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The Design of an On-Line Masters in Technology Management: A Collaborative Effort

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ABSTRACT
The paper describes the views of the principals involved in the initial stages of planning and development of an MSc in Technology Management programme in Ireland prior to its commencement, and subsequently elicits the views of these principals after the programme’s implementation. The Atlantic University Alliance (AUA), a collaboration of three Irish universities, was the vehicle for developing and managing this programme. In the paper we discuss issues relating to the planning and development from initiation through to early implementation of the programme within a collaborative intra-university environment.

Keywords

INTRODUCTION
Educational delivery, diversified over the last two decades as distance education by correspondence or via the World Wide Web, has allowed Universities and other educational institutions to reach out to persons for whom full-time, face-to-face contact is difficult. Traditionally, distance education has provided instructional access to remote students, where conventional educational delivery is either impractical or unavailable. Educational institutions are challenged to engage students in situ, possibly in the workplace, and interact with them in ways that take best advantage of their available time, energies and interests (Carr-Chellman and Duchastel, 2000). For firms in particular, managerial and employee education should be seen as a productive contribution to organisational effectiveness and thus a continuous ongoing responsibility to develop and improve skills (Kovach, 2000).

Whereas today institutions have evolved Web-based distance learning strategies, in the early days of the Web it was pioneering individuals who first began to design alternative ways for delivering course material, giving and receiving student assignments, and collating student feedback. Now software applications, whether adapted or specifically designed for education delivery and management, enable a more open communication medium with students outside of normal channels. Such initiatives are taking place departmentally, at faculty-level and even college-wide. However, this accelerated growth remains largely un-coordinated, inconsistent, and lacks well-planned frameworks for design and implementation. The careful design of e-learning courses that best utilize available technologies is critical in achieving success. It is also important that course content is not simply the conveyance of material developed for traditional distance education. Indeed this could dilute the original instruction and possibly render it ineffective (Carr-Chellman and Duchastel, 2000).

This paper examines how an MSc e-learning initiative has been planned and developed within a collaborative intra-university environment. In particular, it explores the course development process from initiation through to early implementation.

UNIVERSITY COLLABORATION
Three Irish universities, the National University of Ireland at Galway, the University of Limerick, and University College Cork came together to create the Atlantic University Alliance (AUA) as an independent entity. The alliance’s purpose is to harness the individual expertise and resources of each university and make these available to indigenous small to medium sized enterprises (SMEs) through educational programmes. The principals of the AUA Board come from its constituent universities. The first in a series of action plans has been the alliance’s development of an MSc in Technology Management, offered through distance education via e-learning. This programme was launched in January 2003.
PROGRAMME STRUCTURE
The online MSc programme is Web-based and composed of separate modules. The programme’s aims are to:

- deliver the best international practice in technology and innovation management
- stimulate competitive advantage amongst participating companies by developing student knowledge and understanding of technology management
- build the management and leadership capabilities of students
- facilitate organizational change and sustainable improvements within the companies for whom they work

Delivered on a part-time basis over two years, the programme includes online tuition, online support, organised study, periodic daylong tutorials and formal examinations. Tuition and support are mainly asynchronous. Support tools include a Web-based technological infrastructure, online enrolment, tutoring systems, communication systems, assessment processes, and administration procedures.

MANAGEMENT EDUCATION AND E-LEARNING
Increasingly, the demands of corporate life for managers, and other employees of SMEs, mean time and physical distance are major hindrances for those keen to further develop their skill sets. The traditional classroom-based university programme is, for some, a receding option. E-learning enables universities to extend beyond traditional classroom boundaries, proffering courses to managers with the potential for them to be more productive within their current posts and more adaptable to the changing conditions of corporate life. E-learning courses presented via distance education can offer a realistic alternative, and an opportunity to enhance competencies and skills (Dufner, Kwon, and Hadidi, 1999).

Effective e-learning delivery is fundamentally dependent upon access to appropriate technologies, together with an adequate level of end user computing competency amongst students. E-learning courses are often delivered, assessed and controlled using existing Web-based technologies and underlying information systems. However, some authors believe that while the Web and the Internet are relatively new technologies from an educational delivery perspective, the problems of providing instruction with these technologies are not entirely new, nor can it be assumed that they are pedagogically innovative (Barry, 2000; Jung, 2001; Martin, 1999).

The general advantages of e-learning as an educational delivery platform are its flexibility, convenience and accessibility to users, potential access to a worldwide audience, its repeatability and presumed cost-effectiveness. From the student’s viewpoint many of the advantages of e-learning relate to instructional convenience, for example, twenty-four hour access, cross-platform Web browser compatibility, reduced travel costs, and time savings.

