



**ADVANCING THE SCHOLARSHIP
OF TEACHING AND LEARNING THROUGH
A REFLECTIVE PORTFOLIO PROCESS**



THE UNIVERSITY COLLEGE CORK EXPERIENCE



**NONA LYONS, ÁINE HYLAND
& NORMA RYAN, Editors**

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Our own President, Professor G.T. Wrixon, has supported this project from the start. As the introduction will show, under President Wrixon's leadership, UCC has highlighted and supported teaching and learning and has recognised its importance in the university. President Wrixon's support is much appreciated.

And finally we must not forget our students. The classrooms and lecture theatres of the university were the laboratories for the inquiry which led to this publication and the students were the central element of the inquiry. They will ultimately be the beneficiaries of this work, since the goal of the project is to improve and enhance student learning. We thank the students for their involvement and their support.

**Áine Hyland
Vice-President
University College Cork
September 2002.**

INTRODUCTIONS

RECOGNISING AND REWARDING TEACHING WITHIN A UNIVERSITY

Áine Hyland

University College Cork has long been recognised as an institution where teaching is held in high regard. This is evident from the inscription on the university's coat of arms "Where Finbarr taught let Munster learn". UCC's Five Year Strategic Development Plan 2000-2005 *Agenda for Excellence*, outlines the university's commitment to scholarship and to excellence in its core activities of teaching and research. The Plan emphasises the key role of teaching and learning, and states that teaching and learning development will form an important part of UCC's overall strategy in the development of staff. The Plan also adds that

There should be parity of esteem between teaching and discipline-based research, which should be formalised and validated by recognising effective and innovative teaching and learning practices by giving them the same status as research. Research into the teaching and learning process should itself be recognised and rewarded in the same way as all other forms of scholarship. There is a necessity to encourage and support academic staff in the scholarship and practice of effective teaching¹.

This commitment to encouraging and supporting teaching as a valid form of scholarship has gained momentum in many universities throughout the world in recent years. These universities are concerned that the increased focus and emphasis on research in universities and institutions of higher education may have led to a devaluing of their teaching mission. As Ernest Boyer wrote in 1995:

Education is a seamless web, and if we hope to have centers of excellence in research, we must have excellence in the classroom. It is the scholarship of teaching that keeps the flame of scholarship alive².

The same sentiment was echoed by Frank Rhodes, Emeritus President of Cornell University, in his introduction to a collection of essays published in 1998 to celebrate the 250th anniversary of Princeton University, where he wrote:

We need our best scholars to be our teachers, and we need them to give the same creative energy to teaching as they give to scholarship. We need to identify, support, and reward those who teach superbly. There is no antithesis between teaching and research. Great teaching can, in fact, be a form of synthesis and scholarship³.

¹ University College Cork *Agenda for Excellence: Strategic Development Plan 2000-2005*.

² Ernest Boyer "Prologue: Scholarship - A Personal Journey" in Charles Glassick et al *Scholarship Assessed* San Francisco: Jossey Bass 1997.

³ Frank H.T. Rhodes "The University and its critics" in W.G. Bowen and H.T. Shapiro (Eds.) *Universities and their Leadership* Princeton University Press, Princeton, NJ, 1998.

Closer to home, the centrality of teaching in the university's mission is also adverted to by Malcolm Skilbeck in his recent report *The University Challenged*, where he quotes:

New and improved ways of teaching students is one of the challenges facing higher education staff. The status and prestige of research notwithstanding, according to the Carnegie's Commission's international survey of the academic profession, teaching students emerged very strongly as the principal defining characteristic of the academy⁴.

Yet, as Burton Clark noted in *The Academic Life* published by the Carnegie Foundation in 1987, universities seldom recognise and reward excellence in teaching. He made the point that the greatest paradox of academic life in modern America is that while most professors teach most of the time, and large proportions of them teach all of the time, teaching is not the activity most rewarded by the academic profession nor most valued by the system at large⁵.

The same contradiction applies in universities on this side of the Atlantic. Appointments and promotions have traditionally been made on the basis of research standing and output. While lip service is paid to teaching and community service - the other two pillars of an academic's life - these elements are not always seen to be of equal value in the appointments and promotions stakes. Academics in Ireland are not required to have any teaching qualification prior to appointment as a university lecturer, and to date, there is only very limited provision of training courses in teaching in higher education. While in theory, teaching is one strand of the equation in the promotions stakes, academics are of the opinion that those involved in assessing applications for promotion, focus almost predominantly on the research record of applicants. This view was articulated in a number of submissions to the Review Group on the Academic Promotions Scheme in UCC in 2001. The submission of UCC's Academic Staff Association states this view as follows:

. . . there is a widespread perception that the application of the (promotions) criteria is skewed heavily towards research publications and the generation of research income. This perception, whether well-founded or not, sends out a very confusing signal to ambitious young academics. On the one hand they are being encouraged by the President to inspire and nurture the students, particularly undergraduate students, who are the prime source of income of the University, while on the other hand, they are being advised by wiser, and perhaps more cynical older colleagues that they should concentrate their energy on those matters which are seen to relate most strongly to career enhancement.

The tension between teaching and research which developed in the university sector in the 20th century became more marked as more and more funding became available for research from private and public sources. In the post Second World War era, there appeared to be a growing belief that a university could excel either in research or in teaching but not in both. And since research was elevated to a position of superiority in the hierarchy of values within the university sector, the more prestigious universities were increasingly described as research universities, suggesting that in a university, teaching was less important than research.

⁴ Malcolm Skilbeck *The University Challenged: A Review of International Trends and Issues with Particular Reference to Ireland* Dublin: HEA and CHIU, 2001.

⁵ Burton R. Clark *The Academic Life: Small Worlds, Different Worlds* Princeton, NJ: Carnegie Foundation for the Advancement of Teaching, 1987.

The publication of Boyer's seminal book *Scholarship Reconsidered* in 1990⁶, might well be considered a watershed in the history of higher education. This book offered a new paradigm for recognising the full range of scholarly activity within universities. Boyer posited a more inclusive vision of scholarship than had previously been recognised. He suggested that there are four forms of scholarships within universities - the scholarship of discovery, the scholarship of integration, the scholarship of application and the scholarship of teaching. The scholarship of discovery comes closest to what academics mean when they talk about research, although in its broader meaning as suggested by Boyer, it also includes creative work in literary, visual and performing arts. The scholarship of integration makes connections within and between the disciplines. It seeks to interpret, draw together and bring new insight to bear on original work. The scholarship of application seeks to engage the academic with the issues of the day - whether these are in the areas of social sciences, law, commerce, science, medicine or engineering. Lessons learned in the application of knowledge can enrich teaching, and new intellectual understandings can arise from the very act of application. In the scholarship of application, theory and practice interact.

The scholarship of teaching provides the main link between academics and their students, especially undergraduate students, and initiates them into the best values of the university. Good teachers enthuse and engage their students. They imbue them with the excitement of learning and can instil that passion for discovery which will continue the cycle of research and teaching into the next generation. Many academics entered academic life as a result of the enthusiasm and example of a university teacher. Teaching can be one of the most rewarding aspects of the academic's life. In the classroom and in the lecture hall, an academic's research can be subjected to ongoing review and critique by students - often as fundamental and challenging as review by one's peers. For an academic, teaching can provide an ongoing forum to engage in debate and discussion about research.

This complementarity of research and teaching was referred to as follows by John Slaughter, President of Occidental College, in a speech delivered at Engineering Deans Institute in Salt Lake City, Utah, 29th March 1982⁷: "Research is to teaching as sin is to confession. If you don't participate in the former, you have very little to say in the latter". And if, as Frank Rhodes suggested, we need our best scholars to be our teachers and those who teach superbly need to be identified, supported, and rewarded, how should this be done?

In UCC, in the context of the commitment to teaching in the university's Strategic Plan, it was clear that a scheme for recognising and rewarding teaching needed to be introduced and a structured and co-ordinated approach to supporting teaching and learning put in place. UCC had prided itself on being the first university in the Republic of Ireland to set up a Teaching Development Unit in 1984 and throughout the 1980s and early 1990s, this Unit pioneered innovative approaches to supporting university teaching. In the early 1990s, the impact of the Unit had begun to wane and it was not until 1999, with a new emphasis on training and development, which came with the expansion of the Department of Human Resources, that the issue of support for teaching was again taken seriously within the university.

