Institution: London South Bank University

Unit of Assessment: Business and Management

Title of case study: Implementation of a new Organisational Knowledge Management and e-Student System for use by Macedonia Higher Education.

1. Summary of the impact (indicative maximum 100 words)

This case study demonstrates how the application of GRBOM has been used to deliver a national e-student system. Key impacts include:

- Providing an e-student CRM system accommodating 80% of the student population in Macedonia;
- Savings of 237,014 student days with associated direct cost savings of 2.2million euros;
- Administrative and academic savings of 1,058 days and savings of 43,660 euros;
- Providing students with greater choice in the selection of their degree subject and modules;
- Providing the first electronic communication infrastructure integrating students, academics and their universities;
- Providing architecture and methodologies for CRM systems and an e-platform for adoption by Macedonia's Government in other sectors.

2. Underpinning research (indicative maximum 500 words)

This impact case study is underpinned by research carried out at London South Bank University during 1996-2003 by Dilip Patel (Principal Lecturer) and Shushma Patel (Senior Lecturer). The former was recognised as one of the leading 50 Who's Who in Object Technology at the time of the research [1].

To enable organisations to be dynamic and meet the changing needs of their stakeholders, a robust information systems strategy that is flexible and maps different business needs is required. Business functions, processes, data and systems must be accessible, integrated and supported by well-designed information infrastructure. The Generic Reusable Business Object Model (GRBOM) [2] developed at LSBU, enabled large, complex systems to evolve to become open and enterprise centric, and drive forward to meet the needs of all stakeholders.

The GRBOM enabled different organisations to develop a core business model that supports different business functions in various change dimensions (service users, systems, market and service delivery, strategy, user requirements, policies and procedures and legislative and regulatory requirements). The research highlighted that in addition to reusable object frameworks, the cultural (soft) aspects of the organisation needed to be understood. Research at the university [3] highlighted the friction between developers and end-users. A dynamic business object architecture (DBOA) was developed that provided a conceptual understanding of the business and helped to transform the fuzzy (soft) and hard to follow business abstractions to a more structured and easier to understand road map. The road map supports the integration of business functions (user requirements, policies and procedures, and legislative and regulatory requirements) with the operational processes and people.

The development of information systems that support knowledge processing in 'learning organisations' was supported by the development of the EMPOWER framework at LSBU [4]. To be usable by organisations, the GRBOM and EMPOWER frameworks supported the convergence of computing and communications technologies and a managerial focus on the process that leads to effective knowledge processing that captures both the hard and soft aspects of an environment within the context of organisational culture.

The genericity and change dimensions and core business model helped to understand the organisation and the problem situation, and identify a coherent strategy for implementing information systems projects. The research demonstrated how the reuse, pattern and business object modelling dimensions of the framework provided appropriate tools for the initiation and development of systems [5]. To manage change, LSBU's research identified factors for the

successful implementation and adoption of strategic information systems and the necessity for a cultural readiness for change, by exploring the micro-level factors (end users), which facilitate sustainable change outcomes [6].

The research provided insights into how change management can be supported by understanding the knowledge processes, the readiness for change micro-foundation factors and soft dynamics that exist in teams within organisations. It led on to:

- The development of an enterprise system Generic Reusable Business Object Model.
- A dynamic business object architecture that enabled the business processes and work flows to be mapped and helped integrate different business functions.

3. References to the research (indicative maximum of six references)

1. Hanley, D and Schleifer**,** P (1998). Who's Who in Object Technology. Zamir, Saba (Editor). In *Handbook of Object Technology*. CRC Press LLC

2. Choudhury I, Sun Y and Patel D (1997). Generic Reusable Business Object Modelling – A Framework and its Application in British Telecommunications plc. Orlowska, Maria E. and Zicari, Roberto (Editors). *Proceedings of the 4th International Conference on Object Oriented Information Systems (OOIS'97)*. Springer-Verlag, London

3. Hung K, Sun Y and Rose T (1997). A Dynamic Business Object Architecture for an Insurance Industrial Project. Orlowska, Maria E. and Zicari, Roberto (Editors). *Proceedings of the 4th International Conference on Object Oriented Information Systems (OOIS'97)*. Springer-Verlag, London

4. Phillips N and Patel D (1998). EMPOWER: An Object-Oriented Business Information Systems Framework for Learning Organisations. *Proceedings of the Object Oriented Programming Systems, Languages, and, Applications (OOPSLA'96, 97 & 98). Workshop on "Business object design and implementation II"*. Patel D, Sutherland J and Miller J (Editors). (1998), Springer-Verlag, London

5. Patel D and Patel S (2003). The Cognitive Process of Problem Solving: A Business Perspective. *International Journal of Brain and Mind*, 4(2), pp 283-295.

6. Patel D, Samara K and Patel S (2012). The Role of Readiness-for Change in Managing Knowledge Sharing Initiatives: A Case Study Grounded in Micro-Foundations. Pingle, Sameer and Chugan, Pawan (Editors). Enhancing Enterprise Competiveness through Human Capital and Operations Management. Excel Publishers.

