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Developing a Flexible Delivery Program for
Post-Graduate Studies in Information Systems

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Abstract

Universities are facing increasing competition on a global scale as providers for postgraduate material develop resources for online consumption. Professionals in the field of Information Technology need to continue to maintain contact with their rapidly changing technological and organisational environments. How can universities seek to meet the challenges offered in the global market place and yet meet the local demand? This paper examines one solution to the problem – the offering of a master’s qualification for practicing professionals that is delivered in a variety of ways in order to meet the needs of the client. The paper describes some of the philosophies behind one stream of the degree and the means by which the curriculum has been developed. The final model proposed shows how universities maintain their relevance in an online world by capitalising on their established networks and focusing on job related skills that are refined through discourse with the universities research and consultancy staff.

Introduction

There is increased demand for high qualified staff in any of the diverse fields in information technology (computer science, information systems, multimedia and computer networks). Unfilled vacancies are high in USA, Canada, Australia and in the European Union. This level of vacancies has led the USA to recently considering relaxing its green card requirements for such professionals (IEEE Dec 97), and similar effects are being found in other countries (Roach Report 1995). At the same time, the employment of software engineers has moved to a project base (IEEE 1997, Source 1997) which places new demands of these people to maintain contact with the changing pace of the industry. These factors have led to an increased demand for professional qualifications in information technology and a means to continue to keep pace with this rapidly changing environment in both the technology base and in the means for its deployment.

Study to maintain professional competence must be flexible in terms of start and completion times in order to allow practicing professionals to fit the course into their demanding life. It should also be flexible in terms of the means by which the student gains access to learning experiences. A combination of readings, discussion groups and realistic and engaging practical problems seems to be necessary.

Providers have developed courses for this market place and have realised that these courses can mostly be offered through the web. This increases the potential market place and makes these courses appear quite cost-effective. Australian professionals are receiving advertisements from established institutions such as the Massachusetts Institute of Technology, The Georgia Institute of Technology and The Open University. In other words, Universities can now seek to service the international community gaining further prestige and income.

How can a local university compete in this global market place? What type of courses meet the increased demand, the need to be able to complement the professional’s experience and expectations and yet meet the high standards of professional excellence expected of a quality university? This paper reports on the development of a master’s degree targeted at practicing professionals. The course utilises a flexible delivery approach which includes the offering of material through the web and using the forms of synchronous and asynchronous communications available in that medium.

The Concept of a Professional Masters

There are many people in the computing industry without formal qualifications in the discipline and many others that are seeking to either upgrade their existing qualification or cross train into another emerging area. The Faculty of Information Technology at QUT has recognised this aspect and is in the process of developing a master’s course for them and rolling out this new product for July 1998. This product follows the standard Australian offering of 12 advanced units. These units are streamed thus allowing for specialisation. Currently offered streams include Data Security, Software Engineering, Enterprise Wide Systems and an Advanced Project. Students may exit after completing 4 streamed subjects thereby gaining a Graduate Certificate. Completion of two graduate certificates and the project earns the student a masters qualification.

The Concepts in Flexible Delivery

Ian Barnard (Executive Director of the Open Learning Institute of Charles Stuart University) has stated the following criteria apply when developing curricula for flexible delivery systems:

- design campus architectures to increase student learning areas that support collaborative work,
- de-emphasise lecture type instruction,
• increase student-student interaction,
• shift the role of the instructor to that of a learning facilitator,
• increase the quality of student interaction with peers and learning facilitators,
• move from the mastery of set material to application of material in realistic settings
• ensure that students have computers at home and at work, and
• put in place a comprehensive communication technology infrastructure.

We are in the process of embracing these principles in developing the stream for Enterprise Wide Systems. Notice that this approach sees web based instructional material as but one means of delivering content. The key steps are to increase the quality of dialog between learning facilitators and students through the use of a variety of media: intensive seminar work, synchronous discussion groups, asynchronous discussion groups and video conferencing.

