

Educational Gateway Development

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Key words: Education and life long learning, knowledge transfer and sharing.

SUMMARY

The paper is dealing with the experiences of a MINERVA project – Networked Open Distance Education (NODE). The NODE project design started from a vision of educational resources available through distributed networks delivering learning media to individual learners. In order to provide a generic framework for the changing roles of educators and educational institutions a three-tiered system of content authors, institutional gateways ('brokers') and points-of-learning has been conceived, with the latter institutions serving as interfaces with individual learners. These different tasks and institutional roles require services like cataloguing, metadata description, content modularisation as well as support for learning, evaluation and business workflows.

The *outcomes* of NODE will provide a set of perspectives, experiences and insights serving as starting points for further development of institutional strategies in educational markets. Institutions need to focus their activities on clearly defined sections within the qualification value chain, optimising their customers' benefits and maintaining economic viability within the realm of their educational mandates. The flow of learning objects, quality assurance, credit / qualification awards and compensations within educational networks requires interoperable systems with a high degree of connectivity.

Results of the investigations on the conceptual design of an educational gateway are presented in the paper.

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1. BACKGROUND

In order to be able to follow the current processes of change, the employees should be able to develop their assets of knowledge on a continuous basis, thus continually increasing and renewing it. New education approaches and training structures must be developed which help anticipating needs and the evolution of job profiles. Educational developers should now answer questions such as, How knowledge is produced? How is it transferred? And, how are learned skills measured? etc.

The task is to re-engineer educational resources in association with the employment services. In an extension of recent education and training programmes, the first objective should be to develop still further the corporate dimension of education: to improve the quality of training and to foster innovation in education by increasing exchanges of experience and information on good practices; to establish an area of training by recognition of qualifications; to promote mobility made possible by the new technologies of communication; to develop common databases, information sources and knowledge on skills needs; to conduct comparative research on methodologies used and policies implemented; to improve the interoperability of ODE (open distance education) systems and to increase the level of standardisation of the new networked training tools.

The NODE (Networked Open Distance Education) MINERVA project design started from a vision of educational resources available through distributed networks delivering learning media to individual learners. In order to provide a generic framework for the changing roles of educators and educational institutions a three-tiered system of content authors, educational gateways ('brokers') and points-of-learning has been conceived, with the latter institutions serving as interfaces with individual learners. Assuming that some of the traditional barriers between institutions will be broken down in favour of networks of interoperable learning objects, the NODE concept serves as a framework to improve access for individual learners and to redefine roles for networked educational institutions.

The *mission* for the NODE project is to implement a test bed for evaluation of this design and for the identification of key mechanisms, interfaces and critical issues. Authors need motivation, incentives, access to an audience and feedback; gateway institutions need to provide educational programmes with substantial added value in the areas of credits, didactics, learning environments and a business environment; points-of-learning have to identify, motivate and support learners, provide access to a wide range of qualifications and generate a lifelong-learning experience. These different tasks and institutional roles require services like cataloguing, metadata description, content modularisation as well as support for learning, evaluation and business workflows (Brunner, 2002).

The *outcomes* of NODE will provide a set of perspectives, experiences and insights serving as starting points for further development of institutional strategies in educational markets. Institutions need to focus their activities on clearly defined sections within the qualification value chain, optimising their customers' benefits and maintaining economic viability within the realm of their educational mandates. The flow of learning objects, quality assurance, credit / qualification awards and compensations within educational networks requires interoperable systems with a high degree of connectivity. The paper is focusing on the functional design of educational gateways.

2. NETWORKED EDUCATION

Since eLearning removes many barriers of traditional hierarchical educational structure, institutions are transforming into a more flexible, open, networked configuration. The nodes can take many forms. Some nodes have worked well with a tight focus on practical delivery issues, while others have been set up to consider wider development concerns. Their main purpose is to provide a space in which innovation can grow. They should be very flexible changing as necessary. There are two basic types of nodes: gateway and point-of-learning. While the gateway is an active knowledge engine, the point-of-learning is a knowledge transmitter, educational or training provider. However their role and function is changing dynamically. They usually involve people meeting and working together within agencies and across public organisations to solve common problems which are perceived to exist by those who are delivering the educational or training service. Geographically laid out, the knowledge is spread in a network, which has many access points. Like a map can be read from any point, the knowledge within networked environment can be collected from many sources. The knowledge space has also a temporal dimension. The knowledge space is in dynamic changes.