As a Vice- President, I was among those who contributed to the drafting of the Strategic Plan, and I was pleased that the Plan included a commitment to recognising, valuing and rewarding

⁶ Ernest Boyer *Scholarship Reconsidered: Priorities of the Professoriate* Carnegie Foundation for the Advancement of Teaching, 1990.

⁷ Cited in Rhodes, *op.cit.*

excellence in teaching. My appointment as Chair of the Staff Enhancement and Development Committee (SEDC) in January 2001 provided me with a further opportunity to ensure that there would be an explicit recognition of and support for teaching within the university. As Professor of Education and Head of the Education Department I had been interested in university teaching for many years, and in 1994 I had submitted a course proposal to the Faculty of Arts in UCC for a Higher Diploma in Teaching in Higher Education. However, this course outline was not acceptable to the Faculty at that time⁸. I had also argued at a national level that university lecturers should be required to undertake some preparation for the teaching aspect of their work, as was increasingly the case in other countries⁹.

UCC was fortunate that the renewed interest in teaching in UCC coincided with a number of other relevant developments both within the university and in the broader educational community. The requirement for systematic Quality Review of departments and units within the university, in the Universities Act of 1997, had led to the setting up of the Quality Promotions Unit in UCC and we were fortunate that the Director of the Unit, Dr. Norma Ryan, added her dynamism and enthusiasm to the venture to promote excellence in teaching. We were also fortunate that the timing coincided with enhanced funding opportunities through the Higher Education Authority for initiatives within universities which would support teaching and learning. We submitted grant applications under both the HEA's Targeted Initiatives Scheme and the Training of Trainers Scheme in the year 2000, and among the projects for which funding was granted under the former category were a President's Awards Scheme for Excellence in Teaching and an Awards Scheme for Research on Innovative Forms of Teaching and Learning. Funding was also provided to support Teaching Portfolio Seminars in the context of a more explicit recognition of teaching in the university's promotion scheme. Grants were also secured from the HEA under the Training of Trainers initiative for a number of specific courses including courses on Multiple Approaches to Teaching and Learning and a course on Authentic Assessment in the University. Funding was also provided for courses on the use of technology in teaching and learning.

My own personal approach to supporting teaching within the university was influenced by the work of the Carnegie Foundation for the Advancement of Teaching and the publications of the American Association for Higher Education¹⁰ as well as by the work of Project Zero at the Harvard Graduate School of Education. Project Zero's work on Teaching for Understanding was particularly influential¹¹, as was Howard Gardner's research on Multiple Intelligences¹², David Perkins' work on Thinking¹³ and Steve Seidel's work on Portfolio Assessment¹⁴. During my period as Head of the Education Department from 1993 to 1999, a requirement had been introduced that students on the Higher Diploma course in Education¹⁵ submit a Teaching Portfolio relating to their teaching practice. As this practice developed, I became aware of how a teaching or course

⁸ Objections were raised at the Faculty meeting to this course proposal, ostensibly on technical grounds. The course outline was a modular one which could be taken over a period of years but such a model did not fit with UCC's template for new courses at that time.

⁹ Áine Hyland "University Education in the General Context of Irish Education" in *The Role of the University In Society* Dublin: NUI 1994.

¹⁰ See R. Edgerton et al *The Teaching Portfolio: Capturing the Scholarship in Teaching* American Association for Higher Education, 1995; and Pat Hutchings (Ed.) *The Course Portfolio* American Association for Higher Education 1998.

¹¹ M. Stone Wiske *Teaching for Understanding: Linking Research with Practice* San Francisco: Jossey Bass 1998.

¹² Howard Gardner *Frames of Mind* New York, Basic Books (1983); and *Intelligence Reframed: Multiple Intelligences for the 21st Century* New York: Basic Books (1999).

¹³ David Perkins *Smart Schools: Better Thinking and Learning for Every Child* New York: The Free Press, 1992.

¹⁴ S. Seidel et al *Portfolio Practices: Thinking Through the Assessment of Children's Work* Washington: National Education Association, 1997.

¹⁵ This is a graduate initial teacher education course for second level teachers.

portfolio could be a powerful tool for developing and improving teaching. My colleagues and I in the Education Department also developed an increasing familiarity and expertise in the skills of portfolio assessment and I recognised that portfolios in higher education could provide the basis for supporting the scholarship of teaching within the university.

Co-incidentally, in the year 2000/2001, Nona Lyons was a visiting Scholar at UCC where she had advised on Portfolio development on the Higher Diploma in Education course. Nona had been involved in Portfolio development and assessment as a faculty member in Dartmouth College Maine and had edited and published an important collection of articles entitled *With Portfolio in Hand*, in 1998.¹⁶ I was impressed by Nona's work on Portfolio Development and before she returned to the U.S. in the summer of 2001, she agreed to facilitate a series of Teaching Portfolio seminars for university faculty, which proved to be a great success. The launch of these seminars coincided with the announcement that five awards for teaching excellence would be made in UCC during the 2001/2 academic year - this provided an incentive for faculty members who were considering applying for one of these awards, to attend the seminars. However, attendance was by no means limited to these members of staff.

A number of other developments within the university heightened the awareness of staff of the significance of university teaching. The wide-scale introduction of Quality Review of Departments, with its associated self-assessment component, highlighted the role of teaching in the work of a university department¹⁷. Student evaluation of their courses, which had not been a general practice in Irish universities, was introduced as a required component of the Quality Review exercise and undergraduate students were not slow to point out what was good and bad in the teaching which they had experienced. When the Review of the Promotions Scheme was circulated for comment at the end of 2001, there was widespread support for the suggestion that teaching be more explicitly recognised as part of the promotions scheme. There was also support for the recommendation that those applying for promotion to Senior Lecturer would be required to submit a Portfolio of their teaching¹⁸.

We were aware that the requirement of submitting a Portfolio of Teaching might well be daunting for many members of staff for whom the concept of documenting and critiquing their own teaching was a new departure. As Pat Hutchings, citing R. Bass, states in her book *Ethics of Inquiry*

.. for many faculty, the scholarship of teaching and learning is new terrain. They may, for instance, be excellent teachers, but typically they have not treated their classrooms as sites for systematic inquiry; framing their own teaching problems as questions of broader scholarly significance entails a real shift of perspective.¹⁹

The introduction of the Teaching Awards and the expectation that teaching portfolios would be a requirement when applying for promotion, provided an extrinsic incentive for staff to participate

¹⁶ Nona Lyons (Editor) *With Portfolio in Hand: Validating the New Teacher Professionalism* New York: Teachers College Press, 1998.

¹⁷ See the article by Norma Ryan, Director of Quality Promotions in UCC, in the next section of this Introduction.

¹⁸ This recommendation was accepted by the Academic Council in May 2002 and by the Governing Body of the University in June of that year. From October 2003 onwards, all applicants for promotion to Senior Lecturer will be required to submit a Portfolio of their teaching.

¹⁹ R. Bass "The Scholarship of Teaching: What's the Problem" in *Inventio*, 1999 cited in Pat Hutchings (Editor) *Ethics of Inquiry; Issues in the Scholarship of Teaching and Learning*. The Carnegie Foundation for the Advancement of Teaching, 2002.

in the Portfolio seminars. This combined with the intrinsic motivation of many staff to improve their own teaching, led to a demand that these seminars be continued during the academic year 2001/2. Thanks to Norma Ryan, Quality Promotions Officer, a series of weekly seminars was organised from September to Christmas 2001. These were two-hour sessions which were held at lunchtime on different days each week to facilitate attendance by as many faculty as possible. Nona Lyons facilitated these seminars from January 2002 until the summer vacation. An average of c. 25 people attended each of the seminars and in all, at least 200 individual members of staff attended. The seminars were an opportunity for staff to share their teaching approaches and experiences. Each week, two members of staff presented an entry from their Portfolio and this entry provided a catalyst for what proved to be a very powerful conversation among staff. The attendance included staff from across all disciplines and Faculties -Arts, Commerce, Law, Science, Food Science, Engineering and Medicine.

