

INFORMATICS AND THE CHALLENGE OF ENTERPRISE

N.T. Neill*

Synopsis

This paper outlines how the Faculty of Informatics has interpreted the Enterprise philosophy and gives details of how the projects for which it has obtained funding from the Enterprise in Higher Education (EHE) Unit have influenced curriculum content and delivery.

Background

The Faculty of Informatics has four departments and is represented on all campuses except Belfast. Currently approximately 1,200 full-time and part-time students are enrolled on all courses in the Faculty which has around 80 academic staff and 50 research students and research officers. Since EHE is directed entirely towards full-time undergraduate and diploma courses this implies that the courses targeted are:

Course	Campus
BSc Computing & Information Systems	Jordanstown
BEng/MEng Software Engineering	Jordanstown
BSc Mathematics, Statistics & Computing	Jordanstown
HND Computing	Jordanstown

* Lecturer in the Department of Mathematics and Enterprise Adviser, Faculty of Informatics, University of Ulster.

IBAR – Irish Business and Administrative Research, Volume 14, Number 1, 1993, pp 104-114

HND Mathematical Studies	Jordanstown
BSc Computing	Coleraine
HND Computing	Coleraine
BSc Applied Computing	Magee

It must be noted that since all the degree programmes contain a year-long placement element, as does the HND Computing course at Jordanstown, during this current academic year almost 220 students will be found positions in industrial or commercial organisations. The new BEng/MEng in Software Engineering recruited its initial cohort in Autumn 1992 and the way in which the course team incorporated the Enterprise ethos into their submission is discussed later.

The Initial Development of Enterprise

In the summer of 1990, the University and the Department of Economic Development finally signed the contract which brought the University of Ulster into the national EHE Initiative. From January 1990 to June 1990 however, a small amount of funding had been available for, amongst other things, training of the Faculty Enterprise Advisers who would provide the link between the course teams within their Faculty and the EHE management committee.

Clearly the first major task of the Enterprise Unit was to raise awareness within the academic population of the University of Ulster about the aims of the Initiative and the practicalities of obtaining funding. To this end each of the course teams within Informatics was addressed by either the EHE Director or myself. In addition an "Enterprise Roadshow" visited all four campuses, this consisting of an illustrated talk by the Director followed by group discussions on how Enterprise could apply to specific courses. It was as a direct result of these publicity ventures that proposals for funding began to appear, initially a trickle but snowballing rapidly. It was also important, however, to have a frame of reference prior to the launch of EHE as without this the performance indicators measuring the success of the project would be meaningless. Consequently curriculum audits were carried out in conjunction with selected Senior Course Tutors and areas of strength and weakness were identified for individual courses. The combined results of these audits clearly indicated areas of common concern throughout the University, e.g. the correct way to develop communication skills in students, the assessment of group work and case studies, the uncertainty felt by many staff when asked to accept concepts which lay outside their normal academic discipline, etc. These

audits helped form the basis for the staff development programme which is now an integral part of the EHE at the University of Ulster.

Analysis of Programme Content

Clearly three strategic levels can be identified with the work undertaken within Informatics namely:

- students
- staff
- employers

Details of the projects which received funding from EHE follow and the ways in which they attempt to integrate the three groupings defined above are highlighted. It must be stressed that, as with all new concepts, Enterprise in Higher Education may be embraced only reluctantly, if at all, by one or more of these three groupings within any particular institution. Consequently barriers to its implementation are discussed later in the paper.

Summer Computing Camps

For the eight years up to 1990 the schools of Information Systems and Computing Science had run Summer Computing Camps on the Jordanstown campus. These week long events offered school children interested in computing a chance not only to extend their knowledge of the subject but also to sample life at university, with all that this entails. Each year approximately half of the pupils were resident in the student village for the duration of the camp and consequently a programme of social activities had to be provided in the evenings. All supervision was undertaken by a small team of academic staff with the same persons, in the main, making up the team year after year. This, allied to the fact that the camps were usually run in August, inevitably led to a certain staleness creeping into the overall organisational structure.

Although the University did not formally become part of the EHE Initiative until the start of the academic year 1990/91 it was agreed that the Summer Computing Camps of 1990 (Magee was hosting a camp for the first time that year) would provide an ideal opportunity to test the funding and evaluation processes devised by the management unit. Consequently undergraduate students were recruited to assist with the running of the camp although the logistical details had been largely finalised by the time the selection process was completed.

