

## THE EXPERIENCE OF E-LEARNING: PROGRESS TOWARDS A NEW LEARNING PARADIGM

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### ABSTRACT:

This paper reviews the use of E-Learning in the spatial information science programmes of the Dublin Institute of Technology (DIT). The spatial information science programmes are placed within the context of the use of E-Learning across the Institute and this paper draws on the experiences of the DIT Learning Technology Team (LTT). The LTT has just completed the initial brief given to it by the DIT strategic planning group charged with ensuring the implementation of E-Learning as a resource in support of the change from a teacher-centred to a learner-centred paradigm.

E-Learning was first introduced in the Department of Spatial Information Sciences (formerly Geomatics) for the design and delivery of short modules for the continuing professional development (CPD) of staff in mapping organizations. Participants were generally very positive about their experience of E-Learning for CPD and identified a number of clear strengths. However, most participants reported difficulties completing assignments associated with completion of the courses. The courses were based on the principle of 'learning by doing' and, as such, required a considerable amount of assignments to be completed by participants, many of whom felt excessively challenged by their degree of difficulty.

Finally, the paper evaluates the performance of E-Learning tools in the undergraduate programmes of the Department. The cultural and pedagogical changes necessary to use E-Learning as a learning resource are happening much more slowly than the implementation of the technology might suggest. DIT students and teachers are growing more comfortable in an online environment, but are some years away from fulfilling the vision of independent online learners operating in a constructivist manner facilitated by e-moderators.

### 1. INTRODUCTION

The Dublin Institute of Technology (DIT) is the largest educational institution in Ireland, with more than 21,000 students engaged in programs ranging from craft training to post-doctoral research. The multi-level structure adopted by DIT incorporates a number of flexible learning models, which enable students to participate in education at different stages of their careers on either a part-time or full-time basis. DIT is also committed to lifelong learning and has a strong tradition of providing continuing professional education and development (CPD) programs to industry and professional bodies.

DIT established a Learning Technology Team (LTT) in 2002, which has just completed the initial brief given to it by the DIT strategic planning group charged with ensuring the implementation of E-Learning as a resource in support of the change from a teacher-centred to a learner-centred paradigm (O'Rourke 2005).

The Department of Spatial Information Sciences, in the Faculty of the Built Environment in DIT, provides a four-year full-time degree course in Geomatics. It also services the spatial information industry in Ireland on an annual recurring basis by providing a number of part-time programmes in Global Navigation Satellite Systems (GNSS), Geographical Information Systems (GIS) and digital cartography. Furthermore, diverse CPD modules in the spatial information sciences have been designed for specific user groups such as local authorities and government departments. The delivery of these modules, to date, has been on a block release basis whereby all students attend

lectures and practical sessions in the Department of Spatial Information Sciences in Dublin. However, the rigid timetable of CPD programmes on offer has often led to accessibility difficulties for students and office downtime for employers. A new CPD program model based on the utilisation of E-Learning was, therefore, developed and piloted by the department (Mooney et. al. 2003) and Section 2 of this paper provides more detail of this undertaking.

The department has also introduced E-Learning in its undergraduate programme in Geomatics. Section 3 looks at the influencing factors that have affected the success of this initiative placing it in the context of the Irish second and third-level education system.

### 2. E-LEARNING FOR CPD

E-Learning was first introduced in the Department of Spatial Information Sciences (formerly Geomatics) for the design and delivery of short modules for the continuing professional development (CPD) of staff in mapping organizations. The development of a distance E-Learning course in 'Co-ordinate Reference Systems for Spatial Information' has previously been reported (Mooney & Martin 2004).

The course comprises six themes:

Theme 1 Describing position with co-ordinates

Theme 2 Defining and realising co-ordinate reference systems

Theme 3 Calculation in a two-dimensional Cartesian co-ordinate reference system

Theme 4 From local to global co-ordinate reference systems

Theme 5 Manipulating co-ordinates  
Theme 6 Position in Ireland (Customisable)

Students check discussion postings and mailings on a daily basis. Course tutors give an undertaking to respond to messages within twenty-four hours. This can prove difficult to sustain particularly in the case of courses coinciding with a busy domestic workload.

Students of eLearning courses, particularly distance courses, require and expect effective feedback to problems and queries. Designers of eLearning courses, therefore, must factor sufficient time per theme for monitoring and responding to student queries.

Pilot course participants who followed the course over a six-week period covering one theme per week provided extensive feedback to the course developers. They were generally very positive about their experience of E-Learning for CPD and identified a number of clear strengths. Principal among these is the removal of barriers, relating to location and time, that might prevent a member of staff of a busy mapping organization from availing of CPD resources necessary for skills and knowledge updating or for amassing sufficient 'CPD points' for membership of a professional institution and career advancement.

E-Learning also offers participants a unique opportunity to gain direct access to experts in their field of work and many participants felt that valuable contacts had been established of benefit long after the course was finished. However, most participants reported difficulties completing assignments associated with completion of the courses. The courses were based on the principle of 'learning by doing' and, as such, required a considerable amount of assignments to be completed by participants, many of whom felt excessively challenged by their degree of difficulty.

Participant feedback also referred to the degree of interaction with the course teachers, response time to queries and the relationship between the working and learning environments.