However, some authors believe that there are inherent disadvantages with e-learning (Bullen, 2001; Martin, 1999). There is some unease about the growing focus on training rather than education. Of further concern is the lack of human interaction associated with e-learning, a factor that plays a major role in more traditional course delivery methods. There is evidence that distance education is not the preferred option for students, particularly undergraduates (Dick, Case, and Maxie Burns, 2002). For those involved in course development and delivery, rather than assuming increased productivity using an e-learning format, the reverse may in fact be the case when the increased planning and preparation time for designers and tutors, in addition to changes in teaching styles, are considered. Furthermore, the idea that new technologies naturally lead to increased benefits has long since been debunked (Earl, 1992).

E-LEARNING PROVISION
Providers of e-learning programmes include specialised institutions that have long-term experience offering distance education through various methods of correspondence, open and distance learning institutions that deliver instruction to students on a large scale, and dual-mode universities that combine significant distance education concepts with more traditional core academic programmes.

Students enrolled in e-learning programmes are normally older than the average age of residential university students. This is particularly true for courses that target adult company managers and other employees eager to enter management positions. When designing an e-learning system there are a number of instructional aspects necessary for effective adult learning (Little, 2001). These include positive engagement with the learner, explicit identification of learning objectives, underpinning prior knowledge through stimulation of recall, effective presentation of content, ensuring availability of learner guidance and support, appropriate provision of feedback, user performance assessment and consideration of knowledge in context.
From the programme provider’s perspective some of the most difficult barriers to the effective implementation of e-learning initiatives are increased time commitment, staff compensation and incentives, shortages in support staff, shared vision for distance education within organisations, and money to implement programs (Berge and Muilenburg, 2000). Also of vital importance is the overall institutional support for the development and implementation of distance education (Milheim, 2001).

There are also issues of institutional credibility in universities committing to the same or better service levels using Web-based technologies compared to traditional face-to-face taught programmes. Arguments that material should be of “…interest to learners to ensure that they continue to want to learn” (McLellan and Stansfield, 2003, p. 726) call into question how course content is defined, a criticism that may be levelled at some professional distance education business programmes that are designed around the exigencies of students as paymasters rather than by academics.

**DESIGNING E-LEARNING COURSES**

It has been suggested that distance learning via the Internet compels instructors of online courses to become designers as well as teachers (Blythe, 2001). Instructors involved in e-learning who once simply walked into a classroom to teach must now construct a virtual classroom before engaging in distance learning. This has led some instructors to consider themselves as builders first and teachers second (Gillette, 1999). Such a view would be an anathema to other teachers who would view technology, regardless of its sophistication, as just another teaching aid. This phenomenon of teachers as developers largely applies to those who have a close and often direct, campus-based relationship with their students. Designing such 'small’ systems means that it is possible to use only partially structured approaches or perhaps none at all.

Widely used information systems design approaches, such as the lifecycle model, would appear inappropriate for e-learning systems. It has been posited that many of the problems in implementing such systems results from a mismatch between organisational needs and development approaches, and that the continuously changing nature of Web-based information systems require emergent and agile development methods (Jones, Lynch, and Jamieson, 2003). Some suggest that systems may become unsatisfactory and frustrating to use unless specific educational and e-learning oriented models are used in design to avoid potential complications (Cloete, 2001; Govindasamy, 2001). Certainly, since online educational courses are student-centric, it follows that user-centred design and feedback should be essential features of the development approach. However, a user-centred approach does not easily translate to the design and development of a new Web-based course because it is difficult to know who the users will be in advance of course delivery. While the use of Web technologies and the relative novelty of e-learning applications require something other than the traditional life-cycle approach, any new method still needs to draw on some of the immutable aspects of information systems design - project management, user requirements modelling techniques and feasibility assessment.

**RESEARCH METHOD**

This paper is part of a programme of research into a single case study. The environment for the research, the AUA and the actors involved, is distinctly arranged so that temporal aspects of the programme and organisation issues such as change, growth and development can be studied. This longitudinal research method affords the researchers the opportunity to study processes over time rather than discrete factors or precursors and consequences of change. It is expected that this approach will yield richer and more elaborate findings than a typical snapshot of organisational issues. It is intended that when the programme reaches the end of its first full cycle, the views and experiences of programme managers, teachers and students will be sought. The researchers are conscious that new patterns of understanding may emerge that require previous interpretations to be re-examined.

The research strategy for this paper was to separate the study into two parts – the first before the launch of the online distance education programme, and the second shortly afterwards. The research aim was to study issues relevant to the preparation for the programme and early experiences with its design, delivery method and implementation. Where relevant, the expectations of participants in the study are contrasted with outcomes after the launch of the programme and also with experiences elsewhere.