The reaction of the staff and pupils to the inclusion of the undergraduates was very favourable and the students themselves found the experience both useful and rewarding. At the debriefing the undergraduates outlined the educational and personal gains they had derived from the venture and the representatives present from the Digital Equipment Corporation, the industrial sponsors of the camps, were extremely impressed with both the general aims of EHE and also the way they had now been interpreted in a practical context.

The idea of student involvement was incorporated into the earliest stages of planning for the 1991 camp at Jordanstown and those selected underwent formal training in communication skills and all aspects of group work. It is important to note that these sessions were also attended by those members of academic staff who were most closely involved in the development of Common Skills or Enterprise Competencies within undergraduate programmes. It is via such staff that the concepts of Enterprise become an integral part of all courses in the Faculty thus providing a lasting legacy of EHE long after the funded Initiative has actually ended.

Following this formal instruction the helpers were now well prepared to undertake the tasks inherent in organising a Summer Camp. Such bodies as the Accommodation Service, the Catering Department, the Sports Centre, the Medical Unit and various publicity agencies both internal and external all had to be negotiated with and a series of evening diversions had to be arranged. For many of the students, especially those who had not yet been on placement, these were new challenges and teamwork was essential if the event was to run smoothly.

The evaluation was also conducted in a much more structured manner than had previously been possible and the Research Officer attended each day of the camp speaking informally to pupils, students and staff. Formal interviews with the students were conducted at the conclusion of the camp and his report to the Monitoring and Evaluation subgroup highlighted the following:

- tackling the University bureaucracy needed all their negotiation and persuasion skills;
- all students gained noticeably in self confidence during the week;
- quite often the need arose to improvise or adapt to an unforeseen situation;
- all enjoyed working as part of a team to which everyone was contributing equally.

Industrial Information Exchange Day

This somewhat verbose title contrasts starkly with the simple idea which motivated it. Second year students on each of the undergraduate courses are constantly preparing for their industrial placement year with all that this entails, e.g. curriculum vitae submission, interviews (often at the company itself), the proposed adjustments necessary for a socially enjoyable and educationally profitable placement, etc. This anticipatory and slightly anxious group of students are the antithesis of their fourth year counterparts. These post-placement students have a wealth of practical knowledge which could be invaluable to those about to embark on a similar experience. The bringing together of these two groups in an atmosphere conducive to informal discussion seemed, therefore, a natural extension to the preparation for placement units which already exist on each degree course.

Due to the diverse nature of the University of Ulster the bringing together of all final year and second year Informatics students presents certain logistical difficulties since buses must be used to bring the undergraduates from both the Magee and Coleraine campuses to the host venue at Jordanstown. Despite a few minor hitches the vast majority of those invited managed to arrive at the scheduled time and for many of these students this was their first sight of the Jordanstown campus. Although the central theme of the event was student interaction it seemed appropriate to complement this with other placement related activities. These included the presentation of the Digital travel scholarships to those students who had performed best on placement in the two previous years. The awards were made by the Managing Director of the Digital Equipment Corporation in Ireland, the Faculty's major industrial partner, while the keynote address stressed the opportunities offered by placement both nationally and internationally.

It had been agreed that attempting to structure the student group discussions too rigidly would defeat the whole purpose of the day. Consequently the only constraint imposed was that each of the final year groups contained a representative mix of placement organisations and that each had at least one student who had been placed outside the U.K. and one who was currently sponsored by the firm with whom they had undertaken their placement. Each of these students sported a badge giving their name and the organisation with which they had spent the previous year. The overall group size was set at sixteen i.e. eight pre-placement and eight post-placement students and apart from the most general headings no agenda was stipulated. After a hesitant beginning all the 12 groups soon were engaged in

animated discussion and indeed calling a halt for coffee proved quite difficult. During the break and indeed over lunch it was noticeable how the corresponding year groups from the various campuses took the chance to compare experiences and, perhaps for the first time, all those involved actually felt part of the same Faculty. It was at these times that students already placed with a specific firm could search out, via the name tags, the individual or individuals who had just returned from that firm and hence obtain some insight into what they themselves could expect when they took up their position.

After coffee the groups were rearranged and discussion resumed. This meant that each second year student had the opportunity to question at least sixteen fourth year students during the day.

Evaluation was by questionnaire and because of the large numbers involved in the event the analysis was performed via SPSS-X. The results were very informative and showed that all pre-placement students had found the event useful. Many of their comments concerned the practical advice they had received in such basic matters as salary, accommodation, taxation, travel, etc. The post-placement students also had many positive remarks to make although both cohorts felt that sixteen was too large a number for the group discussions and pointed out that the groups had often fragmented internally to allow for a more direct interaction between members.

