

Cooperative Education: the University of Limerick Perspective*

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Cooperative Education at the University of Limerick is a programme in which undergraduates are placed in supervised employment for up to eight months during their studies. It is a component part of their degree programme. UL introduced the concept to Ireland more than 25 years ago and there is now a network of some 1,200 organisations participating with 2,000 placements a year. Procedures for selecting, supervising and assessing placement students are examined and the benefits both to industry and the University are outlined. Cooperative Education has provided the means of forming linkages with partners in industry, commerce, the professions and the public sector. It has allowed UL to adapt to external changes and to reflect such changes in terms of curricular development. At the same time, it has created a corps of graduates with practical experience who are in a position to make a positive contribution to economic and social development. Overall, some 85% of UL graduates obtain employment in industry and commerce.

BACKGROUND

INDUSTRY and higher education are facing a future characterised by profound technological and economic change. The main forces of change are the move towards a global economy, continual changes in the economic landscapes of Europe, North America and the Pacific Rim, a growing interdependence between scientific, technical and managerial competencies and fundamental changes in the make-up of the workforce.

Economic success will be determined by the capacity to generate new knowledge and by the ability of the workforce to apply that knowledge successfully in the production system. A further factor is that, with increasing deregulation and free competition, industry is dominated by the drive for international competitiveness. The focus has become one of the improving productivity and cost structures.

New management techniques are emerging which depend, particularly, on a graduate workforce having strong skills and personal qualities to work in environments incorporating total quality management, world-class manufacturing, learning organisation and team working. Most importantly for international competitiveness in an increasingly global market, industry will require graduates who possess the ability to flourish in a world of permanent change.

With such a pace of change and of intellectual discovery, universities have to remain at the forefront of teaching and research and provide the breadth of learning required for graduates to function effectively in a global market. Existing

academic areas are becoming more sophisticated and specialised and dependent on state-of-the-art facilities and technologies.

However few universities have the financial resources to maintain equipment and facilities at the same pace as industry. Accordingly, universities must look to mutually enhancing international partnerships to which they can bring their teaching and research strengths, while benefiting from the strengths and resources of industrial partners.

Similarly, in its drive for international competitiveness, industry can no longer afford to remain centralised and inward-looking for resources. It is now essential that industry further collaborates with the universities in order to meet the need for mobile, computer-literate, linguistically competent and technically fluent employees.

The requirement for a formal partnership between education and industry is highlighted in the EU White Paper on Teaching & Learning [1], particularly with regard to the business sector. The EU Green Paper on Innovation [2] also cites the need for education establishments to adapt their curricula to a changing world and to meet new target groups. Within Ireland, the report of the Science, Technology & Innovation Advisory Council—STIAC [3] and the Forfás report ‘Shaping our Future’ [4] have both recommended a greater level of liaison between the users and providers of education in order to reflect changing industry requirements in curriculum content. In particular STIAC cites the potential role of an undergraduate placement programme (Cooperative Education) in developing formal partnerships between university and industry. The influence of Cooperative Education has also been highlighted in the EU Green Paper on Innovation.

* Accepted 15 January 1999.

Within the UK, the Dearing Report [5] has further reinforced the message. It recommends that, with immediate effect, the Government should work with representative employer and professional organisations to encourage employers to offer more work experience opportunities to university students. It also recommends that companies should take a strategic view of their relationship with Higher Education and should apply the same level of planning to it that they give to other aspects of their operations.

PIVOTAL ROLE OF COOPERATIVE EDUCATION

By placing students in employment relevant to their academic interests, Cooperative Education forms a component part of a university curriculum. It integrates classroom theory and laboratory practice with real working conditions. It provides the means to develop a healthy working relationship with industry, commerce, the public services and the professions and ensures that the educational programmes produce graduate expertise relevant to economic development. The system was first introduced in the United States in 1906 when Herman Schneider, an engineering professor, and later engineering dean, at the University of Cincinnati, conceived this unique pedagogy after becoming convinced that many professional concepts and skills could not be learned effectively in the classroom, but required practical experience for their understanding and mastery. He proposed that a substantial component of the engineering curriculum should involve the coordinated alternation of on-campus study and off-campus, real-world, paid experience. In the United States, Cooperative Education is now established in more than 2,000 universities and colleges.