The Philosophy for Design

The professional master's units differ from that offered in the other postgraduate courses in the faculty through the fact that the subjects and the project should be grounded in the student's workplace. The professional masters' award is designed to attract practitioners with at least four years relevant experience. They need not have a degree to join the program. The key differentiator for this program and our other graduate programs is the recognition of prior learning for entry and the focus on application of theory to practice. Each unit is directed at a real problem in a real organisation. We would like students to be able to bring a current dilemma to us, to identify relevant theory to assist in solving that dilemma, and then to apply the recommendations of theory to the problem at hand.

Students will be able to commence when they wish to, complete when they are ready, and interact with the learning material in a way that matches their learning style. We are developing a range of online material, directed readings, case studies, and video resources. We will support synchronous and asynchronous interaction with the students through using products that have the functionality of Lotus Learning Spaces. This environment will support real-time chat rooms, asynchronous project work and discussion groups and distribution of reading material.

We selected the theme of Enterprise Wide Systems because it is a major problem facing large enterprises (LEs). It is also a growing area of concern for small to medium enterprises (SMEs). Indeed there many research questions unanswered regarding effective implementation of these systems as well as their effects on the IT industry activity, deployment and training. We have been working closely with SAP, the most successful software house with an enterprise wide system solution and we are one of the foundation members of the Australian distributed SAP Training College SAPIENT COLLEGE.

There is great demand for skills in the selection, implementation, management, training and development with this product. Yet it is more than a product. As a complex computing environment, the students get unsurpassed exposure to key computer science, data communications and information systems concepts. Suddenly all the dry theory is real. What is meant by client-server? How does one establish one? What does the processes of data base recovery and backup mean in this environment. What is the order-entry process and how does it interface with production and sales and distribution. This environment provides the undergraduate with a very rich learning environment. It provides the professional post-graduate with a very lucrative means of capitalising on their diverse skills and education in this over-demand and under-supplied market place. But for precisely that latter reason, this content domain is perfect for offering learning in a flexible way. Busy professionals do not need a full masters degree in order to move into that arena, and nor can they afford the time. They must obtain retraining and upgrade their skills in the most efficient way, but ensure that they can add value to their already rich experience set. This observation set the scope and design strategies for the stream in enterprise wide systems.

The Design

We offer five units in the stream on Enterprise Wide Systems: ABAP/4 programming, Issues and Solutions for Enterprise Wide Systems Implementation and Management, Issues in Information Technology Management, Knowledge Management and Enterprise Wide Systems and Developing IT Consultancy Skills. A student need only complete four of the five to qualify for the graduate certificate.

Each unit seeks to offer a range of learning experiences as mentioned. Each unit seeks to introduce the relevant theory using the web (or CD-ROM). This theory is presented as a directed set of readings with explanatory notes. Discussion groups are formed to elaborate and gain understanding through dialog with peers and learning facilitators. Un-moderated and moderated discussion groups are formed. Online chat is to be used to ensure that mastery of content is gained. The student is then to apply the theory to a practical problem at work. For example, this may take the form of a critique of the change management techniques used in an actual systems implementation.

The unit on ABAP4 programming will give the student an opportunity to enhance the system from real specifications. The unit on Issues and Solutions for Enterprise Wide Systems Implementation and Management gets the student to conduct a case study of an actual situation. The unit on Developing IT Consultancy Skills gives the student practical skills in interpersonal skills, conflict resolution, negotiations, as well as opportunity to learn from practising consultants. They will use these skills when conducting their case study, which is seen as the capstone subject for the stream.

Detailed Design

ABAP/4 is the proprietary 4GL that is shipped with R/3. The ABAP/4 Development Workbench can be used for modifying or individually enhancing standard R/3 applications. However, its primary use is in developing individual solutions separate from SAP standard software with an integrated, professional toolkit. This unit provides an introduction to the use of the ABAP/4
Workbench and toolkit in developing client/server business applications. Students learn how to develop dialog sessions and reports. A key problem in this unit is providing online access to remote students. We are currently reviewing our system architecture to enable this level of connectivity.