4. Details of the impact (indicative maximum 750 words)

The Information Systems and Management Group have been collaborating internationally since 1998. Under the EU's Tempus programme, projects valued at €1.8million have been awarded to a consortium led by the Group. Since 2008, the Group has worked with 9 international institutions on Tempus and other knowledge exchange projects. In 2010, the Group was asked by the consortium to lead a new Tempus project entitled 'Innovation and Knowledge Management towards e-Student Information System' (iKnow), funded under a 2-year Tempus IV award (€560,000) which started in October 2010 [1].

The iKnow project drew substantially on the research carried out by Patel and colleagues on the GRBOM. It resulted in and implemented the first electronic student record and management system for 8 out of 10 (public and private) HEIs in the Republic of Macedonia, covering a student cohort of 80,000 out of a total population of 100,000.

Key deliverables from the project were (i) the production of a student/electronic HEI system software platform, (ii) its testing and circulation, (iii) dissemination via web promotion (social networks), brochures, workshops, 100+ meetings, including steering, management, project

management and development meetings, (iv) demonstrations through more than 100 activities (identified in the final Tempus report) [2]. The Evaluation Report from TEMPUS congratulated the consortium "*on the high standards reached in the activities*", and on "*the sustainability of the system"* and that *"despite the initial resistance to change at the beginning, staff at the universities have accepted the system and even asked for new functionalities*" [3].

Given the collaborative nature of the Tempus IV project and the various stakeholders and beneficiaries involved, LSBU commissioned an Independent Consultancy to visit Macedonia to ascertain the scope and reach of iKnow impact over the period 2011 to 31 July 2013. The consultant interviewed a representative from the Ministry of Education, the Rector, the Vice-Rector, the Head of Computing, the Tempus lead from the University of Skopje, and the Dean of Faculty at the South East European University [4].

The consultant confirmed that the iKnow project had successfully delivered a comprehensive range of outputs and outcomes. This included the introduction of new Government legislation to enable electronic record keeping of personal details, and specifically, in the case of iKnow, to be enacted and deployed across Macedonia's education system.

By 31 July 2013, eight of the Macedonian universities had completed a full year using the iKnow system with the largest HEI (University of Skopje) having used the system for two years. Prior to the introduction of the iKnow system, students needed to collect and provide paper based records and physically visit the University for an average of two days, to enrol and register for courses in their first year of study (average undergraduate course in Macedonia lasts 3.5 years). Returning students go through the same procedure twice a year, taking approximately 1 day/annum in total. To accommodate the registration and enrolment processes a further 1058 days (558 administration days and 500 academic days) of University time is required.

iKnow-Related Time and Associated Cost Savings:

	Student transactions	Total days	Cost per day (Euros)*	Total Direct Cost (Euros)
New Student enrolments	30,014	60,028	25	1.5million
Semester enrolments	176,986	176,986	4	707,944
University administration		558	20	11,160
University Academic		500	65	32,500

*costs provided by University of Skopje

The consultant's impact statement concluded that the savings identified within the REF impact period were 237,014 student days with associated cost savings of 2.2 million Euros. With additional time savings and costs to the universities of 1,058 days and 43,660 Euros respectively [5].

In terms of significance, the iKnow system has been adopted extensively within the 8 universities, delivering the following key benefits:

- For the first time, iKnow allows students with a greater choice of degrees and degree modules;
- Provides a more efficient and flexible real time resource for planning and scheduling of staff and resources, providing significant efficiency gains;
- Provides a real time fully integrated financial recording and payment system to support the management and deployment of resources;
- Provides dynamic student attendance records, registration fees, transcripts with European Credit Transfer (ECT) based on the Bologna process and assessment registration;

- Manages debt for fees and has resulted in the decrease in bad debt from over 20% to less than 1%;
- Provides IT and the communication architecture and processes, for the first time, allowing direct electronic communication with students, parents and other stakeholders (e.g. via email, Facebook and Twitter);
- Provides and delivers critical HEI management information, on staff performance allowing for more effective reward and promotion.

The Rector of the University of Skopje commented "*all 23 faculties are now using the system with the vast majority intending to further develop the system to provide additional benefits*" [4].

Further, the Dean of Computing commented "*Professors have embraced email and social media facilitated by the iKnow system to provide efficient communication with individual students and classes*" [4].

The Macedonian Ministry of Education representative confirmed to the consultant, that the iKnow system represents, and has made, a significant breakthrough for education in Macedonia. He confirmed that it is the very first comprehensive and sophisticated electronic student management and enrolment system ever adopted in Macedonia that has led to changes in legislation to recognise electronic records as official documents. Furthermore, the Macedonian government is well aware of the impact derived from: (i) delivering sound data sets and real time information, and (ii) informing the Government's understanding of higher education and planning. The Ministry of Education, now promptly receives information on the student population and its performance and this is used to support government understanding and inform policy [6]. The Government representative also confirmed that the Government is considering adopting iKnow for use throughout the school system [4].

5. Sources to corroborate the impact (indicative maximum of 10 references)

[1] http://iknow.ii.edu.mk

[2] TEMPUS IV iKnow Final Report (Project 511342) – available on request from LSBU.

[3] TEMPUS IV iKnow Final Evaluation Report (Project 511342) -– available on request from LSBU.

[4] Independent Consultant's Visit Report (2013). Contact: Managing Director, The Innovation Partnership.

[5] The Innovation Partnership Ltd iKnow Impact Statement (2013). Contact: Managing Director, The Innovation Partnership.

[6] Statement: from Ministry of Education, Republic of Macedonia.