There is an increasing tendency among larger prestigious organisations to use the concept in order to establish select networks with a limited number of key university partners on a range of initiatives. Graduate and undergraduate recruitment would be a case in point. However it also offers an opportunity to further strengthen the collaboration by establishing high-level faculty contact in areas such as research & development, product development, process development, consultancy, training, faculty development.

A Cooperative Education programme, particularly when developed with international employers, has a pivotal role to play in economic development since it provides:

- international education programmes with the balance of knowledge acquired through the formal curriculum and on-the-job training, thus combining the strengths of industry and university;
- higher education with access to industry's state-of-the-art equipment, systems and current best

- practices (e.g. total quality management, world-class manufacturing, learning organisation and team working);
- the university sector with the opportunity to avail of practical in-situ linguistic and mobility skills which it could not otherwise acquire;
- the possibility to integrate into academic programmes an understanding of foreign cultures and markets essential to global competitiveness;
- industry with an introduction to a multinational pool of potential graduates and faculty equipped with the knowledge, skills and flexibility to participate fully in commercial/service activities;
- small and medium size enterprises (SMEs) with access to a range of graduate trainees with hands-on experience of working in another country, language and commercial environment, together with a combination of mobility and cross cultural skills;
- the university sector with an important feedback system of channelling education needs into the design and adaptation of course curricula and structures;
- industry and higher education with an active networking environment in which ideas, views and practices may be freely exchanged;
- undergraduates with hands-on experience in an enhanced environment of another country which will provide them, as graduates, with an appreciation of sophisticated systems when they will ultimately work in Ireland.

Such a university/industry collaboration is critical with regard to the particular requirements of society. The EU White Paper on Growth Competitiveness and Employment [6], in interpreting these requirements, focuses on a more competitive economy through reinvigorated SMEs. Key policies have been outlined in respect of investment in education and training, namely, speedier incorporation of research results into marketable innovations and an emphasis on new employment opportunities in the new technologies such as the information society, biotechnology and those in the environment sector.

COOPERATIVE EDUCATION AT UNIVERSITY OF LIMERICK

The University of Limerick model of Cooperative Education involves placement of students in employment relevant to their academic interest for six to eight months during their undergraduate studies. The Cooperative Education & External Affairs Division has responsibility for the direction and development of the programme. Appropriate employers are identified and suitable work assignments arranged. Students are generally selected by employers through interview. In summary, the University maintains contact with the employer and the student is visited by a University faculty member. Evaluation is carried out by both the

employer and the faculty visitor. On return to the University, students must submit a Cooperative Education report which is assessed by a faculty member.

The selection procedure is as follows:

- Arrangements are coordinated by the Cooperative Education & External Affairs Division.
- Students are required to complete standardised CV forms, outlining their academic performance to date as well as details of work experience and other relevant information. They also indicate their preferences for location, type of job, type of employer, etc. This information is held by the Division.
- The Division directly contacts all participating employers twice yearly, with details of the dates of the placement periods, and the disciplines available for placement. A questionnaire is included to make it easier for employers to respond, indicating the number of students required and the disciplines of interest.
- On receipt of the completed questionnaire, the Division forwards a selection of student CVs in the appropriate disciplines. On average, about six resumés are provided for each position.
- Interviews are scheduled by the Division. Employers contact the Division to discuss interview times and arrangements. Interviews are normally held on campus.
- Employers inform the Division of the interview results and students are notified accordingly. Employers then issue a job offer in writing, specifying the terms of the offer.

The market determines the level of pay for Cooperative Education students. Whilst this can fluctuate, a minimum pay threshold is required. Whilst earnings are important, the main purpose of Cooperative Education is to provide relevant work experience and thus complement the student's programme of study. Tax and social insurance is paid by all students.