The networking aspect of the nodes can be a major strength not only across members but also within organisations. Nodes keep a focus on service delivery and users' concerns. The process of working in a member organisation can be as important as the outcomes. Staff understanding of the decision-making process improves and they can become more committed to the outcomes. They can help to generate culture change. Changing the culture of an organisation cannot be accomplished by edict from the top. Nodes provide experience for staff of how to take the initiative and propose change. It provides a model for introducing a dynamic process of change.

Trends in education and training

	Traditional education	Computer-assisted education	Networked education
Focus	Teacher	Learner	Learning community
Mode	Passive	Active	Adaptive
Technology	Blackboard / textbooks	Computers	Networks as communication tools

A distributed learning environment is a learner-centred approach to distance education, which integrates a number of technologies to enable activities and interaction between students and tutors. Our model is based on amalgamating appropriate technologies with aspects of local learning centre-based workshops and co-operative Internet-based distance education. This approach gives tutors the flexibility to meet the needs of diverse student populations, while providing both high quality and cost-effective learning.

3. GATEWAY FUNCTIONS

The NODE model is a flexible system, which allows changing faces of the nodes. Depending on the needs a node can be **gateway** from one point-of-view and point-of-learning from another. The functions of the gateway are listed below and illustrated on Fig. 1.

Marketing

- Needs analysis
- Research of the dynamic educational market
- Promotion of eLearning
- Enquiries from prospective learners
- PR
- Demand maintenance

Management

- Conceptualisation
 - Mission
 - Strategy
 - Objectives
- HRM
 - motivation at aspects for author
 - workload issues (when, how intensively can author work)
 - guarantee for continuity (no hire and fire)
- Information infrastructure
 - Gateway hardware
 - Gateway software
 - consideration of organizational setting of author
 - Knowledge-base backup
- Knowledge management
- Building relationship, networking
- Quality
 - definition of quality levels
 - selection of appropriate contents
 - handling of accreditation issues
 - communications assuring quality

Building knowledge resources

- Original developments
- Knowledge mining
 - Searching from metadata
 - Searching from public data
- Uploading learning units
- Metadata
- Copyright
- Maintenance
- Archive

Course production

- Definition
- Accreditation
- Terms and Conditions
- Calendar
- Certification, Recognition
- FAQ
- Course maintenance

Administration

- Academic administration
 - enrolment
 - accounting
 - certificates
 - placements
 - alumni
- Course administration
 - Content data
 - Course backup
 - Student data upload
- Author's data
- Tutor's data
- Student's data
- Financial
 - ensuring IPR for authors

Portal

- Introduction
 - Contacts
- Overview
- Press
 - News
- Events
- Course offering
 - Next course

- Learning advises
- Opportunities
- Achievements
- Tutor data search
- My workplace settings
- Using my workplace
 - Selecting the right PC
 - Selecting an Internet Service Provider (ISP)
 - Solving technical problems
 - Learning how to learn online
 - Access to modules (timed out)
 - Assignment upload: auto path, name
 - Marking, feedback
 - Progress info (learning route)
 - Grades
- Support
 - Help desk
 - FAQ
 - Tutoring
 - Mentoring
- Download
 - Free software
 - Public data
- Library
 - www links
 - Papers
 - Presentations
- Communication
 - Net-Meeting
 - Effectively communicating with the instructor
 - Collaborating with other students online
 - Chat
- Exam
- Evaluating online courses
- Club
 - Building communities
 - Collaborative learning
 - Wanted / Offered job

