Keynote 2:

Telematics for Learning

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Abstract

This paper presents the research carried out in the Communications and Distributed Systems Research Group on various aspects of multimedia communications which are believed by the authors to be the key to successful delivery of new telematic services for supporting on-line teaching and learning. In addition, the paper presents the specific benefits that research into technology can offer to various components of the educational process, such as authoring, tutorial support, brokerage and access to learning resources, etc. The focus of research is on technology applications although the authors believe that over the next few years it will shift towards the area of effective implementation of on-line teaching and learning strategies at the institutional level.

Introduction

http://www.dcs.shef.ac.uk/

- Telematics research is focused upon the analysis and design of communications systems for the support of broadband multimedia applications and services. The Group is currently involved as a full partner in several major projects. The main theme in all projects is the investigation into the use of the CATV (Community Antenna TV) infrastructure for the delivery of telematic services to a large and diverse community of potential users, based on a wide range of applications such as vocational training in SMEs, information brokerage, nursing

education, virtual environments, and open and flexible learning. The projects described below are currently supported by a team of 38 members, including academic staff, research assistants, administrators, and programmers. Research development and technical transfer is carried out in three laboratories and there is also a drop-in centre for the public.

REGIS

http://regis.nexor.co.uk/regis.html

REGIS investigates the technical problems inherent in providing regional business communities with low cost high speed access to local and international information services. The CATV technology currently being installed in much of the UK only provides narrowcast television and telephone services, but has the potential for high speed access to data services; REGIS will investigate how to interconnect existing and emerging information networks with the CATV systems, and will set up a distributed regional information system demonstrator utilising the resources of cable companies in the East Midlands and South Yorkshire. While trialing new technologies, including X.400 e-mail, X.500 directory services and Z39.50 search and retrieve facilities, it will also allow local companies and public organisations to experiment with the provision of distributed information services. During Phase I the service will be based on primary and basic rate ISDN, allowing higher speeds of access than common currently. Once the technical investigations of emerging CATV standards are complete in Phase II the demonstrator will interconnect high-speed ATM-based data networks in the two regions. The project will also address the issues of tariffing and security, with different categories of information service (for example, message transfer, information retrieval, etc.) requiring different quality of service. The partners plan to offer products and services based on this study within one year of completion. This project could potentially support the delivery of education with fast Internet access integrated into the provision of cable TV.

Network Architecture for the REGIS Demonstrator

Renaissance Service Demonstrator

http://regis.nexor.co.uk/renaissance.html

- The project aims to develop a virtual vocational training environment which can manage and deliver advanced digital content using Narrowband Integrated Services Digital Network (NISDN), Asynchronous Transfer Mode (ATM) and Community Antenna Television (CATV), independent of bearers and components and inter-operable across technology boundaries. The technical objectives of the project are: planning and implementation of network infrastructure; provision of information services; the development of an environment to support a wide range of user services; and the delivery of training content. The networking and music industry have been selected for the trial as they have an audience of early adopters with some experience of computer aided applications, e.g. Novell will use the infrastructure to ascertain its suitability to support their franchised training centres across Europe. The music industry support will be the most demanding application, because of the need to provide high quality digital sound to users from the National Centre for Popular Music and the Sound Training Centre in the UK, as well as the Jazz & Rock Schule in Germany. The learning environment developed as part of this project can be used to support (or complement) the campus based in parallel with on-line delivery of training and education, where the interface between the two is completely transparent to the user.

GAIA

http://www.syspace.co.uk/GAIA/

This programme aims to develop a sector-and-supplier-independent architecture capable of supporting multilateral information trading. This will facilitate: discovery of information, goods or services; location of suppliers; negotiation of service levels of quality, delivery and price; digital delivery, payment and royalty management. These services

will be delivered through a scaleable brokerage model, broadly applicable to distributed information supply chains and networks. The architecture will enable information brokers to recognise: the heterogeneous nature of content; information requirements of various user groups; the need for secure operation of all service components; and the quality of service as the main differentiator. GAIA will provide an holistic architecture based on the principle of interchangeable components, while taking into account the diversity of the telecommunications infrastructure. It will be trialled in four areas: commerce, education, publishing and music. The quality of service will be related to availability and selection of bearer services; more pervasive services can be exploited to add value to the brokerage process. GAIA will deliver architecture and standards, market stimulation, and toolset development. GAIA project could offer direct benefit to any system set up for brokerage of learning materials, in a non-monopolistic environment where the users will have a choice of several different suppliers of learning materials, tutorial support, assessment, etc.