A case study research method was chosen, primarily using questionnaires as the research instrument with follow-up phone, e-mail and face-to-face contact for questionnaire response elucidation and clarification. The questionnaire primarily contained closed questions appended with open-ended extensions to elicit more discursive responses. For the ‘pre-launch’ study three principals from the Programme Board (two Academic Directors and the Board Chairperson) completed questionnaires. After the MSc programme’s implementation the same three participants from the first part of the study completed a ‘post-launch’ questionnaire.
FINDINGS - BEFORE THE LAUNCH

The Need for an MSc and Faculty Expectations

The pre-launch study revealed a strong level of agreement that an MSc in Technology Management programme was needed. Participants felt that the e-learning/distance education model was the most effective way to deliver the programme given the difficulties firms have in releasing staff for training, and the expected geographic dispersion of students. While respondents did not cite increased competition between higher-level institutes as a driving force for choosing the delivery mechanism, they felt the programme to be, by its nature, a competitive product. The view was expressed that the AUA were fulfilling the primary role of a university - providing knowledge.

There was agreement that the e-learning model would not reduce each university's individual faculty workload relative to traditional course delivery methods. The view was that, if anything, the workload would increase dramatically, especially during the development process. On completion of development, participants expected that there would be a constant need for updating materials, communicating with students, departments and universities.

E-Learning, Course Delivery and Communications

There was consensus amongst respondents that e-learning models of education delivery were not inherently superior over traditional classroom-based methods. Nonetheless, there was agreement that e-learning adds pedagogical benefits: it was felt that it could offer facilities (electronic course materials, libraries and databases) that could not be provided as efficiently and immediately through traditional classroom methods of course delivery. Self-paced instruction was viewed as an attractive aspect of the programme.

Respondents did not believe that e-learning accommodates different learning styles more efficiently than traditional classroom methods. They felt students would ordinarily appreciate a traditional classroom format for its direct interactive learning and spontaneous two-way communication. There was consensus that the e-learning model would not be a suitable replacement or improvement on face-to-face styles of education, a finding inconsistent with those who make a case for the superiority of online teaching (Feenberg, 1998; Harasim, Hiltz, Teles, and Turoff, 1995).

Respondents expected the e-learning model to enhance faculty-student communication, particularly through e-mail, thus making the student more accessible to the instructor and vice versa. Facilitating communication (e-mail, discussion boards and chat rooms) between students and tutors was considered critical. It was the thought that online discussion and feedback mechanisms between students and tutors would have to be implemented with care. However, respondents were not certain that e-learning would effectively enhance student-to-student communication. It was felt that this type of communication would have to be structured and managed correctly to be of real benefit. Ongoing evaluation of students' reaction to this form of delivery and regular interaction was considered essential.

Operationalising the Programme

For the design of the MSc, considerable work was done at the outset by a tri-university committee on the structure and content of the programme. There were several planning sessions where the aims and objectives were established and the content requirements for individual modules were articulated, focussing on the production of a student-centric system. It was decided that the MSc in Technology Management delivery would be based largely on online support and asynchronous training, with some synchronous aspects. In order to implement requirements, a design specification of the system’s functionality and the specific features it should have was created. Together with AUA staff, a local Web development firm developed a Functional Specification Document, followed by a Technical Specification Document that detailed the Website architecture and the operating structure. This latter document formed the basis for software development.

There was agreement that monitoring usage would be crucial and an essential mechanism in evaluating the system’s success. Respondents advocated monitoring features such as user connection times, Web pages visited and facilities used. It was expected that the system would generate summary reports on these and other aspects of usage. To accommodate routine updating, the system was designed so that course tutors could modify material independently of systems developers.

E-Learning in Collaborative Institutions

The MSc in Technology Management, as a multidisciplinary programme, combines the expertise of various faculties within the three partner universities. Respondents viewed this multidisciplinary approach to be a major strength. It was felt that collaborative difficulties between the educational institutions could be overcome. Respondents agreed that the AUA would offer further degree courses via e-learning/distance education in the future, and that the addition of more degree courses would be less arduous given the extant platform, its infrastructure and the embedded organisational knowledge.
FINDINGS - AFTER THE LAUNCH

The Need for an MSc and Faculty Expectations

It had been anticipated that there would be a strong need for an MSc in Technology Management delivered via distance education in Ireland. This was found to be the case measured by expressions of interest, registrations and geographic spread. Initial expectations that the e-learning model would not reduce the faculty workload relative to delivering courses through more traditional methods, and that it would probably increase, were not sustained after the programme was launched. Alleviation of organisational work was realized through administrative planning and structuring and facilitated by the appointments of a course coordinator and administrator within the AUA together with the outsourcing of some content development to non-faculty members. Contributing faculty members were remunerated for their input. Elsewhere, special incentives such as release time for course preparation, and reduced teaching loads have been offered (Onay, 2001).

