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A Multi-Discipline Approach Linking Related Disciplines and Stakeholder Communities to Develop eBusiness Expertise for the New Technological Environment

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Although teaching institutions are typically well behind business in adopting new technologies, an attempt is being made at the Auckland University of Technology to introduce a new field of study and a new technological environment for its delivery - a comprehensive programme in eBusiness studies.

The university works very closely with its stakeholder communities particularly in identifying new programme needs to ensure a balance is achieved between technical skill and business focus. As a result of this collaboration an operational model comprising a total of eight modules was constructed with the aim of integrating the proposed eBusiness qualifications within the structure of an existing Bachelor of Business degree.

This paper discusses the background and development of a module called "Electronic Transactions and Security" and the interrelationship between other modules within the eBusiness field of study. The module comprises transaction processing, transaction security and risk management and has evolved into a multi-discipline partnership between the Accounting and Finance and Information Technology business disciplines. New digital technologies - such as on-line collaboration and on-line resource sharing and exchange will be an integral part of the teaching and learning process.

Introduction

There is a difference between the educational needs of an experienced information technology practitioner venturing into eBusiness, and the educational needs of a student completing their first degree. In between these two extremities it is even more difficult to define the educational needs of a marketer, manager or an accountant who wishes to join an eBusiness development team. The information technology practitioner will have sufficient knowledge of the industry in general and of the mechanisms involved in setting up information technology infrastructure of a business enterprise. The student or the novice in information technology will need a good introduction to the foundations of networking and internetworking. All these require a flexible approach to teaching eBusiness at undergraduate level. Even more so at a technical university such as the Auckland University of Technology (AUT) which is in constant and active competition with other education providers.

Although teaching institutions are typically well behind businesses in adopting new technologies (Leidner & Jarvenpaa, 1995), an attempt is being made at the AUT to introduce a new field of study (and a new technological environment for its delivery) - a comprehensive programme in eBusiness studies. The teaching model evolved as a

multi-disciplinary one and a framework for the field of study comprising six modules is currently being developed. All modules are taught within one academic semester. We proceed to discuss the background and the development of a module we finally called "Electronic Transactions and Security" (eTransactions) and its integration within the set of other modules designed to support the proposed eBusiness qualifications, and conclude with a brief discussion on future development.

Background

The demand for a programme development in eBusiness initially came from the students. With the current job-market favouring people with eBusiness knowledge students demanded papers on eBusiness to incorporate into their existing course of study. AUT identified the possible need for a qualification in eBusiness and went to industry to gauge their support. AUT has had a history of working closely with industry particularly in identifying new programme needs and their subsequent development. Industry was very supportive of AUT's proposed eBusiness programme development within the existing Bachelor of Business degree (BBus). Industry has "hundreds and hundreds of jobs it cannot fill because of a skills shortage. Skills most in demand are Internet and e-commerce" (Wells, 2000).

The BBus seeks to develop graduates who will have a broad understanding of business and the relationship between different disciplines, and also to develop capabilities in critical thinking, problem solving, teamwork and communication, technical competence in business processes, and information technology and research skills. These capabilities are reflected in the BBus Graduate profile. Currently 1400 students are enrolled within the BBus programme (Gerbic & McConchie, 1998). Some of the special features of the BBus include small classes of approximately thirty students, a professional ethics module, inter-disciplinary studies, and using real-world scenarios within case studies and co-operative education.

In developing a new programme, past experience has shown that it can take some time for growth within the programme. For this reason it was decided to develop six stage one modules initially: eBusiness Information Technology Infrastructure (eTechnology), eBusiness Management (eManagement), Making the Web Work for Business (eDevelopment), Electronic Transactions and Security (eTransactions), eBusiness Law in the Global Market (eLaw) and eMarketing - with a further stage two modules being developed subsequently: Project Management (eProject) and Economic Organisation (eEconomics). The rest of this paper describes the development process gone through for the eTransactions module and the interrelationships within the proposed model for teaching eBusiness.

E-commerce industry, e-commerce enterprises and eTransactions

The first development stage included an investigative process aimed at achieving a good understanding of the expectations of the stakeholder communities - the e-commerce industry and the educational sector. After studying the literature and some of the existing programmes and courses in e-commerce and e-business (see also Table 1), we were able to define the eTransactions module as comprising Web-oriented billing, payment and security. These three content areas are of special interest to e-commerce enterprises as well as to e-commerce products and services providers. In Tettech & Burn (2000), for example, we find a mapping of on-line transactions to key infrastructure components which joins together secure online ordering, authentication,

invoicing and billing in the context of small and medium sized-eBusinesses, which is relevant to the New Zealand reality. Storey et al (2000) place the content areas of billing, payment and security into three of the ten classes used to model the e-commerce industry. While pointing out that e-commerce billing and payment differ from traditional methods and includes banks and other types of information providers (and new intermediaries), Storey et al note that the security class is extremely large and includes all computer assets protection, privacy and standards issues. In other words, while billing and payment seem to be "natural" components of the planned module, the scope covered by "security" would need careful consideration and it would be impractical to exclude security topics from other modules of the programme (e.g. eTechnology). These preliminary conclusions were later validated in the process of concrete module content development but first we needed to construct a general framework for the first stage of the new qualifications programme. With the content and structure of the eTransactions module now broadly defined, we asked ourselves - what is the position of a module on transactions and security in relation to the other modules of the set? We next discuss the integration model adopted.