As a direct result of the comments made by the pre-placement students it has been agreed that the production of a "Student's Guide to Placement" be undertaken by a subset of the post-placement students. This Guide would address those issues which are of fundamental concern to all the students about to embark on the placement experience and as the subset itself would consist of representatives from all courses and campuses it would provide an excellent chance for those involved to refine their teamwork and communication skills, both electronic and otherwise!

The Information Exchange Day has been successful in attracting funding for a two year period. By its third year those students who were initially in the pre-placement group will have returned and will now be in a position to complete the cycle. They would be expected to be largely instrumental in the organisation of that year's event and, as will be noted later, a student led Exchange Day has now become an integral part of the Faculty's overall approach to placement.

Industrial Seminar Series

One of the cornerstones of the EHE Initiative is the development of employer partnerships. With this in mind the Placement Tutor for the BSc in Mathematics, Statistics and Computing applied for funding to initiate a seminar series in which speakers from industry and commerce could illustrate how their particular organisation used statistics, operational research, mathematical modelling, etc. in a practical context.

To date representatives of organisations as diverse as the N.I. Housing Executive, British Coal, Gallaher Ltd, Department of Trade and Industry, Parexel and the Department of Agriculture have participated in the series.

Although the series was aimed specifically at second year undergraduates, some of whom would hope to obtain placements in the above organisations, it proved equally popular with students on the Higher National Diploma course in Mathematical Studies. These talks not only brought to life topics previously only encountered theoretically in lectures but also emphasised the opportunities available for numerate graduates. In fact, at the end of the series, many of the students commented on their increased motivation as a result of its inclusion in the course.

One particularly pleasing aspect of this project was the willingness of employers to continue with the series after EHE funding ended. They have welcomed the chance to strengthen links between their organisations and the University and consequently now give their time free of charge as their costed contribution to EHE.

Honours Project Fair

All final year students undertake a project which contributes significantly to their degree classification. The project provides an opportunity for the student to investigate, in some depth, a subject in which they are interested. Most students tend to allocate more time to their project than they actually should, but this effort is often reflected in the quality of the end product.

Within Informatics many honours projects have as their primary objective the creation of software, this software often being of a standard which is potentially suitable for commercial exploitation. To reflect the commitment shown by students to their projects the course team for BSc Applied Computing at Magee successfully applied for funding to host Summer Project Fairs beginning in May 1991.

The organisation of the event is left largely to the students themselves although secretarial and administrative backup was available within the Department. Invitations are professionally printed and sent to industrialists throughout Ireland and the U.K. An attractive catalogue is produced in which a photograph of each student accompanies a precis of their project. The introduction to the first catalogue, written by the students themselves, summarises the aims of the Fairs perfectly:

“Some of the projects involve co-operation with industry, others are based on the research interests of staff at Magee while others reflect primarily the interests of the students themselves. All are the work of the students alone. We hope that the day will help to strengthen the links between the Department of Applied Computing and business and industry. It should also help to illustrate the possibilities that exist for the involvement of firms in student project work and the level of design and development skills available to employers by means of graduates from the course”.

Without exception the interest of the industrial visitors is matched by the enthusiasm of the students and many valuable contacts are established. The presentation and communication skills of the undergraduates are fully tested and it has been proposed that, in succeeding years, a percentage of the overall marks awarded to each project will be assigned to the Project Fair so that the ability to enthuse and inform non-specialists will be adequately rewarded.

C.T.I. Centre for Computing

The Computers in Teaching Initiative Support Service was established in 1986 as part of the University Grants Committee's and Computer Board's joint initiative on computers in university teaching. The aims of the Computers in Teaching Initiative (C.T.I.) are:

- to encourage the development of computer assisted teaching and learning in U.K. universities,
- to evaluate the educational potential of information technology at U.K. universities,
- to promote an awareness of the potential of information technology among lecturers and students in all disciplines.

Under the C.T.I. twenty centres were established to support and promote the use of computers in teaching within specific disciplines and the Centre for Computing

is on the Jordanstown campus of the University of Ulster. Clearly the aims of the C.T.I. have immediate implications for curriculum content and teaching and learning strategies and hence a link between the C.T.I. Centre for Computing and EHE would seem to be quite natural. This link was established when undergraduate computing students were enlisted to assist with the creation of a database containing currently available software at university level throughout the U.K.