In January 2002, 23 portfolios were submitted for the President's Awards for Teaching Excellence. 19 of these were from individuals and four were group portfolios. Almost without exception, they were of a very high quality. The criteria which would be applied to the assessment of these portfolio had been notified in advance to applicants. They had been informed that the awards would aim to acknowledge the efforts of academic staff who are successful in uniting the role of teacher with that of researcher, as well as their excellence in teaching. In the case of staff of centres where research might not be an essential element of their work, their application would be judged on their excellence in teaching and their contributions to the teaching mission of the University. It was pointed out that the awards were intended to recognise teaching accomplishments which might be exhibited at any time during an applicant's career.

As a general guideline, applicants were informed that criteria for assessment of applications would include the following:

- ◆ Command of the subject
- ◆ Effective design and redesign of a course or courses
- ◆ Ability to organise course material and to present it cogently
- ◆ Use of appropriate and diverse teaching and learning methodologies
- ◆ Use of appropriate and diverse modes of assessment (where relevant)
- ◆ Evidence of integrating research and teaching (where relevant)
- ◆ Ability to inspire in students independent and original thinking
- ◆ Ability to encourage intellectual interest in beginning students and to stimulate advanced students to creative work
- ◆ Enthusiasm and vitality in learning and teaching
- ◆ Guidance of student research projects
- ◆ Participation in advising students
- ◆ Ability to respond to a diverse student body.

The Awards committee, which would assess the applications, would take into account the different approaches to teaching and learning in different disciplines and Faculties, and would strive to achieve a balance in awards across the different Faculties of the University. Account would also be taken of the varying experiences of applicants in documenting the scholarship of teaching to date.

The task of assessing the portfolios was an exciting if rather daunting one. Each one of the eight assessors read each portfolio, viewed each video and reviewed the student's evaluation of the applicants. It was a time-consuming but fascinating task and all involved agreed that it was a most

informative learning experience. It was a matter of regret that only five awards were available as it was generally agreed that at least twice that number were deserving of an excellence award.

A suggestion that a collection of extracts from the portfolios be published was endorsed by the Awards committee and all the applicants were invited to submit an extract or extracts which they felt best reflected their teaching approach. Nona Lyons met with those who indicated an interest in contributing to the collection, and provided advice and support where requested. She played a major role in collating the extracts and in providing a coherent framework for presenting them. We are indebted to her for her work on this, no less than on other aspects of the overall venture. My task was largely that of copy-editor and liaison with the designer and printer. This edition of the collection is a preliminary one and because we were anxious to move quickly to have the book available for the beginning of the next academic year, it is a black and white only publication (no colour) and it contains no illustrations. The decision to exclude illustrations was a painful one, as many of the extracts relied for their impact on the relevance and in some cases the sophistication of the illustrations. I apologise unreservedly to those contributors who feel that their extracts are diminished by the exclusion of pictures, diagrams and other illustrations but we hope that it may be possible to publish a more sophisticated edition later.

The collection which follows provides invaluable evidence of how the scholarship of teaching is being implemented / interpreted in University Cork at the beginning of the 21st century. The publication is sub-divided into two main sections – a sampling of portfolio entries and some reflections on teaching. The sampling of entries contains a wide range of entries and includes some examples of the teaching philosophy espoused by staff as well as examples of how staff “enact” their teaching. The collection contains entries from a range of faculties and disciplines - Arts, Commerce, Science, Food Science, Engineering and Medicine. They range from the highly sophisticated entries of staff who are experienced and well-read “scholars of teaching” to some who might prefer to be considered novices in the field. Their styles vary considerably – some contributors are familiar with the discourse of teaching and learning, which like so many other forms of discourse in the academy, has developed a style of its own. Others are written in a truly engaging and almost amusing style. But the reader should not be lulled by the apparent levity of some of these entries – in one or two cases they are profound in their reflections. All entries are impressive – as much in their honesty as in their profundity. We are truly grateful for the generosity and courage of all who contributed. It is not an easy thing to do to subject oneself to the review of one’s peers in an area of scholarship which can be so personal and so sensitive but each one who submitted a portfolio for review was willing to do this and those who have contributed to this collection have done so on the double. To all of you, a big thank you.

At the end of the day, it is important that we remember that the ultimate purpose of this exercise is to improve the learning experiences of our students in the university. In that regard, I cannot improve on the following quotation from a recent publication by Mary Huber and S.P. Morreale:

What matters is not just what the disciplines can do for the scholarship of teaching and learning, nor even what the scholarship of teaching and learning can give back to the disciplines in return. What matters in the end is whether, through our participation in this new trading zone, students’ understanding is deepened, their minds and characters strengthened, and their lives and communities enriched.²⁰

²⁰ M.T Huber and S.P Morreale (Editors) *Disciplinary Styles in the Scholarship of Teaching and Learning* The Carnegie Foundation for the Advancement of Teaching and the American Association for Higher Education, 2002.

SUPPORTING THE ENTERPRISE

Norma Ryan

A little over two years ago a few of us sat down to brainstorm ideas for the promotion of and recognition of teaching excellence within the institution. We were well aware of the efforts that many individual staff members were making but it was obvious there was no mechanism in place to recognise those efforts or, indeed to reward the efforts in a tangible way. Individual staff had excellent ideas and practices and yet there was no forum for discussion of their ideas and practices, no means of sharing the experiences learnt, by some over many years of teaching. It seemed a needless waste of an extremely valuable resource and we set out to explore ways by which the university could recognise the efforts and the excellence in teaching and also that the knowledge and skills attained could be shared with others.

The ultimate objective of our discussions was to fulfil the vision of UCC as a university where we

- ◆ Provide outstanding education in undergraduate, and selected professional and graduate areas;
- ◆ Produce research, scholarship and creative work of an excellence that is recognised internationally, nationally, and locally;
- ◆ Provide an equitable and fair environment, focussed on learning, for both students and staff;
- ◆ Provide a high quality of undergraduate student experience;
- ◆ Build on and enhance a strong tradition of community and professional service.

In this context, we considered various possibilities, and decided to commence the campaign for the promotion of excellence in teaching using a three-pronged approach. Funding was applied for, and obtained, from the Higher Education Authority under the Targeted Initiatives programme for three proposals:

1. Awards for Excellence in Teaching,
2. Awards for Research into Innovative Forms of Teaching, and
3. Recognition of Excellence in Teaching in the Promotion & Establishment scheme for academic staff in UCC.

The work on recognising and enhancing the scholarship of teaching in UCC commenced when Professor Nona Lyons, a Visiting Research Scholar at the Department of Education, UCC, agreed, in the spring of 2001, to introduce the concept of using the development of teaching and course reflective portfolios as one means of documenting the scholarship of teaching being undertaken by staff. Nona's introduction to the concept, conducted over a series of four two hour workshops, was so well and enthusiastically received that we decided to continue the work the following autumn. We set up a series of weekly seminars where staff presented their experiences, shared their knowledge and ideas, and discussed their failures as well as their successes. The level of enthusiasm and willing participation by many staff in the project was truly encouraging, and was greatly enhanced when Nona returned the following November for an extended seminar and a public lecture and in January 2002 for a term to facilitate the weekly seminars and to assist applicants for the Excellence in Teaching Awards in preparing their portfolios.

The immediate and swift response to and acceptance by staff in UCC of the idea and practice of using a portfolio as a means of self-development, of documenting their teaching practice and as a

means of sharing and discussing with others their experiences, clearly demonstrated the value of the exercise. As a staff member in the Department of Biochemistry in UCC for many years it has been a wonderfully enhancing experience for me to have so many of my colleagues share their thoughts and ideas on their teaching practice over the past year. New staff, young staff and not-so-young staff, experienced staff and less-experienced staff have all contributed and I am sure will continue to do so. The weekly seminars will continue as a discussion forum where everyone with an interest in teaching is welcome, irrespective of background or experience. They will continue to offer guidance to staff in development of reflective portfolios and thus continue to enhance the quality of the teaching experience for the teacher and the learning experience for the student.