Integration model

The relationship between the six stage one modules is shown in Figure 1. The proposed flat structure allows for more flexibility both in study planning and in content delivery. A real-world focus will be achieved by using relevant assessment, and later on through the Co-operative Education module - a strategy of applied learning in which advanced students leave the classroom and pursue learning activities in the business world (AUT, 1999).

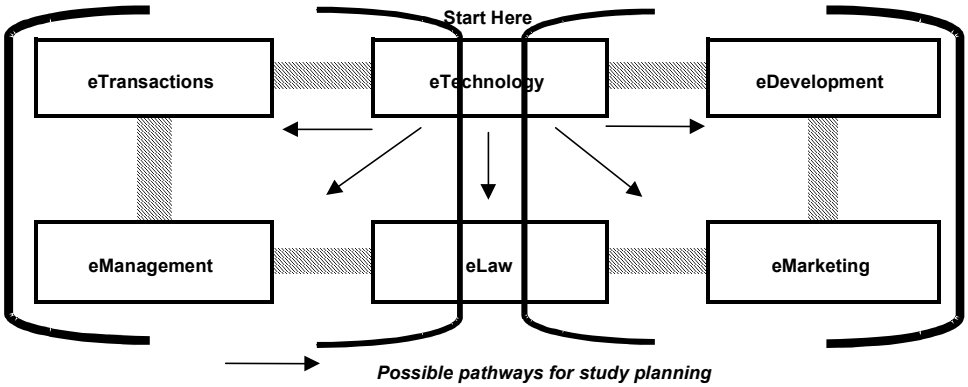

Figure 1

The integration basis for the eBusiness programme is the module called "eTechnology", which in fact has been offered for three consecutive years as a compulsory module for BBus students majoring in Information Technology. The structure of the module roughly follows the framework for understanding electronic commerce proposed by Shaw (1997), which in turn is based on the Open Systems Interconnection (OSI) layered model for network architectures. Students taking this module are exposed to a broad range of eBusiness topics and through projects and assignments achieve a good understanding of the current state of eBusiness worldwide (Adamson & Petrova, 1998; Petrova, 1999). Compared to the hierarchical framework for e-commerce suggested in (Zwass, 1998), "eTechnology" broadly matches the "infrastructure" meta-level. As Zwass points out, this meta-level comprises the first four layers of the framework. We see it as a good starting for studying eBusiness.

Figure 1 reveals two intertwined teaching areas of strong integration - one focused on information technology and management, with the other one encompassing information technology and marketing. The "eTransactions" module found its place within the area of technology and management, loosely linked to eLaw, and remotely linked to Web page design and eMarketing.

Development of the eTransactions module

An important part of developing a module is the research on what other institutions have done, with the hope of gaining some insight into what the structure and content of a new module should be. Nine universities were investigated on what they covered in eBusiness (Table 1). However, most of the courses appeared to be very computer orientated and not business focused as our proposed module is. The development team felt there was a need to balance technology with a more business-centred approach.

Table 1

University	Programme	Topics (courses) included
Albany, USA	Acc 680, Research Seminar in Accounting: Electronic Commerce	Communications Infrastructure, E Commerce Architecture, Authentication and security, Software infrastructure, Software development
Duquesne, USA	GRBUS, 670 eBusiness I	e-Business Strategy, e-Business Trends, e-Business Architecture, e-Business Design, Customer Relationship Management, e-Procurement
Illinois, USA	Electronic Commerce: Business Uses of the Internet, MIS 571	Virtual Organisation, Risk, Security and Privacy Concepts, WWW Server Set Up
Indiana, USA	L561, Information Industry: electronic commerce	Web-based e-Commerce Site Set-up, e-Commerce Marketplace
Louisville, USA	Electronic Commerce	Web Site Development, Electronic Commerce Strategy, Electronic Commerce Trends
McGill, Canada	Electronic Commerce 273-690 (MBA)	Five courses: 1. Business opportunities 2. Application development 3. Venture Management 4. Consumer Relationship 5. Public Policy (Economics)
North Carolina State, USA	Managing the Digital Enterprise	Digital design, Intelligent agents, Channel Conflict, Security and Encryption, Privacy Intellectual Property
Victoria, New Zealand	Postgraduate Diploma in Information Systems Management	Four core courses: 1. Emerging Information Technologies 2. Managing Information Technology Related Change 3. Strategic Information Management 4. Information Systems Management

University	Programme	Topics (courses) included
Waikato, New Zealand Bachelor of Electronic Commerce		Courses 1. The World of Electronic Commerce 2. Electronic Retailing 3. Electronic Banking and Finance

