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Integrated information systems for
student work and back-office tasks
in higher education processes

On-stage and behind the scenes

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Workgroup Computing Competence Center Paderborn

- Projektgruppe Office Systeme und Workflow Management -

Das Workgroup Computing Competence Center Paderborn befaßt sich mit Forschung, Prototyping, Produktentwicklung, Systemeingührung, Projektabwicklung, Technologietransfer, Consulting und Schulung bei Groupware-basierten Anwendungen für betriebliches Informationsmanagement. Gegenstand sind insbesondere Business- und Technologie-Frameworks für Office Systeme, Workgroup Computing, Workflow Management, Projekt Management und Connectivity-Systeme in Client-Server Architekturen. Das Workgroup Computing Competence Center Paderborn besteht aus gemeinsamen Arbeitsteams an der Universität Paderborn und der PAVONE Informationssysteme GmbH Paderborn.

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Table of Contents:

1 Introduction	1
2 Quality management requirements in higher education.....	1
3 Management of higher education processes	2
4 Future development and research plans.....	2
5 Presenting and exhibiting the project	3
6 References.....	3

On-stage and behind the scenes

Integrated information systems for student work
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1 Introduction

Business Administration Schools and Higher Education have long been considered an enterprise highly resistant to change. Since the end of the last decade, information management in graduate education has increasingly been subject to research. Much has been written on the changes anticipated in higher education as a result of the application of information technology (IT) and innovative information systems (IS). But while quality management issues are starting to be addressed at the corporate level of all Universities, their implementation at department and faculty level is inhibited by a lack of tools for managing the diverse accountability requirements and for addressing the mixed demands from students, staff, the university, the profession and the community. Comprehensive back-office information technology is a conceivable means to ensure the fulfillment of these requirements and to implement sound quality management of administrative procedures. Nevertheless there is understandable concern that formal implementation of total quality management (TQM) will simply lead to more *paperwork* and less time for *real work*.

Some research projects focus on changes in the content and delivery of materials to students or on curriculum management. Few, however, consider how IT might change the management of educational processes *behind* the lectures and seminars in departments and faculties, which so far are oriented towards paper based contents and logistics. Nevertheless, both aspects have to be closely examined and even more important an integration and combination has to be reached. An approach like the one presented in this overview-paper would allow to solve management requirements, which occur in higher education and training facilities.

2 Quality management requirements in higher education

Over the decade, while funding in the education sector has declined, student numbers have increased disproportionately. Student to staff ratios, in fact, increased over that period, such that these ratios are now comparably high. At the same time there are new and emerging pressures to be addressed from these shrinking resources¹:

- increasing accountability demands from government, the public, and from students with significant workload implications regarding continuous improvement in distributed administrative processes;
- increasingly competitive educational markets, e.g. the internationally oriented universities;
- emerging demands for modular courses to follow current requirements of flexibility and innovation;
- internationalization of the education market place with competition especially for fee paying overseas students and for top post graduate students, which demands distributed work at different locations;
- internationalization of the professional market place, with the consequent need for broader international recognition of qualifications.

In short, the challenge is to manage the delivery of a quality service to discriminating consumers in a very competitive and dispersed marketplace at a time of resource constraints.

Reflecting these pressures there are a number of quality criteria, which any management system for the education and training area should address. First, an appropriateness of the portfolio of course offerings has to be reached and a good fit between teaching and learning methods is necessary. Curriculum materials must be suitable to the outcome objectives while monitoring and evaluation with regular feedback from

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¹ cp. [Linard/Brimo 1994]

students must be ensured, as well. For the back-office field a seamless integration of different areas of management tasks, such as purely administrative work, students' supervision, lecture material provision or public relations and research has to be ensured. A further and important field is the know-how management of all team-members to ensure up-dated information to all people involved, i.e. students and educational and administrative staff. International processes in the educational area more and more prevent teams from meeting face to face, and consequently they meet virtually by using distributed information systems. Therefore, such management systems should not only be operable in a local environment, but even more important they must be designed to support distributed but team-oriented work within and between different teams and groups of higher education institutes.