As Director of the Quality Promotion Unit I have responsibility for, among other things, implementing and facilitating reviews of all the activities of all department and units in UCC. Prime among the activities of an academic department is the teaching activity of the department. This is not an easy or straightforward task. Teaching is a multi-faceted activity, encompassing not only lectures, but tutorials, small-group teaching, laboratory and research work, project work, computer-aided learning, problem-solving techniques - all with multiple learning objectives for the students. Today there are many sophisticated tools available to the teacher in addition to the traditional blackboard and chalk. Not least among these is the use of computers and of the Internet as tools for information delivery and as a means of acquiring learning. Course design, preparation of teaching materials, assessment, feedback and advice to students, collaboration with colleagues on course teams are all elements of the work of a teacher in an academic environment. All of these elements are complex and require that adequate support and assistance be given to staff to enable them to give of their best. The encouragement to staff to reflect on their teaching practices and to discuss them with colleagues in a non-threatening environment, i.e. non-judgemental, has provided participants with a level of support and encouragement that has been very well received. Many have commented on the changes they have introduced into their teaching practices as a consequence of attending the seminars and attempting to put a portfolio together.

The measurement of the effectiveness of teaching and learning is a complex matter and cannot be one simply of numbers and statistics. In the current climate of accountability and transparency we are continuously being asked what are we doing and how well are we doing it. Thus, it is important that we develop appropriate tools to measure the effectiveness of teaching and learning. These tools must be acceptable both to the assessor and the assessed, and must fulfil the purpose for which they are used. The aim of the Quality Reviews in UCC is the improvement and enhancement of the quality of all our activities, including teaching as a high priority, and all mechanisms which work towards that end are welcomed. Heightening the awareness of the scholarship of teaching and of the value that reflection on one's teaching can bring to an individual can only enhance the activity and thus ultimately the quality of the student experience. Informed reflection will lead us in the development of appropriate tools for the measurement of the effectiveness of teaching.

It has given me great pleasure over the past year to support this Scholarship of Teaching project, and I look forward to the continuing development of the initiative over the coming year.

THE PROJECT

INTERROGATING, DOCUMENTING, AND REPRESENTING
THE SCHOLARSHIP OF TEACHING THROUGH A REFLECTIVE
PORTFOLIO PROCESS: THE UNIVERSITY COLLEGE CORK EXPERIENCE

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In 1990, when Ernest Boyer published his book, *Scholarship Reconsidered*, he made a bold assertion. Calling for a radical re-consideration of scholarship within the academy, Boyer argued that colleges and universities needed new forms of scholarship beyond the traditional research model, what he termed the scholarship of discovery. He called for three additional forms: a scholarship of integration to go across disciplines and capture and interpret work at their intersections; a scholarship of application to address real, consequential problems of people and institutions; and, a scholarship of teaching that would not only contribute to knowledge but transform and extend it. Boyer challenged: Can we define scholarship in ways that respond more adequately to the urgent new realities both within the academy and beyond?

Boyer's work launched a series of investigations into college teaching and instigated such questions as: What is the scholarship of teaching? How can it be inquired into? And how can it be documented and represented? It was Donald Schon who saw that if such an idea were to be taken seriously it must "produce knowledge that is testably valid, and claims...must lend themselves to intellectual debate within academic communities of inquiry" (Schon, 1995, p.23). For Schon, the new scholarship of teaching implied a kind of action research, planned and conducted by faculty themselves, not by some outside, objective observer of standard scientific inquiry. But how? With what consequences-especially for the validity of the knowledge uncovered?

This collection of essays takes up these issues at a time of intense interest in third level teaching in Ireland, the United Kingdom and the United States. It focuses on a major new scholarship of teaching initiative presently going on at University College Cork (UCC) and does several things:

- ◆ Presents a context of the project, that is, the initiation of a new President's Awards for Excellence in Teaching at UCC in which faculty were to make application by preparing a teaching portfolio;
- ◆ Describes why the "scholarship of teaching" became an important conceptual rationale for the project and how a portfolio in this work is cast both as a mode of inquiry into teaching *and* a way to document it and reflect on its meaning;
- ◆ Outlines how the portfolio process is scaffolded through the presentations of portfolio entries; and,
- ◆ Offers results of the project, indicating what faculty from across different disciplines say they find in it. This discussion of findings continues in a related chapter, Chapter 12. There I also consider larger institutional implications and consequences of this work to ask: Can it be sustained institutionally? Advanced? What might stand in the way?

Data discussed here and faculty comments are drawn from two sources: UCC faculty presentations made at an ongoing weekly "Portfolio Seminar" in which some 40 people shared potential portfolio entries during the 2001-2002 academic year; and, from selected interviews with 16 of

the 23 faculty members who prepared and submitted for award a Teaching or Course Portfolio. In all, approximately 250 faculty participated in the seminars. In spring 2001, while a Visiting Research Scholar at UCC with a special interest in reflective portfolios, I was invited to introduce the portfolio idea and to serve as the facilitator of the project. In January 2002 I returned to UCC to facilitate the on-going seminars and document this work. Presently, I am conducting interviews with faculty who submitted portfolios for the UCC 2002 awards. Here, I turn first to the context of the project and its beginnings.

Institutional Context and Organizing Concepts: A Scholarship of Teaching

Impelled in part by the initiation of Awards for Excellence in Teaching at UCC as well as by such questions as: How do we know what our students know and understand? Or, Why are some things hard for students to learn?, this Scholarship of Teaching project is designed to foster inquiries by UCC practitioners across the arts, commerce, law, engineering, science and medical faculties into issues of teaching and learning. Although clearly a response to the UCC Teaching Awards initiative, the portfolio seminars that took place in the spring of 2001 and throughout 2002 were not limited solely to this purpose. Drawing on Ernest Boyer's idea of a scholarship of teaching, this project was introduced to some 60 UCC faculty through the series of three seminars held in the spring of 2001, titled: "Interrogating, Documenting, and Representing the Scholarship of Teaching: Portfolio Options." The goal was to provide a forum for faculty to explore: What is the evidence of a scholarship of teaching? How can it be inquired into and documented? And, how should it be assessed?

In his book, Boyer had made his case persuasively saying he believed that "the time has come to move beyond the tired old 'teaching versus research' debate and give the familiar and honorable term 'scholarship' a broader, more capacious meaning, one that brings legitimacy to the full scope of academic work." Boyer affirmed as fundamental the idea of scholarship as including original research, but argued that

the work of the scholar also means stepping back from one's investigation, looking for connections, building bridges between theory and practice, and communicating one's knowledge effectively to students. Specifically, we conclude that the work of the professoriate might be thought of as having four separate, yet overlapping, functions: the scholarship of discovery; the scholarship of integration; the scholarship of application; and, the scholarship of teaching (Boyer, 1990, p.16).

Boyer believed that teaching makes consequential the work of the professor. It begins with what the teacher knows. But it is also a "dynamic endeavor involving all the analogies, metaphors, and images that build bridges between the teacher's understanding and the student's learning." Boyer saw that "all too often, teachers transmit information that students are expected to memorize and then, perhaps, recall...but teaching at its best means not only transmitting knowledge, but transforming and extending it as well" (Boyer, 1990, pps. 23-24). Donald Schon emphasized the fundamental feature for a new scholarship of teaching as active inquiry into it by faculty themselves. Lee Shulman, then of Stanford University, later to follow Boyer as President of the Carnegie Foundation for the Advancement of Teaching, extended these arguments to the need for a new kind of documentation:

My argument is that until we find ways of publicly displaying, examining, archiving,

and referencing teaching as a form of scholarship and investigation, our pedagogical knowledge and know-how will never serve us as scholars in the ways our research does. The archival functions of research scaffold our frailties of memory, and we need something comparable for the scholarship of teaching (Shulman, 1998).

It was from Shulman's work, along with that of colleagues at the American Association for Higher Education (AAHE), that the idea of a portfolio emerged as a candidate for representing teaching. But it was to become something more.

The Portfolio as a Mode of Inquiry into Teaching *and* a Means to Document It

Why Portfolios? While the portfolio may be thought of simply as a receptacle, a means of documenting teaching, it can also serve as a method of inquiry. Portfolios came into teaching in one form through teacher education because educators recognized this possibility. If competent teaching is a complex, uncertain and often messy activity, it could not easily be documented or assessed. Traditional ways of credentialing teachers - by courses completed, degrees, or an acceptable grade on a National Teachers Exam - seemed inadequate to capture teaching's dynamics or dimensions. Portfolios emerged as a more possible medium. Life in classrooms, teachers at work could be caught through a portfolio with its entries and evidence of work over time. It could document how a teacher and his or her students were progressing, recording lessons taught, assessments made. It could carry a syllabus, a course plan, and ample samples of student work, revealing levels of student understanding - including student portfolios.