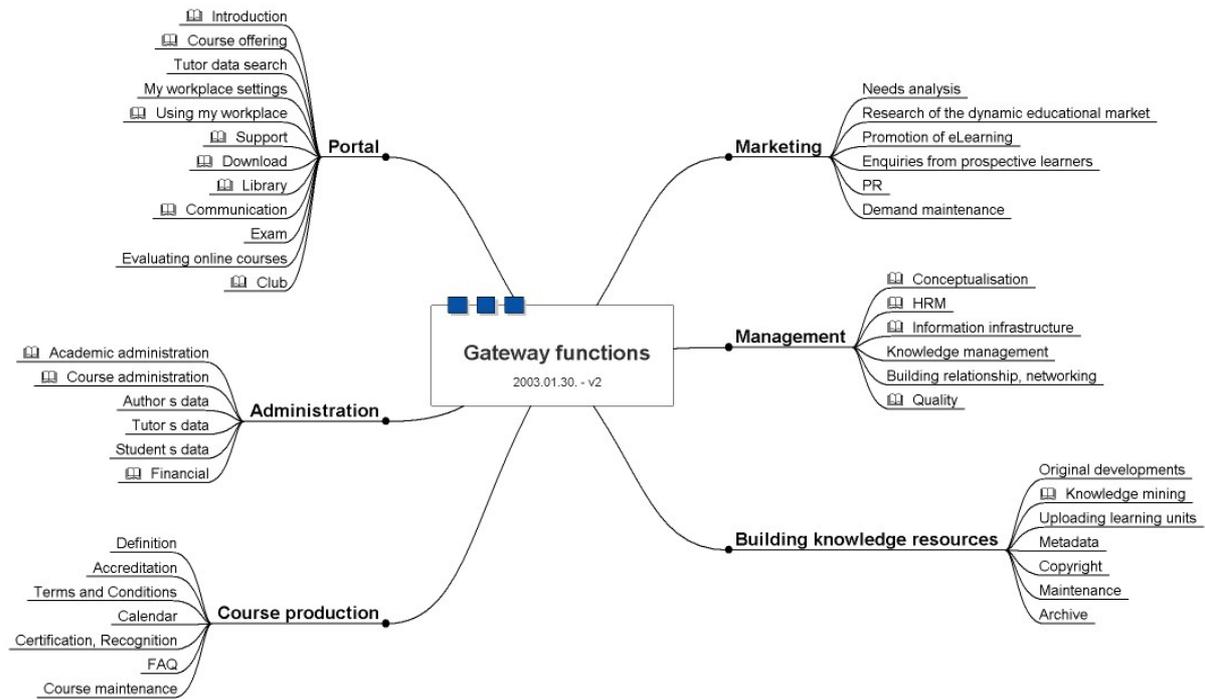


Fig. 1 Gateway functions

The educational institutions are under intense pressure to get the best course in hands of their learners, in the right length, at the right time, for the right price and very important in the required quality. To do this, they have to expand considerable time and resources on planning their supply strategy to respond to demand of the industry or society. This goal can only be reached, if the organisations introduce a usable and innovative tool which serves the above mentioned requirements. This tool must enable networked educational partners to work together across different and possibly flexible platforms. Moreover it must support the sharing of management and technological information.

4. CONCLUSIONS

The results of the investigations imply that educational systems will be transformed by the following features:

- Future structures of open distance learning will be more “Web-centric” in that they will be information and communication technology enabled and will open increasing use of the Web.
- Systems will be more “learner centred” in the sense that they will:
 - offer learners and teachers / trainers with global access to on-line resources and assessment strategies,
 - make possible learners to interact with learning objects, teachers, tutors, mentors, administrative and service resources,

- enable learners to tailor the learning experience to their needs.
- Original educational objects, expertise and knowledge can be incorporated to add value to learning resources acquired from elsewhere.
- Course planners, teachers can acquire learning objects from large content databases, aggregate and manage these according to the needs of particular groups of learners by and selecting the appropriate mode of delivery.
- Learners will be able to fulfil their educational needs from a world-wide list of educational / training institutions.
- Collaborative learning will enable learners to establish their own learning groups focused on their common interests.
- Because learners will be able to access virtual courses from anywhere, thus saving substantially on travel costs.

New business models assure to radically change the educational services and greatly improve the effectiveness of knowledge delivery. Principally important are customisation and community building. The web links together students, professionals, alumni etc. and allows new ways of communication and interaction. eBusiness also changes how we teach and learn, it is more about redesign the strategy than technology.

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BIOGRAPHICAL NOTES

Bela Markus is a land surveyor, M.Sc., Ph.D., professor of Geoinformatics, and director of the College of Geoinformatics, University of West Hungary. He has 30 years teaching experience in surveying, 15 years in teaching GIS and 7 years in development and organization of open, distance learning professional courses for land administration. Prof. Markus has over sixty published papers on various aspects of using GIS. He is actively involved in many national and international academic programmes, is chairman of the Hungarian UNIGIS Course Board, chairman of the Working Group on Geoinformatics of Association of Hungarian Surveyors and Cartographers, and is the national representative of FIG Commission 2. From 2002 he is chairing the FIG Working Group 2.4 – Knowledge in Spatial Information Management. Prof. Markus is member of AGILE Council and EUROPACE Executive Committee.

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