A social network service uses software to build online social networks for communities of people who share interests and activities or who are interested in exploring the interests and activities of others. Most services are primarily web based and provide a collection of various ways for users to interact. Social networking has revolutionized the way we communicate and share information with one another in today's society. Various social networking websites are being used by millions of people everyday on a regular basis and it now seems that social networking is a part of everyday life. The main types of social networking services are those which contain directories of some categories, means to connect with friends, and recommender systems linked to trust. An increasing number of researchers are becoming interested in studying social networking tools, and social science researchers have begun to

investigate what the impact of this might be on society. Issues typically investigated include identity, privacy, social capital, teenage use, and e-learning.

However, little attention has been paid so far to what added value social networking tools and platforms can offer for the benefit of the inhabitants of all ages of disadvantaged rural areas. The Rural Wings project investigates the potential offered by this new era in ICT to those living in geographically and socio-economically disadvantaged rural areas, viewing social media as a tool of twin importance: both in the fight against the digital divide, and in Europe's efforts for the promotion of lifelong learning based on the development of trans-European communities of learning individuals sharing knowledge and experiences. Thus, the project develops and implements experimental learning approaches examining the potential offered by these new trends and tools for the alleviation of the socioeconomic disadvantage suffered by rural populations in Europe, and in particular for the enhancement of rural citizens' opportunities for effective and meaningful lifelong learning. One further major outcome of the project is the promotion of a new vision for the use of social networking tools and platforms for learning in favour of the geographically, socioeconomically and digitally disadvantaged, which will be proactively fed by the project in the direction of policy making and uptake in education and training systems with the aim to achieve a multiplier effect across rural Europe.

Overall, the innovation generated in the project is carefully based upon already existing knowledge and experiences of the consortium (most of the members of which have significant previous work in the field of lifelong learning initiatives in rural and disadvantaged areas), through an introductory comparative analysis of existing practices (inside but also beyond the consortium) aiming to identify transferable good practice and success factors.

Online Social Networking and Teachers' Professional Development: Developing Communities of Practice

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 (Wenger, 1999) 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. The work of Lave and Wenger (Lave & Wenger, 1991; Wenger, 1999), for example, provides a good base for studies related to networked learning in their exploration of what they have termed "communities of practice". The concept of a community of practice refers to the process of social learning that occurs when people who have a common interest in some subject or problem collaborate over an extended period to share ideas, find solutions, and build innovations. It refers as well to the stable group that is formed from such regular interactions. Lave and Wenger conclude that a "community of practice is an intrinsic condition for the existence of knowledge, not least because it provides the interpretive support necessary for making sense of its heritage" (1991, p. 98). Thus, in order for successful professional development to take place, an effective community of practice must be established, whether that be through online or face to face interaction.

In 2005, Steven Downes elaborated further on the idea of communities of practice and how they had translated into online learning communities. Downes goes on to admit, however, that as students and teachers continue to use wikis, blogs, and other interactive online tools "a network of interactions forms – much like a social network, and much like Wenger's community of practice" (p. 4, see also Sims & Salter, 2006). Many current researchers have agreed with Downes' descriptions of both present and future environments of learning. One particular case in point is that of Bernard Cornu (2004). In his discussion of networking among teachers and learners, Cornu suggests that "collective intelligence" should first be developed for teachers and that "the classroom is the first place where collective intelligence

should be addressed, developed and improved” (p. 4). Pettenati and Cigognini (2007) likewise continue on Downes’ work stating that learning trends favour the informal approach afforded by online social networking.

“The emerging domain of study of informal e-learning is receiving greater attention because of the widespread of social networking practices and technologies. Social networking is emerging as a highly natural practice because it is deeply rooted in our daily behaviour; spontaneous relations, interactions and conversations support informal learning practices, contributing to the creation and transmission of knowledge. In informal learning practices the social behaviour and the support of technologies converge toward the “network”; a network made by people and resources, a social network, unified by personal needs or common goals, interaction policies, protocol and rules and telematic systems all together favouring the growth of a sense of belonging to the “net” community. (p. 17)”

Hence, because of its natural, informal nature, online social networking has tremendous potential for utilization among teachers worldwide in staff development and other efforts. As further research is centered on the potential possibilities and pitfalls of incorporating online social networks in learning, we will hopefully gain a better understanding of how such technologies can be utilized to enhance pedagogy. Furthermore, such efforts should provide insight and additional answers to a research question that has gained in importance as educational technologies have evolved: How are online social networks best utilized to enhance teacher professional development?

We are aiming 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 and 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 of the things that the technologies we are envisaging have to offer. 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, re-using of assets, coordination and synergy, discussion of developments, mapping of knowledge and identification of gaps, etc. (Wenger, 1999). How this can be designed and realised given current technological developments remains an open challenge for us. In the last paragraph of our paper we are describing one of the use cases that are currently implemented in the Rural Wings schools.

A Case Study: Using ePortfolios to support the Development of the School Organic Garden

School gardening projects fit easily into the curriculum and enhance studies in a wide range of subjects, but they also have a special value all their own. Some schools have always had gardens, but gardens for teaching have a more recent history. Over the last 30 years many thousands of schools have incorporated gardening into the curriculum. With the growing experience of school gardening has come a great deal of evidence of the multiple benefits to be gained. The main benefit is that schools with gardens are innovative schools producing creative young people with positive and all-encompassing attitudes to life. The schools gardening movement is now spreading fast in all parts of the world. There are numerous on-

line resources (including blogs and wikis) available on the web focusing on the specific subject (see Figure 1).