However, each portfolio entry carries a crucial element: that is, a *reflection*. Through reflections, a teacher revisits and inquires into his/her own teaching, assessing what succeeded or failed and why. In this reflective interrogation, teachers uncover the meanings and interpretations they make of their own practice. Through a portfolio documentation they can make this knowledge public and open to scrutiny. Thus, the portfolio can be both the means of inquiring into teaching and a way of recording the results of that process.

For an activity to be designated as scholarship, the AAHE suggests that three characteristics are needed:

- ◆ It should be public;
- ◆ It should be susceptible to critical review and evaluation; and,
- ◆ It should be accessible for exchange and use by other members of one's community (Shulman, 1998, p.5).

Portfolio Models: To the AAHE, two portfolio models offer the possibility of meeting these goals: the Teaching Portfolio and the Course Portfolio.

The *Teaching Portfolio* can be defined as a set of accomplishments of teaching, usually including samples of student work and accompanied by reflective writing and serious conversations with colleagues. While there may or may not be a set of specified entries for a teaching portfolio, it usually is thought of as comprised of a range of evidence of one's teaching. For example, there might be a statement of one's teaching philosophy or beliefs, a syllabus, a video of a class, sample assessments used to determine what students know and understand, etc.

The *Course Portfolio* focuses more specifically on a single course (Hutchings, 1998A). Creating a

course portfolio is or can be inherently an investigation for, as Shulman suggests, it depicts a “journey motivated by purpose and beset by uncertainty. A course, therefore, in its design, enactment, and analysis, is as much an act of inquiry and invention as any other activity more traditionally called ‘research’ or the scholarship of teaching” (Shulman, 1998,p.5).

The course portfolio by its conceptual framework very specifically highlights outcomes, that is, student learning. But, I believe, so too should a teaching portfolio include a substantial look at student learning. All portfolio types, including team portfolios, department portfolios etc., incorporate evidence of student learning and as such may be said to share certain purposes for a portfolio-maker (Lyons, 2002 B):

- ◆ To engage in the systematic inquiry into and documenting of teaching.
- ◆ To highlight the evidence of student understanding and learning.
- ◆ To articulate and make public the knowledge of teaching and learning.
- ◆ To foster dialogue with colleagues about reflective teaching and its scholarship.

Portfolio Entries: A Theoretical Activity

Portfolios are constructed through their entries. Each entry is a significant piece of evidence that creates a portfolio maker’s vision of teaching and learning. It is a professional undertaking. Each entry usually includes some artifact, that is, some piece of evidence related to the entry, such as a syllabus, a contract between practitioners in training, samples of student work, etc. Lee Shulman calls portfolio-making a “theoretical activity,” for what is deemed portfolio worthy is a statement of the portfolio maker’s theory of teaching/learning.

Portfolio entries vary with the purpose of the portfolio, whether a teaching, course portfolio, mentor, etc. The portfolio usually opens with a statement of its purpose along with such basics as a table of contents. It may have an organizing theme. Most portfolios that document teaching, supervision or mentoring can be organized around design, enactment, and results - a set of ideas first put forward by the American Association of Higher Education (Hutchings, 1998 B) for constructing a course portfolio. But this set of ideas seems useful for several kinds of portfolios.

Design of Teaching: possible evidence includes: all the ideas and documents that set forth the course of study and the expected performance of the student, such as, the plan for the program, assignments, syllabi, contracts.

Enactment of Teaching: how the course is enacted, brought to life. Entries could include a learning log or journal, observations, diaries, hard copies of electronic exchanges, videos of performance teaching and/or videos of students at work, etc.

Results of Teaching: Entries focus on evidence of students’ work, performance, and understandings, including quizzes, projects - even student portfolios! Alternative assessments, a student’s reflective journal, all are useful. Interviews or surveys of student understandings also offer insights into what exactly students have learned, know, and the meaning they find in their learning.

Five elements usually accompany each entry and its evidence:

- ◆ A Label or Name for the Entry.

- ◆ The Context: Provides information about the context and purpose of the entry, the setting, students involved, subject, etc.
- ◆ The Rationale: Explains why the entry is included and why the portfolio-maker is interested in this entry and its inquiry.
- ◆ The Reflection: This is the critical heart of the entry. It is where a portfolio-maker interrogates what is learned from the experience the entry represents. Usually it is a robust account of several pages and includes how this entry changed the portfolio-maker's practice or how it might, or whether aspects of the original puzzle remain.
- ◆ Implications for Practice: The conclusion may be thought of as a new hypothesis about teaching and learning that emerges from the investigation, one that might shape future teaching/mentoring and one's own on-going learning (Lyons, 2001).

Portfolios ought to be formally and publicly presented to colleagues, peers, etc. (Lyons, in press). They need, too, to be scaffolded, that is, supported in their development. In the UCC project, a scaffold was provided by the weekly presentations by faculty of their own portfolio entries. Over the course of 2001 and the fall of 2002, each week UCC faculty were invited to continue meeting together to share their teaching experiences as potential portfolio entries. In all, some 250 faculty attended seminars and 40 presented portfolio entries for their own teaching or course portfolio.

Scaffolding the Process of Inquiry: Portfolio Presentations

We close the classroom door and experience pedagogical solitude, whereas in our life as scholars, we are members of active communities: communities of conversation, communities of evaluation, communities in which we gather with others in our invisible colleges to exchange our findings, our methods, and our excuses. I now believe that the reason teaching is not more valued in the academy is because the way we treat teaching removes it from the community of scholars (Shulman, 1993).

In the large sunny room of the Law School building, Áras na Laoi, some 40 members of the UCC faculty gathered on a May morning to find out about portfolios and to begin to consider what might become entries of their own. Two members of the medical faculty who team-teach a course in Epidemiology and Public Health were the first to volunteer to present. It was the end of the school year and faculty were fresh from reading scripts, reviewing exams and other documentation of their teaching and their students' learning. "We decided to look at some evidence from one of our courses that we find puzzling," the two began (Lyons, 2002A).

Describing two assignments given to their students, each designed to examine and analyse epidemiological data, these teachers discussed how they had found one assignment successful with their students and the other clearly not-and this was the second year in a row that they had assessed this result. They described the situation of the one assignment as "disastrous." What followed was a discussion, not only about inquiring into why one assignment did not work, but why this pair of teachers had continued with something they had reason to believe was a failure with their students. The idea that faculty could continue to pursue something problematic opened the discussion to what it is that people continue to struggle with and what that might indicate: potentially something held as valuable, in spite of its difficulties. How to uncover and correct these difficulties, make it possible for students to experience the kind of learning faculty envisioned, opened a critical question that came to be considered the heart of the interrogation and the

seminar discussions: *How do we know what our students know and understand and how can we find out?* That question engaged and held UCC faculty interest that was to continue over the course of the following school year.

When week after week, faculty volunteered to present aspects of their courses and their teaching, they acknowledged a kind of culture shift, an introduction of a new UCC norm: to share teaching with other colleagues. When fall came and the new school year opened, the Portfolio Seminars continued. In all, a range of topics - entries for teaching or course portfolios - was presented and discussed. The following titles of faculty presentations provide a sampling:

- “The archaeology of a course: The history of revising a course in biochemistry”
- “ How I went from a reluctant social work lecturer to an eager enthusiastic teacher; or going from 12 theories to 3 to help students *use* theory in their practice.”
- “Using role-play in medical education.”
- “Web-based learning as the royal road to transforming classrooms: A Bridge Too Far?”
- “Designing a new-born infant resuscitation education program.”
- “Using an expert student group in problem-based medical case study discussion.”
- “Fostering student understanding in teaching Dante.”
- “Using drama to teach German.”
- “From a philosophy of teaching to a practice of facilitated learning-”Exciting the sociological imagination.”

Results: What Faculty Say They Learned

It might be said that the basic goals of this project were achieved in January 2002, when 23 portfolios were submitted for the 2002 Awards for Excellence in Teaching at UCC. Five awards were made, as originally intended. Yet, some acknowledged, at least twice as many could have been awarded. Several portfolio-makers and some faculty portfolio presenters offered their views on their experience of the portfolio process and shared them at a last seminar of the year. Their comments reveal the meanings they found in the process. They also point to larger implications, if this work is to survive and thrive within an institution and advance a scholarship of teaching.