Due to the practical usage of the database (over 70 Universities and Polytechnics would have access to it) the planning and teamwork involved in its production were crucial. The students thus gained an invaluable insight into how such a major undertaking is tackled. Demonstrations were embedded in the work schedule, these again underlining to the students the importance of effective communication skills.

Summary

The projects outlined above have attempted to bring together students, staff and employers in ways which are mutually advantageous to all parties. It has become clear, however, that ongoing staff development is crucial to the continued success of the Initiative and thus considerable resources have been made available for:

- individuals to attend/present papers at conferences related to teaching, learning or assessment;
- course teams to organise local, national and international conferences at the University of Ulster on the same themes;
- the production of materials to assist academic staff with more effective course delivery.

It is an inherent part of the funding contract between the EHE unit and sponsored individuals or teams that any expertise gained be disseminated to the under academic community throughout the University.

The Influence of Enterprise on Course Development

As noted earlier a BEng/MEng Software Engineering course commenced in Autumn 1992. Although each of the University's courses is reviewed quinquennially it has been interesting to monitor the development of a completely new course and to see how it has incorporated the Enterprise philosophy into its curricula. It should be pointed out that almost all the staff who will teach on this course are already involved with the other undergraduate programmes and hence have had considerable exposure to EHE.

The course states one of its five aims to be: "to develop professional attitudes and the ability to communicate effectively and work closely with others". This aim in fact expands to become one of the central themes of the new course, namely that of Professional Development. The desire to include such an underlying theme stems from:

- the University's stated objective to "link theory and practice"
- the Faculty's experience of sandwich courses and the part the placement experience plays in the development of inter and interpersonal skills
- the EHE Initiative.

It was the opinion of the Course Planning Committee that: "the inclusion of Professional Development components which contribute significantly to the final award provides an exciting opportunity to achieve and recognise enterprise competencies".

It is for this reason that formal training in all aspects of group working will be now given as part of the second year unit in Software Production. It is also stated explicitly that preparation for placement will involve participation in career orientated events such as the Industry Information Exchange Day. It is through such developments as these that the Enterprise ethos will become an integral part of University life. To see innovative ideas, initially funded as pilot schemes by EHE, become firmly established parts of the undergraduate programmes is after all the ultimate goal of the Initiative.

The placement component of this new course differs significantly from all those currently operating within the Faculty. Placement for the BEng will consist of three consecutive 4 month terms of employment interrupted by 1 week courses at the University. These courses will be used to promote information exchange amongst students and between students and staff and to reflect on the placement experience. This innovative form of placement has developed experientially, helped in no small way by the Enterprise Initiative which has allowed embryonic ideas to become quantifiable reality.

Barriers to the Implementation of Enterprise

As noted earlier in this paper it is often the case that new ideas and concepts may be met, at least initially, with suspicion. This was certainly the case at U.U. and was due in no small way to the use of the word "Enterprise" itself. Many people assumed that an initiative with such a word in its title had political or entrepreneurial

overtones and breaking down these preconceptions was indeed a difficult task. Even when this initial hurdle was overcome many staff chose to ignore the challenges presented by EHE mainly because innovation in teaching and learning strategies requires considerable time and effort on behalf of the individual concerned. Unfortunately this effort is not always given the recognition it deserves when compared to research output and despite assurances to the contrary the latter still appears to be the primary criterion for internal promotion.

From the employer's viewpoint EHE has offered increased opportunities for contact with the University generally and in particular with their potential future employees. However in this recessionary period some industrial partners have been forced to reduce or even terminate their involvement with academia. Since developing employer partnerships is one of the cornerstones of Enterprise philosophy the unfavourable economic climate has thus proved an unforeseen obstacle.

Conclusions

During the first three years of EHE at the University of Ulster all the full-time courses detailed earlier in the paper have either been through the quinquennial revalidation exercise or submitted afresh. Consequently all course documents now indicate how the Enterprise ethos is incorporated into each particular programme. Over 70% of all full-time undergraduates in the Faculty have been part of an EHE event while individual members of staff, course tutors and indeed the Faculty as a whole have received funding to support the commitment of EHE to relevant staff development.

New employer partnerships have been forged and existing links strengthened, indeed the willingness of employers to become involved in the academic process has been one of the major successes of the Initiative.

With any undertaking such as EHE it is recognised that a significant number of academic staff will not contribute fully, if at all, to the project. However within each course team and on each campus there now exists a nucleus of lecturers who are committed to the concept of Enterprise and who will continue to influence course design and delivery long after the EHE unit itself has ceased to exist.