E-Learning and Communications

Participants felt that it was too early in the programme’s lifecycle to verify initial expectations that the implemented e-learning model would enhance faculty-to-student communications. Feelings of uncertainty that e-learning would enhance student-to-student communication remained the case. Those with most direct involvement on the programme indicated that students were not yet engaging significantly in student-to-student communications, perhaps indicative of the fact there are few team projects. Where team projects have featured significantly on a course, a high level of team communication has been detected (Sudweeks, 2003).

Operationalising the Programme

Respondents agreed that there had been significant problems in registering students on the ‘same’ programme at the university closest to them because their respective computer systems could not cope with distance learners enrolled on an inter-university programme. Eventually a work-around was agreed whereby students would register at each university for the first year and single registration in the second year when the universities had re-designed admissions and examinations systems. Early on, there were also problems with remote library access, mainly due to differing configurations of company firewalls but this problem was resolved promptly. The lesson drawn by one respondent was that “we did not anticipate administrative issues; we only foresaw academic problems. It is important to keep administration [personnel] fully informed of all academic proposals.”

Opinion was divided as to whether problems were largely intra-organisational or inter-organisational. By rank order the most significant intra-organisational problems or issues were: admissions procedures, integration of the courses into records systems, integration of the courses into information systems, examinations procedures and course module writing. The most significant inter-organisational problems or issues were: admissions procedures, examinations procedures, political difficulties, integration of the courses into records systems and integration of the courses into existing information systems. Some of the principals had pointed to reduced visibility with e-learning type courses because they may be perceived as organisationally ‘external’. This phenomenon makes controlling and evaluating the course all the more important (Owoc, Maciaszek, and Hauke, 2001). Without consensus on how this problem might be resolved, regular newsletters or progress reports were suggested to improve awareness.

E-Learning in Collaborative Institutions

There was absolute agreement that the existence of the AUA as a separate independent entity has positively affected the success and progress of the programme to date. The AUA as a separate entity benefited the entire project, and facilitated the sharing of ideas and resources, in addition to enhancing the programme status. Furthermore, there was consensus that the independence of the AUA had significantly helped in bringing about change within the constituent institutions. Opinion was clear that implementing organisational change and resolving problems would have been more difficult for the principals, working from within each constituent university, rather than through the AUA. One respondent succinctly reported the reconciliatory and consensual nature of the AUA in responding that “home institutions do not want to be seen as opposing progress and will adopt changes more readily as a result.”

DISCUSSION AND CONCLUSIONS

The primary objective of this study was to research issues regarding the preparation for an e-learning programme and the early experiences of the principals involved with its design, delivery method and the programme’s implementation. Overall, the respondents expressed strong support for the collaboration, and viewed this and the multidisciplinary approach to the MSc amongst its major strengths. Consensus that there would be a need for such a programme and that the course should be delivered via a Web-based e-learning system was borne out by expressions of interest and registrations. Undoubtedly the structure of the AUA was seen as highly effective in bringing about the necessary changes to make the programme
successful, often acting as a gatekeeper of the system and buffer between the collaborating universities. Nevertheless, significant unanticipated inter-university administrative problems were encountered. These were resolved at an institutional level in a manner similar to such problem resolution elsewhere.

There was firm consensus that the e-learning model of education delivery is not inherently superior to traditional classroom-based methods. Indeed, there was a widely-held belief that traditional instructor-led and classroom-based delivery methods are pedagogically sound, and the implicit view that there may be some contextual difficulties with innovative e-learning methods is supported by literature elsewhere (Leuthold, 1999; Squires, 1999). Certainly, the findings from this study suggest that the key principals involved are fully aware of the dangers of assuming technology-led initiatives are necessarily better than other approaches. None of the respondents were of the opinion that the e-learning/distance education model would be a suitable replacement for face-to-face styles of learning, a finding consistent with reservations previously expressed (Bullen, 2001; Martin, 1999). Moreover, the respondent generally felt that traditional classroom course delivery methods were better in an overall pedagogical sense, and that e-learning courses would be expected to be more effective when integrated with classroom-based learning. Such concerns point to mature reflections about the potential of such systems upon the outset, rather than a headlong rush into a milieu of technology and opportunism. Nonetheless, all respondents were of the opinion that e-learning can add pedagogical value, particularly in circumstances where students are geographically remote or are unable, because of employment commitments or otherwise, to attend residential university courses.

Some of the pre-launch expectations and views will not be assessed until the programme completes a full cycle. For example, judging the success or otherwise of the programme can only come later and such an assessment must be conscious of the problems there have been with similar initiatives cited elsewhere (Jones et al., 2003). The effectiveness of aspects such as the usability, monitoring and administration of the system can only be measured at a future time. Since conventional software evaluation methods are inappropriate for distance education applications, an alternative approach is needed. Contributing to the longitudinal nature of this study, and to facilitate the measurement of the aspects mentioned above the authors expect to once a full cycle of the programme has concluded.

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