That final seminar opened with six UCC portfolio makers discussing the question: “Looking back over the experience of creating a portfolio, what stands out for you?” This question was also asked in interviews with those faculty who completed and submitted a portfolio for the UCC awards. Here I report on some responses - 20 respondents from both groups - as they cluster around a central finding of this work (Lyons, 2002A). While most faculty acknowledge that the portfolio development process was very hard work, more time-consuming than they ever realized it might be - they also acknowledge that it had brought about a process of reflection that gave them new insights and knowledge. That seemed to happen through an emerging consciousness that had at least four dimensions: a coming to a new awareness of one’s teaching; a more explicit understanding of the interconnection of the organizing ideas, concepts and content of teaching for oneself and one’s students; a deepening knowledge of students, how they may be motivated, how they respond, and, especially, how to find out what they know and understand. This new consciousness not surprisingly leads to changes in teaching practices. The following elaborates these interconnections of reflective consciousness.

Becoming More Consciously Aware of Teaching through Critical Reflection: Almost all participants of

the portfolio inquiry process comment on how it has made them more consciously aware of their own teaching practices, of their beliefs about teaching, and of their importance in day-to-day teaching. Some are surprised at seeing exactly how the elements of their practice fit together. Some are surprised at the gaps they find in such a critical review. Others see connections and become more aware of certain aspects of their practice-things they say they may even have been doing or acting on but not explicitly aware of. As one lecturer commented: "I was putting together two courses for a teaching portfolio. And in doing that, I suddenly realized the connections between the two.... I was not aware of the connections. Like someone said at the last seminar, suddenly they discovered that they had a teaching philosophy. Similarly, I had not been conscious of these connections. Now this reflective process makes that possible. In the future, I know I will be more conscious-that's part of the reward of this reflective process."

This may not be surprising. As Jerome Bruner reports, reflection is "a process of sense making, of going 'meta,' turning around on what one has learned through bare experience, thinking about thinking" (Bruner, 1996). Third level faculty all too often are not encouraged in this process. But this idea of a new consciousness of teaching has at least three other related components:

Making goals, concepts, and organizing ideas of learning more explicit to oneself and one's students. One faculty member identified a new "explicitness" as a result of the reflective portfolio process. ". . . it was very interesting to put in writing explicitly what I wanted to put into the course, what I wanted students to do, what I wanted students to learn." This faculty person has decided that next fall he will give his students this rationale for his course. He wants to see what difference it might make to their learning. This finding fits with the work of such researchers as Howard Gardner (1999) or Grant Wiggins and Jay Mc Tighe (1998) who today argue that teaching for student understanding requires a level of explicitness of organizing questions, concepts and content as well as a focus on student engagement and performance.

Becoming aware of students' needs as learners, coming to know what they know and understand of the concepts and content under study. Almost all UCC portfolio makers comment on their increased awareness of students, their motivation, how they know what students know and how they need to find out. In many instances, faculty report greater experimentation with continuous assessments in their search for new ways to do that.

Changing one's teaching practice, continuing investigations. One clear outcome of this kind of reflective consciousness is that faculty here report changing their practices, of experimenting with new ways of doing things, and of actively committing themselves to their on-going professional development. One example came in the second year of this project when the team from Epidemiology and Public Health who opened the first Portfolio Seminar Presentation reported the subsequent success of their revision of a student data analysis project. It was the one they reported as a disaster. In pursuing developing a course portfolio, they radically revised the assignment, changed the data set they were using, and found success with their students in using it. They attribute success directly to the reflective portfolio process. And, of course, there was their own commitment to excellence in teaching.

Related to this finding, is the discovery that many faculty have come into third level teaching with little if any preparation or learning about teaching. Many report their first teaching experiences as being pure sink or swim. This group, however, has actively engaged in finding ways to support

their own development as teachers, taking up courses offered at UCC, others going abroad through distance learning programs of the Open University or other opportunities for learning about teaching at third level.

Thus, there is revealed through the uncovering of reflective awareness a new, usable knowledge: of one's teaching practice; of what is needed for effectiveness; of a deepening sense of one's students, their needs and possibilities as learners; and, of the possible ways to change one's practice. In addition, there is at least one important institutional change that UCC portfolio makers report:

Building a forum for critical discourse about teaching and learning across disciplines.

Almost all 20 faculty respondents commented on the fact that the portfolio seminars were initiating a new norm at UCC, that is, a forum for faculty discourse about teaching and learning across disciplines. During the seminars participants commented frequently about the commonalities across disciplines of issues of teaching that confront them daily in the classroom. They also said how much they valued learning how people were dealing with difficult issues, such as teaching large classes in immense lecture halls, or obtaining the participation of students in active learning. A new norm was born which put teaching and student learning in the forefront of consideration.

In Conclusion

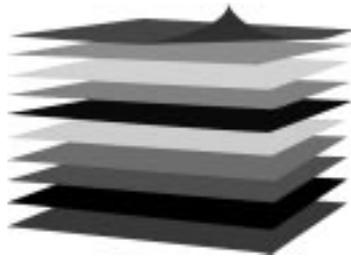
Other results from faculty engagement with a reflective portfolio process are reported in the last segment of this book, particularly Chapter 12. But it is important to consider some of the implications of this work. How can this work be sustained? At what level? With what resources? These questions invite institutional consideration. But clearly here a door has been opened, commitments to teaching revealed, and ways to excellence in teaching identified. Part 2 below continues the conversation.

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PART I



**PORTFOLIO ENTRIES OF UCC STAFF:
A SAMPLER OF PORTFOLIO EVIDENCE**

**DESIGNS FOR TEACHING:
A TEACHING PHILOSOPHY**

CHAPTER 1

WHERE FINBARR TAUGHT, LET MUNSTER LEARN

Marian McCarthy
Department of Education

Introduction

This philosophy statement provides a context for my portfolio, which is a course portfolio that sets out to document my teaching and learning, and that of my students, over a period of three years, from 1998 to 2001. The course in question is a foundation course within the Higher Diploma in Education, entitled *ED404 Teaching Studies* and is, therefore, prescribed for all Higher Diploma in Education students. (The Higher Diploma in Education is a post-graduate professional course for prospective second level teachers in Ireland). There are approximately 220 students registered annually for this course. Since this is the largest group of students I teach and since it is my opportunity to reach the greatest number of students, I am always concerned about the quality of the course and with student involvement. It is so easy for students to get lost in the crowd in a large lecture theatre like Boole 2 in University College Cork, where these Teaching Studies sessions currently take place. Equally, in such a huge, theatrical and hierarchical space, it is easy for the teacher/lecturer to get carried away with the sound of her own voice and forget that the students also have one.

In this work-in-progress, I attempt to show how I have tried to listen to and hear my students' voices and I begin to document how and what I have learnt about the complex process of teaching and learning. The teaching philosophy statement, which frames this portfolio and which now follows, helped me to lay out this complex journey for myself and to explore what teaching and learning in this university mean to me.

Statement and Reflection

I wish to open this statement by exploring the photographic evidence that accompanies this entry. My first photograph is that of the Bradán Feasa, or Salmon of Knowledge, a sculpture, which, until recent renovations, was hanging on the main outer wall of Áras na Mac Léinn (The Student Centre), overlooking the President's garden, here in University College Cork (UCC). When I took this photograph in 1999, I was struck by its symbolism, and particularly by its placing - in the heart of the students' world. The legend of The Salmon of Knowledge is part of Irish myth and history. I can remember being told this story in primary school and eating lots of fish - not just on Fridays - in those early years, in order to become "more brainy"! In the legend, Fionn is given the task of cooking, but not eating, this precious salmon of knowledge. However, he burns his finger in removing the salmon from the fire and puts his finger to his mouth, thus coming into contact with the flesh of the salmon. From then on, Fionn became the seer, the wise one. Would that the stuff of legends were so easy to come by in the reality of the classroom or lecture theatre!