The University provides alternative programmes for students who do not receive a placement. These programmes may comprise communications skills workshops, confidence building, developing a positive orientation, presentation skills, relaxation training, verbal and non-verbal communication. There are also modules associated with self-development. An academic report or project is agreed with a schedule of industrial visits to external organisations.

It is also possible to undertake an academic placement in a University abroad. This can happen where the experience provides an opportunity to develop new competencies in a different cultural environment, and ideally also allows for foreign language development.

ASSESSMENT AND EVALUATION

While on Cooperative Education, each student is monitored by a faculty member from the relevant

area of study. The purpose of this is to discuss the work assignment and the student's programme with both student and supervisor and to deal with any problems that may have arisen. The faculty member completes a Cooperative Education Visit Form and submits this to the Division for ultimate assessment by the External Examiner.

Credits are assigned for satisfactory completion of Cooperative Education and assessment is on a pass/fail basis. Successful completion of the programme is a prerequisite for graduation.

Towards the end of the placement period, each employer receives an Employer Evaluation Form which allows an opportunity to assess performance as well as commenting on the Cooperative Education programme. This is returned to the Division where it forms part of the student's official record. The student must also submit a report.

Preparation of students for Cooperative Education takes place in several stages. During the first academic year the Division organises a preparatory programme for all who are due for placement the following year. This includes briefing on the main elements of the programme, advice on completion of the CV and an outline of policies and procedures in relation to the programme.

The next stage of the preparatory programme is held early in the second academic year. It focuses on interview procedures. Expert advice is given by a panel of speakers under the direction of the Division.

In addition to the formal preparatory programme, additional meetings are organised to discuss procedures for international placements. A series of workshops are provided which are specially designed to help students prepare for interviews. The following workshops are available—Interview Skills, Presentation Skills, Self-Esteem & Assertiveness Training and Communication Skills.

All European Studies undergraduates spend a Cooperative Education period abroad and start preparation for it some twelve months before the placement begins. In addition many students from other courses avail of the opportunity of international placements. Before seeking a placement abroad, students are advised to consider the benefits such as exposure to a different business culture and to advanced and different technological environments. They should also consider the opportunities for foreign language development and the development of a network of contacts for the post-graduation period.

In preparing students for international placements the University advises that lack of familiarity with local customs and practices can result in misunderstandings and difficulties. They are also advised that the network of local support which one takes for granted at home does not necessarily exist abroad and that they have to be resourceful and able to develop their own problem-solving skills. Furthermore, students are advised to take into account that payments abroad are similar to or even lower than those pertaining in Ireland.

IMPACT ON THE UNIVERSITY OF LIMERICK

The University of Limerick, from its inception in 1972, has been strongly influenced by economic factors, then pertaining, when it took as its theme 'Europe' and 'Products into Europe'. Accordingly, it introduced the concept of Cooperative Education to Ireland and, in doing so, showed how such a university/industry initiative can impact on the total university as an institution. Cooperative Education has provided the means of forming linkages with partners in industry, commerce, the professions and the public sector. In doing so, it has created a corps of graduates with practical experience who are in a position to make a positive contribution to economic and social development. Overall, some 85% of UL graduates obtain employment in industry and commerce.

The main characteristics of the Cooperative Education programme at UL are:

- more than 2,000 placements per annum;
- total employer contribution of £9.5 million per annum;
- network of over 1,200 employer organisations—some 3,600 individual contacts;
- for such organisations, participation in the programme has been their first point of contact with the University. The programme is built on acquiring and developing company intelligence;
- international placements account for some 35% of overall placements;
- 650 employers visit the campus annually.

During the last five years there has been an increase in Cooperative Education placements, a consequence of the UL campus development. Such an increase has been catered for through a strategy of developing internationally, with the consequence that one-third of undergraduates are now placed abroad. Due to the more advanced scientific, technological and business environments, these placements can facilitate technology transfer and create an enhanced graduate expertise. Furthermore, the involvement of participating employers is facilitating the University to develop its international collaboration.