3 Management of higher education processes

In this project the authors suggest that the conceptual and technical means exist, which will enable faculties to implement effective educational quality management systems addressing all the above criteria: The systems approach to education provides a sound framework for implementing quality management, for achieving curriculum integration and assisting architectures for decision making in educational processes. The technology to embed this team oriented systems approach into the normal day-to-day work patterns in a way which will cut overall administrative demands on staff will be provided by the underlying Groupware paradigm.

The joint research project between the Department of Civil Engineering at the University of New South Wales, Australia, and the Department of Business Computing and Information Management at the University of Paderborn, Germany, combines both: A prototype information management system for team oriented lecture administration, curriculum documents, courseware, distance learning, and student course work as well as the back-office testbed environment for the distributed management and operational processes of the department teams driving the teaching and learning processes on the students' side. This integrated architecture of the respective Groupware-based applications is a fully interactive, multi-platform, client-server framework, with full security and audit features. It provides templates (structured input forms with context sensitive guidance) where relevant data is linked and common data items only need to be entered once.

At the University of New South Wales a prototype application environment, implemented with Groupware software, provides integrated quality management of faculty planning and administration, curriculum documents, courseware, and student course work and 'help desk'. The Prototype modules currently implemented include: corporate planning, academic committee management and action item tracking, curriculum and courseware management, student assignment/assessment management and help desk. The back-office approach accomplished by the University of Paderborn is both, a research framework as well as an operational system which covers lecture, curriculum and student management, reporting and publication management, as well as project administration and highly developed and refined correspondence and workflow management applications. The concept in question presents an architecture, which, on the one hand, assists office work with flexibility and responsibility of the team member and on the other hand, provides the necessary structure and conformity for activities in teams. To achieve this combination of structure and flexibility the presented framework consists of two basic components: A flexible correspondence and workflow management environment. The corresponding structural part of this architecture is given by a system repository, which serves as the base for all database applications incorporated in the system.

4 Future development and research plans

The underlying Groupware-platform of both sketched prototype and application environments already ensures a maximum integration of both concepts. It provides integrated quality management of faculty planning and administration, curriculum development, courseware development, student course work, researching, reporting, regulations and rules, as well as time management.

Nevertheless, a further development of the research framework and its parallel implementation and testing in diverse institutes and testing fields would be helpful. The goal would be to develop the approach to operational status for implementation in higher education and training institutes such as universities, technical and further education or private sector training providers, in research and development divisions of organizations, government, or businesses and other functional administration and training departments.

A second aspect, which is already part of this joint project, is further integration with already existing Groupware-based workflow management environments and concepts. Unstructured and structured information processes represent day to day work in application environments like those mentioned above.

While some workflow thoughts are already build-in concepts of the sketched back-office framework², others still have to be discussed and conceptualized. Emphasis should be on workflow support of distributed teams, whose members might operate in world-wide education and training processes.

Third, a further development and implementation of the prototype environment for use by other institutions and probably in other fields requires a profound examination of today's paper based processes of creating, copying and distributing information. Analyzing and inspecting traditional office procedures would allow to understand cooperative office processes with their distinct particularities and to transfer these findings into the proposed back-office architectures.

Another step to be undergone would be a validation of the pedagogical integrity of the system and an implementation in several different environments to identify problems arising from different mental models, education cultures and terminology etc. Research into the validity of current education paradigms in the information world opened up by the World Wide Web and research into the potential uses of the knowledge integrating capabilities of new technologies for combining the WWW with Groupware technologies is yet another facet to be considered.

5 Presenting and exhibiting the project

Presentation and demonstration would introduce the idea and concept of a distributed and integrated workflow enabled back-office architecture for general management of administrative team-based processes. In this particular project the higher education environment serves as an excellent example of how processes for teaching, learning, research and development or general know-how management can be assisted by integrated information technology. A presentation would contain both: Introduction and discussion of theoretical concepts and architectures, as well as prototype and system demonstrations for clarifying usability and requirements of the presented framework.

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² cp. for example chapter 3 in [Nastansky/Ott 1996]

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