However, the symbolism is not lost on us. The master, who was protecting Fionn, had spent a

lifetime looking for the salmon of knowledge - only to have it innocently snatched from his grasp by Fionn's action. The legend helps us to understand that knowledge is not easy to come by, it takes a lifetime of searching, as it did for the master. Then there is the re-searching, which is what I am trying to do through this portfolio process, followed by the making, mistaking and remaking, before any salmon of knowledge is netted. And then, in terms of current research into teaching and learning, there is the reality that knowledge is only one of the four dimensions of understanding, the others being methods, purposes and forms (Wiske, 1998). Without methods (how we learn to build knowledge) and purposes (why this knowledge has significance for us and how we own and make sense of it) and forms (the various representations we give to knowledge in making our own of it and sharing it), knowledge is inert and without context. In terms of teaching at university level and my attempt to involve 220 students, it is my job to build the dimensions of understanding into each session, so that my students are meaningfully engaged. Like Fionn, they need to make their own of their encounter with the salmon of knowledge. In my reluctant role as master (for there is so much that I have not mastered), I can facilitate that journey, but I cannot and should not dictate its individual pathways.

I am also struck by the idea of the "Leaping Salmon" which is equally evoked in the sculpture. I note the struggle of the salmon as it strives to climb the waterfall. Again, as with the legend, there is challenge; the task is achievable, since it is part of the nature of the salmon that it will swim against the current, up the waterfall. But the task is not easy. It is significant that this is the image chosen to portray and distinguish Áras na MacLéinn. I read it as a sign of hope and challenge. It is in our nature to thirst for knowledge and to strive and climb for it. As a teacher in this university since 1995, it speaks volumes about my role in helping students - and myself - to negotiate that waterfall.

In my attempt to outline my teaching philosophy, my second artifact, of the motto and crest of this college, is equally significant. I have chosen to present two images to represent my thinking here. The first is of the crest and motto as cast in stone on the wall outside the Honan Chapel in UCC. The motto reads "Where Finbarr taught, let Munster Learn" and has become my inscription for this portfolio and my inspiration. Again, perhaps this motto is the stuff of legend, as instanced by Prof. O Riain's research regarding the Finbarrian tradition, wherein a tongue-in-cheek letter writer suggested to him that the new motto of the college should read "Where Munster thought that Finbarr taught"! (Murphy, 1995, 386). Nevertheless, even if this is not exactly the site where Finbarr taught, what matters to me is the symbolism of this motto and, in particular, the symbiotic intertwining of teaching and learning. It is my belief that if there is no learning, then there is no teaching; there may be lecturing, or preaching, but for learning to happen the students need to be involved, as indeed does the teacher if she is to learn about her own process.

This brings me to my second image of the motto, which is displayed on the lecterns of the Boole theatres. In this photograph, the five HDE students who volunteered to give the final lecture of the year in Teaching Studies are pictured in Boole 1, behind the lectern, in December 2000. Jutting up behind the crest, is part of a Christmas stocking, which we used to gather draft examination questions, designed by the students and submitted at our final session. My purpose, for the moment, is to highlight the interconnectedness of teaching and learning as given to us in this motto. To me, its beauty lies in the perfect balance it gets between teaching and learning - without the latter, the former rings hollow. "Munster" is doing the learning when I get off the podium and give my students the chance to demonstrate and share what they know and understand. My challenges to them must invite their performance of understanding and not just their imitation of it in some meaningless copying and

regurgitation of “the notes”. I could not have a better call to teaching than this motto, for when learning is at the heart of teaching, I am moving in the right direction.

Looking at the crest of the college as presented in both images, it is significant that the open book of learning is at the centre, overlapping the royal lion on the left, the three ancient sub-divisions of Munster on the right, and framed above by the arms of the city of Cork. For me, the centrality of the book of learning underlines the importance of learning within the college. Its openness conveys the idea of on-going learning; the possibility of being open to change is also present in the metaphor associated with books of being able to “turn over a new leaf”. Indeed, documenting my teaching is a good way of beginning such a process. The concept of “an open book” also signifies accountability and making something public and I believe that we should indeed be both accountable and public about our teaching. The open book is indeed the centre, but not the sole symbol of the crest. I think this is significant in placing us beyond the remoteness of the “ivory tower” image. As a teacher in this university, I am part of Cork, part of Munster and in the 21st Century, part of the whole world. We are no longer dealing with a student population from Munster only, our students come literally from around the world and our teaching is of that world. Such sweeping demographic changes in the student population have significance for how and what we teach - cultural, racial and individual diversity are now a key factor in our interpersonal and pedagogic interaction with students. And our student population now has a thriving force of mature students who make real the process of life-long learning.

All of my Higher Diploma in Education students are postgraduates and many of them are mature students; this has significance for how I will design and teach courses. A transmission model of teaching, where I set myself up as expert, will not do in the contemporary lecture theatre, where many of my students have had experiences about teaching and learning that far outweigh mine. It is my belief that I must give them voice and honour where they are coming from and who they are, by letting them speak for themselves. This is why I have introduced the idea of the student lecture at the end of each term, in an attempt to let them make their own of the Teaching Studies course. It is also why I have encouraged students to design the examination questions for the course and make their own of the otherwise dreaded, terminal exam.

In finding a pathway through this teaching statement, I now want to draw on some key educational figures in the United States and their philosophies and explore how they encapsulate my teaching beliefs. The first is Howard Gardner, Psychologist and Professor of Education at Harvard, and honorary doctor of UCC, whose insight in the following quotation sums up good teaching for me : “We all have different kinds of minds and the good teacher tries to address each child’s mind as directly and personally as possible” (Veenema et al, 1997). I have spent 25 years now trying to become a “good teacher”. I began my teaching career in 1976, taking my Higher Diploma in Education in my old school (St. Vincent’s, Peacock Lane, on Cork’s north side) and then continued to teach for 18 years in an all-Irish secondary school (Coláiste an Phiarsaigh, Glanmire, Co. Cork) before coming to teach in UCC in 1995. On the one hand, it could validly be said that I have not travelled very far - yet, in terms of teaching and learning, I feel that I have covered thousands of miles - many of them across uncharted territory, trying to explore new ways of teaching and learning with my students.

It was in working with second-level students that I discovered the truth of Gardner’s dictum for myself. I have recorded this adventure in an M Ed. thesis, which I completed in this university

(O'Connell, 1994). In it, as a teacher of English in those days, I explored the drama text in a student-centred way, using the various sign systems of the play to draw the students into it. In that process, I began to use the students' various intelligences to hook them into the work - though I did not use that terminology at the time - and so began my exploration of Gardner's work, which is now so central to my current teaching. I have also summarised my teaching process and findings during this era of the early 90's in article form. (McCarthy, 1996).

In his Theory of Multiple Intelligences, Gardner (1983, 1999a, b) claims that each of us has at least eight intelligences, which we use to process information and make sense of the world. It worries me at university level, that as teachers, we tend to be overly defined by the lecture system and behave as if students had only two intelligences - the logical/mathematical and the linguistic. The other intelligences, namely, the bodily-kinaesthetic, the inter and intrapersonal intelligences, the musical, the visual-spatial and the naturalist intelligences are equally important in helping students to learn. I hope in this portfolio to show how the personal intelligences, in particular, can be used to draw the students into the learning. Whether at secondary or tertiary level, it is my belief that the good teacher must reach out to the students and seek to involve them meaningfully in their learning. In Gardner's words again: "We can have specific educational goals, but we must be willing and able to approach them by multiple means" (Veenema et al, 1997).

Another American whom I find inspiring is Brooks Adams, who sums up for me the constructivist approach to learning: "Knowing that you cannot teach a child everything, it is best to teach a child how to learn" (Wiske, 1997, 18). I believe that this is also the task of university teachers. In this technological age, there is little point in being product driven with knowledge - for it is readily available on the Internet. The point is to teach students how to access knowledge and how to process it. How can we do this if the students are sitting for slots of 50 minutes in our lectures taking endless notes? This system of infinite coverage will simply perpetuate the myth that knowledge is a product - already packaged, simply to be downloaded. But, as students learn for themselves in the real world, real problems don't come pre-packaged. As graduates, students learn quickly that knowledge remains inert, unless it is constructed and owned by themselves and made relevant and purposeful. In short, I believe that we need to teach students to think for themselves and to be flexible with knowledge. We can't do that if we continue primarily to lecture at them.