Within Europe, countries such as Germany, France, The Netherlands and Luxembourg have been particularly targeted. This has resulted in the creation of a significant employer base with specialist markets being developed in aeronautics, electronic/computing and financial services sectors in France and Germany. Within Luxembourg and The Netherlands, the strategy has been to target investment management services and manufacturing industries. Within North America, there are some 140 placements per annum. Marketing efforts have focused on areas such as financial services, tourism/travel and telemarketing sectors. Placements are concentrated in the New York, New Jersey, Boston and Philadelphia regions,

with a number of additional placements on the West Coast.

Four short case histories indicate the typical work that engineering undergraduates do during their placements:

- *Production Engineering*: Jim was placed in the Process Engineering Department. One of his responsibilities was to provide the support necessary for distributive system. This included the introduction of new products as well as changes to the existing products. The BOMs (Bills of Materials) first had to be updated and then the documentation drawn up, signed off and introduced on the floor. Jim was also involved in the updating of the different process areas, e.g. solder wave area, and also in the support for the machine insertion area, pick-and-pack area and the material configuration (integration manufacturing system) which involved the updating of these areas and the process involved.
- *Electronic Manufacturing*: Tom was assigned to the Manufacturing Engineering Department and was involved in capacity studies which provide information on machine requirements in the plant. One of his projects was to formulate a procedure for checking the accuracy of Bills of Materials. He was also involved with work on the actual printed circuit assembly process and with its improvement. Tom produced manuals for the correct operation of two wave soldering machines and also developed an idea for increasing the baking capacity of the oven used to remove moisture from the boards before they go to wave solder.
- *Electronic Engineering*: Ann spent the first week developing the skills necessary for the job, e.g. soldering and desoldering. The first half of the placement was spent manufacturing audio-based electronic equipment. The second half was spent at the test bench. She carried out automatic level, noise and distortion tests on various audio amplifiers and modules as well as power supplies.
- *Mechanical Engineering*: Barry was involved in projects such as the development of a waste disposal unit. This involved the replacement of 'E' chiller and Expert k3g palletisation and in minor projects such as mechanical handling of 30 litre keg, conversion of Nos. 6 & 7 boilers to gas/oil firing and new grain conveyors and adaptation of Kieve 6 for Ale. Other duties included helping draughtsmen and engineers to complete site surveys and working with contractors' drawing, checking to ensure accuracy.

The development of the Cooperative Education concept by the University of Limerick has had a significant impact on the organisation itself. Firstly there has been a need to allocate appropriate resources so that the programme could be developed on a corporate basis. It has also required key

faculty to have the ability to interact with employers during student placement. This has allowed for the natural development of relationships between University and industry on a one-to-one basis. It has also provided an opportunity to acquire intelligence on markets, recruitment/skills requirements and new technologies and management processes, because feedback from employers is going directly to the individual faculty, it has provided an effective mechanism for fine-tuning existing programmes or designing new programmes to meet the needs of the marketplace. However such feedback requires that curricula are developed on a modular basis so as to cater for change in a cohesive way. Because Cooperative Education is marketed as an expertise resource for employers, there are inherent curricular demands to ensure that students have a relevant experience prior to placement. Furthermore, curricular design for the post-placement period has to take into account the enhanced experience gained by students so as to ensure appropriate synchronisation. These academic issues need to be constantly addressed if the concept of Cooperative Education is to maintain credibility.

The importance of Cooperative Education has

extended beyond the obvious aspects such as allowing undergraduates to gain relevant professional experience. It has provided a mind-set which has allowed UL to adapt to external changes and to reflect such changes in terms of curricular development. It has also provided a continuing working partnership with industry in providing collaborative initiatives in areas such as research and development, product development, process development, consultancy, training and faculty development.

Overall, Cooperative Education has given the University a mechanism to further enhance university/industry interaction and has allowed it to play a significant role in Ireland's social and economic development. The high demand for University of Limerick graduates is seen as a vote of confidence by industry. Alternative initiatives such as continuing education, consultancy activities and technical support services can provide other mechanisms for education/industry initiatives for the university sector as a whole. If such mechanisms are properly developed, it will ensure that universities will continue to provide an appropriate education response to the future needs of industry as it faces into the 21st century.

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