



Other Users

Discussion note

Increasingly, research and education networks (at the national, regional and local level) connect not only researchers, teachers and students in research institutes, universities and other institutions of higher education, but also other kinds of users (in the public sector). This "greater inclusiveness" of research and education network infrastructure and services in Europe is a development of strategic value.

Following up on case studies published by SERENATE in 2003, EARNEST has focused on three user communities:

- Schools
- The healthcare sector
- The arts, humanities and social sciences (AHSS).

Schools

In recent years, National Research and Education Networks (NRENs) all over Europe have increasingly brought Internet connectivity to schools. This development has been stimulated and in some countries even started by European policies to promote the use of information and communications technology (ICT) in schools. The different technical and organisational options for connecting schools and their pros and cons are now well understood, thanks to information exchange between NRENs.

It is now time for research network organisations to go one step further and to look systematically at the services that can be provided to schools by NRENs (and others) and at the actual use that schools make of the Internet and the resources available via the Internet for the teaching and learning process.

Schools have characteristics that are distinctly different from those of other user groups, and they have specific needs. There is a gap in understanding between the technicians, i.e. those in the NRENs, and the practitioners; if that what is provided by the technicians is not what the schools want, then they will not use it. The challenge for schools is to have an adequate and reliable infrastructure in order not to discourage teachers or pupils. This opens the debate about ICT training for teachers and technical support within the school.

As regards technical requirements, quality of service is important, for example, when schools start using videoconferencing. Some schools ask for content filtering. Interoperability is an important issue when dealing with learning platforms.

As far as pedagogy is concerned, nowadays IT and networking are used more widely across the curriculum, with the aim to enhance traditional teaching methods; a number of factors affect pedagogical approaches to the use of ICT. Furthermore, ICT has reduced some teachers' workload, and there is some evidence that ICT can increase the achievement and attainment levels of pupils in a number of subjects.

Arts, Humanities and Social Sciences

For a part, the AHSS communities are not new users of research and education networks. Indeed, many people active in the social sciences and the humanities are employed by universities and research institutes, which are the original core target group of NRENS, and partially this also holds for the arts. However, new applications are appearing in the humanities and social sciences that make particular demands on research networks and the services provided by them, while in the arts – for example, in the performing arts - innovative and very demanding network applications are being developed.

The AHSS communities use network services for supporting a wide variety of content-centric activities, including creating, producing, communicating, publishing, teaching, searching and archiving materials. More and more information and sources of inspiration become widely available and easily accessible thanks to the development of high-speed networks.

Network services and technologies have an important impact on modern research practices in AHSS. This is illustrated by a number of examples in the report commissioned by EARNEST. In that report, several categories of advanced applications in the AHSS are clustered based on technical requirements: real-time collaboration technologies, live performances, libraries and digital repositories (think of copyrights issues), Authentication and Authorisation Infrastructures and trust, peer-to-peer technologies, online surveys. The report concludes that these domains have intensified their usage of network technologies compared to the period covered in the SERENATE report.

The diversity of the technologies employed and the persistence of the infrastructures signal an important paradigm shift towards online collaborations. The number of multi-disciplinary scientific projects is growing, involving people in humanities and social sciences working together with researchers from computer science or engineering departments. At the same time, computer scientists, software developers and engineers are offered employment to support the work of AHSS projects. Moreover, the number of scholars in the humanities and social sciences with knowledge of modern computing and network technologies is increasing. The need for providing specific training on these technologies to scholars has been acknowledged.

It is important to raise awareness among the AHSS community of how new services developed by the NRENS could transform their work, as well as to raise the awareness of the NREN community as regards the problems that are being approached within the AHSS.

Healthcare

Although NRENs usually connect university hospitals and in some European countries a small number of other hospitals as well, NRENs do not serve the healthcare sector in general. There are a number of reasons for that, but because in many countries the need for a high-level information and communication infrastructure is coming high on the agenda of the healthcare sector, there is an opportunity for that sector to learn from the wide and long experience of the research networking community. Conversely, for NRENs the healthcare sector could be a prime candidate for a large extension of its "inclusiveness".

In a large number of European countries there are recent initiatives to establish a network and information infrastructure for the national healthcare sector. Most health data networks in Europe are mainly regional. National solutions exist in a few countries. Throughout Europe a large number of advanced regional applications are using networks to exchange information between hospitals and generalist and specialist doctors.

The healthcare sector has significant political and legislative constraints, which means that the situation in a country or region will not change rapidly even when technological development offers opportunities for a change towards lower cost and better care. The sector is applications driven, but still rather immature with a large number of different applications even within one hospital, and a relatively low level of interoperability at this stage. Existing operational applications are not, in general, limited by available bandwidth. However, there are emerging applications requiring significant bandwidth, such as tele-diagnostics, remote radiology with exchange of high-resolution images and video streaming for the transmission of surgical operations with a view to teaching or monitoring remotely.

The NRENs are generally not involved in the healthcare sector. Exceptions are the Scandinavian and Baltic countries, the UK and Serbia where the NRENs are involved in a few projects. The pharmaceutical industry and clinical research organisations generally use closed, rented networks and have relatively little demand for high-speed connections. However, they are very demanding regarding service level agreements and guarantees offered by their contractors.

The main "market" for NRENs would seem to be: providing parts of network security infrastructure for health research and the healthcare sector, and exchange of large-volume information between collaborating hospitals (mostly for tele-diagnostics, medical education, clinical research or monitoring of surgical interventions). NRENs could support cross-border pilot projects within Europe federating a number of motivated healthcare actors in a test of scalability of network capacity improvements to the international level.

The main strong point of NRENs in the healthcare context is the excellent international high-speed connectivity that they offer at reasonable cost, including to countries outside Europe. The main obstacles for NRENs to get involved in the healthcare sector are probably:

- The perception that they would not adequately protect the confidentiality and integrity of the sensitive personal data involved, and their lack of knowledge of the healthcare sector
- Limitations in the guaranteed service levels offered
- The fact that some NRENs are restricted by their connection policies in serving other sectors.

For discussion

Besides connectivity, which services could NRENs provide to schools? Is an extension of the range of services provided to schools something that NRENs should pursue proactively?

In providing services to schools, should NRENs limit themselves to connectivity and network-related technical services, or should they also be active in providing content-related services?

Should NRENs set up special services for the arts, humanities and social sciences or are the requirements of that sector covered adequately by the existing service package of NRENs?

Do you agree that action should be taken to raise awareness among the AHSS community of how new services developed by the NRENs could transform their work, and to raise the awareness of the NREN community as regards the problems that are being approached within the AHSS?

Should NRENs aim to become the provider of connectivity and network services for the healthcare sector (not just health research, but the healthcare sector as a whole) in their countries, or should they leave that role to separate organisations created specifically for that purpose?

If NRENs want to provide connectivity and other services to the healthcare sector, what are then the main obstacles, problems and issues?

Which recommendations to various stakeholders can be formulated?

Which of the findings and recommendations are the most important ones that should be incorporated and highlighted in the overall Summary Report of the EARNEST Foresight Study?