Issues in Enterprise Wide Implementation and Management uses graduate 'consulting' teams of three to pursue practical and applied research projects in relation to Enterprise Application Software. A series of 'real-world' projects are designed around the capabilities of students enrolled and thus students with graduate studies in other than IT (e.g. Business) are encouraged to apply. Sample project topics in 1997 were: (a) R/3 Implementation at Queensland Transport: A Case Study, (b) Business Process Reengineering through R/3, (c) Accelerated SAP (ASAP): a Rapid Implementation Methodology, (d) Market Potential for R/3 Related Education & Training, (e) Data Warehousing with R/3, (f) Post-implementation Review of R/3. Several organisations using or implementing R/3, sponsored the projects. Practitioner 'guests' attended regular 'project clinics'. Guests included representatives of Queensland Treasury (FISB), SAP Australia, Price Waterhouse, BHP IT, Coopers & Lybrand and various Queensland Government departments. All guests were intimately involved with R/3 in practice.

Students are introduced to SAP AG's R/3 client/server product in the unit Issues in Information Technology Management. They have accounts on the School of Information Systems' SAP R/3 server which includes a full implementation of R/3 and the Queensland Government departments. Key topics for discussion include issues in systems selection, outsourcing, business process reengineering and implementation issues.

This brief discussion shows the intent of the units. These five subjects are currently under development. Course offerings will vary from local students able to attend residential weekend activities, to those units that are available nationally and regionally. The latter subjects tend to be more content mastery than application of theory to practice. The latter approach requires a rich repository of relevant cases or excellent contacts with local developers and consultants.

Development

The process of design of these units commenced with determining the market needs and how these needs might best meet the University's strategic plan and conform to its rich history of matching theory to practice. From there, a flexible delivery plan was developed. Each unit was analysed with respect to the following dimensions: Background and Rationale, Key Ideas in how to offer flexibly, Relevant Student Characteristics, Intended Learning Outcomes, Content, Teaching and Learning Strategies, Issues and Validation Strategy. The output of this flexible delivery plan then formed the basis for the actual course documentation, the development of the learning resources and the provision of appropriate technology.

Implementation and the Future

We are developing a stream of theory subjects that will use SAP R/3 as the exemplar system. These subjects include Database Technology, Client Server Systems, Object Oriented Systems and a Technology Project. In these subjects, much of the content will be delivered via the web, with enriching tutorial support delivered via synchronous and asynchronous services.

This courseware development is very time-consuming, with up to 50 hours per contact hour of material. Learning designers are working in conjunction with technical specialists and curriculum masters in order to achieve the desired outcome. The current projects are seen as a prototype as we know that significant ongoing development will be required in order for the material to be made available to the widest possible audience.

Conclusion

SAP R/3 is a wonderful vehicle for demonstrating the application of theory to practice. We emphasise educating the student in the theory rather than training the student in the package. We believe that this will in fact make the student's skills more relevant in a fast changing work environment. The skills that we give the student are generic: what is an enterprise wide system, how do you select one, how do you implement one, how do you manage one, how do you undertake effective planning of IT assets?

We also seek to give life long skills of planning, conducting research, report writing and report presentation. We believe that successful graduates of this program will be an asset to any organisation implementing or using SAP or any consultancy house specialising in supporting enterprise wide systems implementation.

We are meeting the needs of the practicing professional in offering the course so that they can commence when they are ready, study in the mode that they prefer and learn to apply the relevant theory to practice. We are showing how Universities can capitalise on their specialisations, local contacts, research and consultancy programs and thereby maintain a credible position in the global education market. Case study work requires facilitation in both contacts and content. This level of work cannot be readily taught through the web. Its advantage is also that sustained relations with the private sector for real problems is maintained. A rich base of research topics and collaborators is forged.

References

References are available upon request from the first author (g.stewart@qut.edu.au).