The next step was to look at one of the focal points - billing and payment are financial transactions, and thus a suitable definition of finance was required. There are two main definitions of finance. In the first one finance "is concerned with a company's investment and financing decisions" (Peirson & Bird, 1984). The type of finance decision referred to looks at the viability of various projects and whether those projects should be undertaken. This definition of finance would be covered adequately in the eStrategy module - an important part of strategic planning is determining whether a project has potential (Braddick, 1991). The second definition looks at the financing of the business in terms of the accounting equation: "Liabilities plus Equity equals Assets ie the business is funded by either Lenders or Shareholders and applied to buy assets" (Flett & Williams, 1998). This did not appear to offer any value to the eTransactions module - the topic could be covered in one lecture session rather than in an entire module. There was a need to broaden the term finance and to establish a solid relationship between "finance" and electronic business transactions. Payments are required to keep shareholders and lenders happy in the form of dividends and principal/interest payments. Payments canonly occur if customers 'transacted' on the eBusiness site (Kalakota & Whinston, 1996; Dhamijia, Heller & Hoffman, 1999). The adopted direction of the module necessitated a multi-discipline approach between two business disciplines.

Multi-disciplinary approach

As mentioned above, Zwass (1998) introduces a comprehensive hierarchical framework of E-commerce. Comparing each meta-level of the hierarchical framework to the set of the six modules under development we found out that some parts were missing, and that they were related to the transactional side: remote consumer services (banking), e-money, smart card systems, digital authentication services and secure messaging. When defining the content of the module - now on eBusiness transactions we realised that transactions without considering the security aspects would be meaningless. There could be a wonderful eBusiness site but if customers could not transact in a secure environment the business would cease (Greenstein & Feinman, 2000).

This lead to a multi-disciplinary partnership between the Accounting & Finance and the Information Technology business disciplines. There was a need to integrate these two disciplines with the aim to achieve a balance between technical skill and a business focus and to extend our scope beyond the transactions and to real-world business models. This determined the structure of the proposed module. It will have two key parts: the first one will cover types of electronic transactions (Schneider & Perry, 2000) and transaction processing and will be taught by the Accounting & Finance discipline. Transaction processing includes: taxation implications of eBusiness cease (Greenstein & Feinman, 2000), foreign exchange issues associated with the various types of transactions (Kalakota & Whinston, 1996) and an understanding of the electronic clearing and electronic banking systems (Greenstein & Feinman, 2000). The second part, taught by the Information Technology discipline, involves the security of transactions and risk management. With regards to business-to-consumer eBusiness, or

Web-enabled retail business transaction security is of considerable interest particularly when seen as a threat to both the server and the client (Rose, Khoo and Straub, 1999). Security issues encompass securing of transactions, establishing an identity and payment authentication and are linked not only to the underlying technology but also to the procedures and approaches in managing security and privacy (Adams & Sasse, 1999; Lau, Etzioni & Weld, 1999). The added component of risk management is an important concept in starting a new business, where the businesses' "total risk equals its total variability of returns" (Francis, 1986) or even "the perceived possibility of success or failure in a business" (New Zealand Bankers' Association, 1997).

Alongside with developing the module content, a suitable teaching and learning model was sought - one which allow teaching innovations and would serve to satisfy the growing demand for flexible and but academically sound content delivery.

New teaching environment

To ensure that transaction processing is more dynamically taught the teaching process will involve a mixture between teacher and student centered learning modes. As Zepke (1996) points out students learn from having an experience rather than watching. To support this premise the student centered part of transaction processing studies will involve students using self-study packages developed as distance and flexible learning self-contained units. These will contain a variety of readings, case studies and guides to referenced Internet sites as well as formative tests to assess students' understanding. The teacher centered part will be taught in a traditional lecture style but reliance on the new technological environment will ensure this will be a stimulating experience with the use of an on-line learning system (known as Websol, this AUT system comprises several types of discussion forums, a messaging tool, and a flexible library used by students to store and to access files). The trend to use computer assisted course delivery, distance-based learning approaches and collaborative learning influences current efforts to improve the quality and effectiveness of teaching (McInnis, 2000). It is also the basis for developing a fully-fledged on-line version of the module, which might be offered in the future to students unable to attend campus classrooms.

The proposed mixture of modes will enhance independent learning. As Vogel & Classen (2000) point out, in order to succeed this intended exploration in IT learning will need new programme design and new policies. The changed paradigm of teaching and learning will help students to develop skills in organization, collaboration and assessing relevant information - but will have managerial implications as well: the authors specifically recognize the importance of change management and human dynamics - such as tutor training and tutor skills development.

Conclusion

The eTransactions module will be taught with a multi-discipline approach that will integrate with the technology and management pathway through the Bachelor of Business "eBusiness" major. However, as there is no set example to follow and the module is still evolving there are issues that need to be looked at. First is the continual consultation with industry on the content of the module descriptors to ensure that the balance between technology and business is maintained. The next is the evolution of the appropriate learning environment including the mixture of on-line teaching, up-front teaching and possibly video conferencing, and the managerial implications involved in offering a rich mixture of content delivery modes. Finally - development

of appropriate assessment to ensure all capabilities detailed in the Graduate Profile are assessed with a strong focus on collaborative learning and teaching strategies.

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