School organic gardening is also a very interesting and very relevant theme for rural schools. In the framework of the Rural Wings project a teachers' community of practice has been developed to support the creation of organic gardens in the participating schools. The Rural Wings portal offers to the users numerous social networking tools to support their effective collaboration and communication over the web. The tool that was selected to support the specific community of practice was an electronic portfolio service called "Confolio" (www.confolio.org). The users of the Confolio service can store files, links, ideas etc, collaborate with other portfolio owners by sharing information (access control), structure their content using international standardized formats (e.g. IEEE LOM) and publish opinions on contributions by others, in such a way that these opinions are retrievable from the contribution itself (see Figure 2).

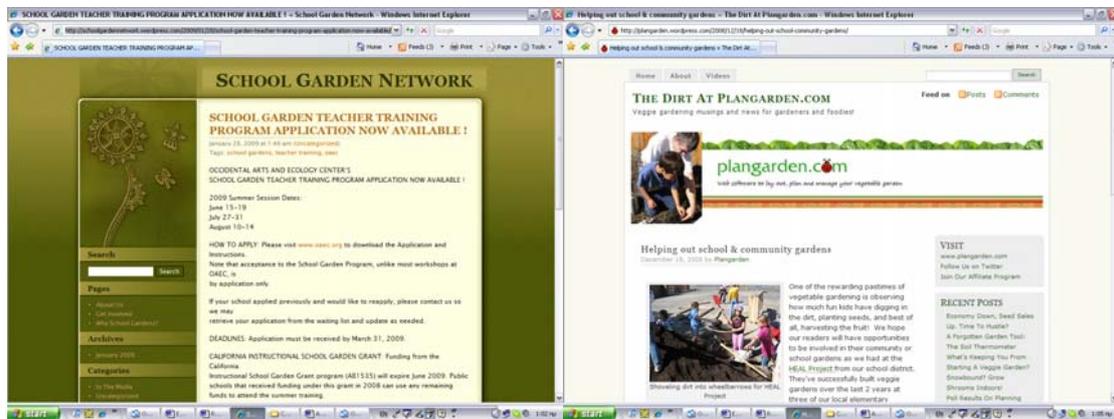


Figure 1: Numerous blogs are available on the web to support the exchange of information, educational materials and projects, guidelines for teachers and proposals for effective community involvement.

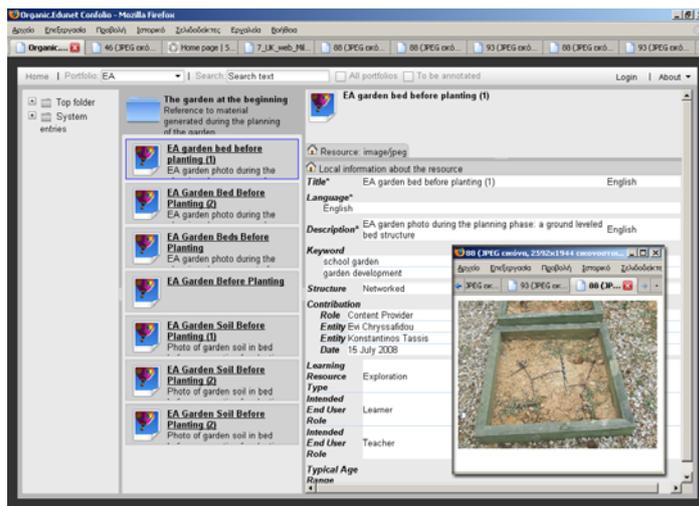


Figure 2: The Confolio service, offered to the teachers in the framework of the project allows for easy upload and retrieval of educational content through the use of educational metadata that interconnect the available content with the school curriculum. This service was used for the day to day communication and support of the teachers who developed organic gardens in their schools.

One of the activities, which has been developed in the framework of the teachers collaboration was to construct greenhouse models in order to understand how the “real” greenhouses work. Combining the “greenhouse” concept while tending the school garden and implementing the greenhouse construction has proved to be a powerful educational tool to

raise students' awareness in the challenges of today's environmental issues. If students (and people in general) do not draw a casual connection between climate change and local consequences, they may not perceive climate change as a risk issue and consequently fail to assess and act on potential response actions.

Diffusing such innovative educational practices to whomever teacher is interested in, has been realized by use of the Rural Wings infrastructure and tools. Many teachers from other Rural Wings schools were informed about how to establish a school garden and they were guided through the process through continuous interaction with the trainers and other teachers. Thus, peer-to-peer interaction via has been instrumental in diffusing innovative educational practices to enhance students' awareness in environmental issues.



Figure 3: The map indicates the location of the Rural Wings school network in Greece. The mark in the centre indicates the location of Ellinogermaniki Agogi Teachers Training Centre in Athens that collaborates with the 3 Environmental Centres at Vertiskos (60km N from Thessaloniki), Hrea (200km SE from Athens) and Rethymnon in Crete, and the 6 schools that are developing their organic gardens. All institutions are part of the same satellite broadband network that allows continuous communication and interaction. The broadband connection allows also for collaboration with teachers from Israel that are developing similar activities.

The Rural Wings Organic Garden network brings together 21 teachers trainers and teachers from 3 environmental education centres and 9 rural schools from Greece and Israel. These centres are financed from the Greek Ministry of Education and they are authorized to train teachers on issues related with environmental education and to design applications and projects for students. Teachers have access to the educational materials the environmental education centres are offering.

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