This feedback highlights a key issue in using E-Learning for CPD. Course participants, many of whom have been working for a considerable number of years, do not seek the same outcomes from a course as an undergraduate student and do not enjoy the same amount of time for completion of tasks. For an undergraduate student, being forced to extend oneself, in searching for solutions beyond daily course content, is a necessity in developing the transferable skills needed throughout a career. A CPD student, on the other hand, requires a degree of difficulty necessary to maximize learning but not at the cost of excessive time in doing so. Designers of E-Learning courses must, therefore, ensure that course assignments are very closely related to desired learning outcomes appropriate to the target participant group - otherwise one barrier (location and access) removed by E-Learning may be replaced by another (unrealistic and inappropriate expectations).

Participants felt the learning experience was a good one provided that feedback was forthcoming from course tutors in a timely manner.

The generation of content suitable for the efficient learning of complex concepts is time consuming. In the authors' estimation, approximately thirty hours preparation is required for one hour of student on-line study (Mooney et. al., 2003). Material must, therefore, be re-usable in other courses or

educational resource. Courses should have a long 'shelf-life' in order that they can be used over a period long enough to recover some or all of the creation costs.

Tutorials covering complex concepts are possible through the use of communication tools provided they are well prepared and structured. However, assessments should lead to an accredited award and students should be given sufficient time to prepare submissions. Group based assignments are difficult to realise and the gain to the learning experience is marginal while grades accruing can be affected by factors other than a student's knowledge.

The experience of the authors points to the need for a 'template' for the design of internationally accredited adaptable E-Learning course modules for CPD. Such a template should include a set of guidelines for best practise covering course structure, length, degree of difficulty, nature of assignments, type of interaction etc. In addition it should comprise a set of agreed assessment criteria and formats that will comply with the European Credit Transfer System (ECTS) norms.

### 3. UNDERGRADUATE IN-HOUSE LEARNING

The Dublin Institute of Technology (DIT) established a Learning Technology Team (LTT) during 2002 in order to manage the introduction of E-Learning across the Institute. In the three years to May 2005, the LTT has worked directly with more than 50% of DIT academic staff, and the quantity of undergraduate degree programmes making course materials available on the internet using WebCT (the E-Learning environment adopted by DIT) now exceeds 70% (O'Rourke 2005). Significantly, however, the cultural and pedagogical changes necessary to make DIT a centre of E-Learning excellence are happening much more slowly than the implementation of WebCT might suggest. For many DIT Staff members, the introduction of e-Learning means little more than using technology to distribute materials previously distributed in class, while students - although very IT literate - have shown difficulty associating Internet use with formal learning and education.

The LTT has been crucial in enabling staff members to utilise E-Learning and its role is changing from the bearers of "technology" to the providers of innovative methods for learning and teaching.

The Department of Spatial Information Sciences at the DIT offers the only undergraduate degree programme in the spatial information sciences in Ireland. The programme is of four years (eight semesters) duration. The vast majority of students enrol on this programme immediately on leaving secondary school at an average age of eighteen years, but sometimes as low as seventeen years. Most students, therefore, complete their third level education in the spatial information sciences before reaching their twenty-second birthday. This period in a student's life is one in which he/she continues to mature and there is significant variation in the ability of students to take responsibility for, and manage, their own learning. This has important consequences on the learning/teaching methods offered by the department. Initiatives have been taken in recent years to try and shift from a teaching paradigm to a learning paradigm with varying degrees of success. The introduction of problem-based-learning (Martin et. al. 2006) represents one

such initiative, while the utilisation of E-Learning represents another.

The successful adoption of a learning paradigm is further influenced by an emerging trend among Irish students leaving secondary school. In recent years, students have become increasingly examination-focussed. This is due to the competitive nature of securing places in Irish third-level education. Places are offered on the basis of points scored in the secondary school leaving certificate examination. Because the Irish economy has performed strongly during the last ten years there is an expectation among most young people that they will progress to third-level education as a matter of course. It is inevitable therefore that pressure has built on second-level teachers to 'coach' students in examination techniques in order to extract the maximum points from their leaving certificate examination. Unfortunately, many students carry this approach into their third-level programmes. Many are more concerned with passing the examinations that will secure them a degree qualification than learning the subject. As a consequence such students are more comfortable in a teaching paradigm rather than one where responsibility must be taken for their own learning.

In the Department of Spatial Information Sciences, all modules of its eight-semester degree programme in Geomatics have an E-Learning module available on the DIT WebCT server. The modules are used as sources of information and a repository of course material. The use of the E-Learning environment as a source of course material can be effective if it allows classroom sessions to operate as interactive tutorials where issues are explored rather than material re-introduced. This is proving successful in some modules but difficult in others. As an institute, DIT has begun to recognise the effort involved on the part of staff members who adopt the new learning paradigm. DIT staff members are vastly experienced in their respective disciplines but may not have grown up in the Internet era. The average age of staff is between forty-five and fifty-five years. For many it has proved difficult to come to terms with on-line technology and required considerable investments of time.

Unfortunately, however, in no case is the E-Learning module yet used for self learning. Students are most comfortable while in the physical presence of a lecturer and teachers are

more practiced in the ways of the physical classroom. Both are growing more comfortable in an online environment, but are some years away from fulfilling the vision of independent online learners operating in a constructivist manner facilitated by e-moderators (O'Rourke, 2005). This represents a significant challenge to the department as it strives to offer increased flexibility of choice in its modular programmes. Inevitably, as the number of available modules increases, the traditional modes of delivery associated with the teaching paradigm will become more difficult to resource. It remains to be seen if E-Learning delivers on the considerable potential it offers.

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