Blueprint for (Higher) Education 2000

http://www.jtap.ac.uk/

Few commercially self-sustaining operations have emerged in the area of interactive distance learning; most have focused on specific aspects of delivery such as multimedia authoring or technical feasibility, without addressing crucial issues related to overall user needs, such as organisational viability and cost-effective content authoring and maintenance. This project examines how a conventional university can market interactive distance learning outside the framework of fully funded programmes with minimal financial risk. It will utilise an existing public network infrastructure (ISDN) for course delivery and will form strategic partnerships with commercial organisations to provide a high level of user support. The trial will develop the methodology for overall course production (not authoring), marketing, distribution and support-areas where universities are traditionally weak..
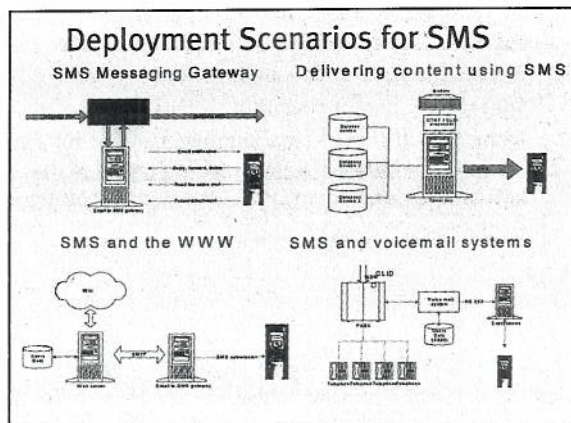
The starting point for the project will be an established full-time Masters programme in data communications; the expertise acquired during the project will be directly applicable to many other HE institutions. This project translates campus based delivery into the format suitable for on-line delivery, allowing the student to not only download learning materials from the Internet, but also top register on-line, get tutorial support using e-mail and/or conferencing, complete on-line assessments, and so on, rendering campus attendance purely optional.
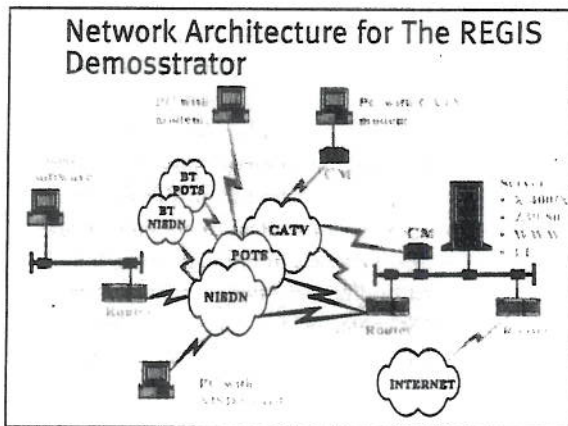
SMS

http://www.dialogue.co.uk/

SMS, now an established part of modern business communications, enables users of cellular digital networks to exchange almost instantaneously 160 character long messages with users on any other digital network. With the appropriate gateways, SMS can inter-operate with fax, e-mail, or paging. Future developments include message translation and closer integration with voice services. The Group is currently investigating the potential of using SMS as a transport layer "protocol" to support applications in the area of electronic commerce over heterogeneous Wide Area Networks.

Although somewhat peripheral to the mainstream of projects in the Group, it is expected that by the year 2000, SMS and related technologies may become essential to learners on the move, or those with unreliable, intermittent, and/or bandwidth limited connectivity. SMS forms part of a rapidly growing field of mobile and/or wireless Internet access technology.

Deployment Scenarios for SMS

Network Architecture for The REGIS Demosstrator

TELERISE
http://www.telerise.shef.ac.uk/

TELERISE, supported by the European Regional Development Fund (ERDF), is a strategic initiative for Yorkshire and the Humber. The project represents a collaborative effort between the University, Government, industry and the region's Business Support Infrastructure. The main aim of the project during Phase I is to transfer technology and knowledge for competitive business advantage, to set up telematics demonstrator projects in key areas as well as to establish a state-of-the-art Open Systems Information Centre supported with an on-line regional information service for SMEs (Small-to-Medium Enterprises) in the following growth business sectors: health, environmental, and print and design related technologies. The TELERISE project has a dedicated and highly skilled team of information, and computer network professionals and is focused upon providing a service to businesses. Its has twelve full-time members of staff including a team of liaison officers whose efforts will be dedicated solely to the promotion of TELERISE services to businesses in the four sectors. It is expected that during Phase II, the project will lead to the establishment of a self-sustaining commercial operation that will become a major part of the information infrastructure for the provision of information on-line to businesses not only in Yorkshire and the Humber regions but also nationally and internationally.

The most relevant aspect of TELERISE for on-line learning are Information Gateways, the first step towards personalised news service, widely seen as the key feature of the Internet in the 21st century. By carefully profiling users (distance learners) it will be possible to cut down the increasingly longer times required to locate the relevant information on the Internet.

Concluding Remarks

* This paper reviews aspects of telematics research in the Department of Computer Science at the University that could have an impact on the future of on-line teaching and learning. The key areas of development are: a) the delivery of broadband (multimedia) services to home, b) the implementation of virtual learning environments (integrating all components of delivery with an impact on campus based and remote delivery); c) information gateways and personalised news services for focused and more effective Internet searching, and d) the use of wireless technology to support mobile users, and in particular the development of SMS technology for notification of content delivery or service (including voice-mail and e-mail) to learners and tutors on the move.

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