Let me turn now to Mark Twain, from whom I have learned so much about teaching and learning. His book, *Life on the Mississippi*, was a key text in a wonderful on-line course on Teaching for Understanding, which I took with Lois Hetland and the Project Zero team at Harvard during the academic year 2001/2. The book is about learning to teach and learning to learn and charts the relationship between Bixby - the master river pilot - and Twain - the apprentice pilot. The following impassioned words are spoken by Bixby in a moment of frustration with his pupil. I find the enthusiastic and over-anxious part of me identifying with him, regardless of the age or understanding of the student: "When I say I'll learn a man the river, I mean it. And you can depend on it, I'll learn him or kill him" (Twain, 2000, 41). Twain gives a footnote with the word "learn", commenting wryly that "teach is not in the river vocabulary" (Twain, *ibid*). What fascinates me about Bixby's words is that they brings us back again, via another route, to our own college motto, for once more, teaching and learning are inextricably linked. Indeed, "I'll learn him" is also part of Cork vernacular! Substituting learning for teaching has its place, for to teach someone is to help him to learn - indeed, so involved is Bixby in his teaching that it has become learning - he has no need for the "teaching" word in his vocabulary. On one level, I would go along with Bixby's translation of teaching as

learning, since I believe that if my student isn't learning, then I had better look firstly to my teaching in addressing the problem. There is a danger lurking in Bixby's turn of phrase, however. As teachers, we cannot do the learning for the students and Bixby, in his enthusiasm and frustration, is losing sight of this point. The teacher and the student have their distinctive roles in the learning process. I agree with Adams that it is the teacher's role to teach the students how to learn; the student's role is to make his or her own of that learning process. In short: "Where Finbarr taught, let Munster learn".

The above philosophies can be harnessed in the whole movement towards Teaching for Understanding (TFU), which has been the biggest influence on my teaching beliefs and methodologies in recent years. Growing out of the work of Howard Gardner and David Perkins and the Project Zero team at Harvard, it puts the theory of Multiple Intelligences in perspective and the learning theory of Constructivism- where nothing is your own unless you work it through - to good use. Within this model, the intelligences are not ends in themselves, rather they are a means to an end, which a good teacher will use in pursuit of educational goals that will help the student to understand the key concepts of the discipline in question. As part of my work with the Multiple Intelligences, Curriculum and Assessment Project here in UCC, I have tried earnestly to follow the philosophy of TfU over the past five years (McCarthy 1997; 1998a; 1998b; 2000). It has helped me to be more transparent as a teacher and more accountable to my students.

In terms of its place in this teaching philosophy statement, the key message behind TFU is that it provides teachers and learners with a performance view of understanding, rather than a representational view. In short, the latter implies that there is a definite representation of understanding, which the teacher has and which the learner does or does not possess. As Perkins (in Wiske, 1998, 47) points out, however, the problem with this possessive image of understanding is that it does not allow for the learner who does not "get" or "have" the picture. Nor does it allow much for teacher intervention, other than that of the didactic model, wherein the teacher tries to transmit to the student his or her own understanding. Indeed, the teacher becomes like the frustrated Bixby - "learning" the students or "killing" them! The performance view of understanding, however, is much more flexible and open and provides us with an incremental and transformational view of learning. In other words, the learner comes gradually to understand by performing, doing, or engaging in activities that are real within the world which is to be understood. It is to this model of understanding and of active learning that this portfolio will speak. In terms of building my philosophy of teaching, the Teaching for Understanding model allows me to develop many roles. I need to become the designer of my course - rather than just the transmitter. I need to become the facilitator, rather than the dictator of learning. I need to become a motivator of my students, a choreographer of our shared teaching space, and a good listener. I hope in the course of this portfolio to show how I have attempted to grow into these roles. There is a place for the standard lecture, but in my opinion, used too often or exclusively, it does the more dynamic roles of teaching a disservice. And as much of the research indicates (Bligh, 1998, Gibbs & Habeshaw, 1984, Jenkins, 1992, Ramsden, 1992) it can make students too passive and listless, and perhaps the greatest disservice of all, it can render them voiceless and unable to think critically for themselves.

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CHAPTER 2

TOWARDS A PHILOSOPHY OF TEACHING

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As a university teacher of 31 years' standing, I have had very diverse experience with students, including lecturing to classes of 500, working with small groups of six to sixteen, and consulting with individuals. Broudy (1972) made a useful distinction between *Didactics* (where the focus is on teaching), *Heuristics* (promoting student thinking) and *Philetics* (engaging the social motive for interaction). I have pursued all three.

What philosophy lies behind such variety of activity? It would be good to report that I have, over the years, developed a fully worked-out and consistent rationale for all this activity. Unfortunately I must confess that I have not. However, it is possible to describe the different facets of my approach using the concept of role.

In what follows, I try to convey my philosophy of teaching in terms of a number of overlapping roles, some more historical, some more current, which I have occupied over the years. The roles are *Developer*, *Shaman*, *Monitor*, *Facilitator*, *Researcher*, and *Gatekeeper*.

1. Developer

When I first began teaching, I had had no formal training, and I cannot identify any strong role models from my undergraduate days. However, I took easily to lecturing, probably because I had been a debater at school. There was a marked discrepancy between my ease in lecturing and my incompetence in small group tutorial teaching - only rarely could I get the students to speak. Fortunately, it was a time of great interest in teaching development among staff, at UCC and nationally, and I availed myself of various training activities. These activities led to a gradual broadening of my view of the teacher's role, and an ability to foster learning in small groups. In parallel with the development of my own teaching, I joined with colleagues in generating support for teaching. We promoted workshops, sent staff to courses elsewhere, and successfully argued the case for the creation of a Teaching Development Unit with the first full-time director in an Irish university. As my own skills developed, I was able to offer workshops to colleagues in Cork and elsewhere on various aspects of teaching.

2. Shaman

Adelson (1961) uses the name Shaman to denote teachers who are narcissistic - they keep the students' attention focussed on themselves. In Broudy's terms (1972), they emphasise didactics. As indicated above, I took easily to lecturing, and was inclined initially to view the task as being a performance, the sole aim of which was to inspire and enthuse.

I still remember my first lecture. I drew on the blackboard a heart with an arrow through it, and underneath, the caption "I love Burriss Fred!" I then proceeded to expound enthusiastically about the work of B. F. (Burrhus Frederick) Skinner on operant conditioning of pigeons and rats. At the

end of the lecture, a student in the front row put up her hand. “Who is Burris Fred?” Undoubtedly, Burris Fred was not the only incomprehensible entity in my first lecture. It is likely that, in common with most novice lecturers, I filled my discourse with a succession of unexplained concepts. I spent most of my first year writing lectures, and the next five removing superfluous detail.

I continue to adopt the Shaman role with large first year classes. I now take pains to make my explanations clear, but have not abandoned the inclination to dramatisation which was a feature of that novice’s first lecture.

3. Monitor

McCann & Margerison (1989) identified various roles in management teams. One of these roles is concerned with monitoring that systems are working appropriately, and paying particular attention to detail.

A good example of the Monitor in action is my insistence on clear written expression. In feedback to students on their written work (Swain, 1986), I indicate the failures in communication which they perpetrate repeatedly. Former student Máire Griffin described the impact of this role as follows:

I handed up a draft of my thesis. Imagine my surprise when I received it back covered in squiggles, with words, paragraphs, sentences and entire pages rearranged or crossed out entirely. There were also numerous comments written in the margin. Clearly, my thesis was not as perfect as I had thought! However, mixed with the sheer fright of seeing my beloved thesis defaced in this way was admiration for Ronny’s command of English, attention to detail, and the manner in which he had engaged with an obscure area of cognitive psychology, as well as immense gratitude that he had taken the time to do so. A fellow classmate received her draft back from another supervisor with a tick on the last page, and the immortal letters “v.g.” at the bottom.

4. Facilitator

According to Adelson (1961), the teacher in this role focusses students on themselves, in order to help them fulfil their potential. I am most likely to take up the Facilitator role in discussion or group work classes. I would describe my approach as “person-centred” (Rogers, 1980). The notion of person-centredness emphasises the importance of establishing a personal relationship with students, engaging in dialogue, and promoting learner autonomy (Swain, 1991, 1996). However, there is no need to abandon traditional, rigorous, academic standards!

This approach is ideally suited to student advising and the development of heuristic skills such as critical thinking (Swain, 1984, 1991). However the role finds its fullest expression in professional training (Swain, 1999, pp. 45-46):

I am the Director of the one-year full-time training course for guidance counsellors at UCC. The course requires detailed organisation. I have to ensure that the complex administrative arrangements are in place, and that formal academic requirements are satisfied. However, I also take the view that a training of this sort must cherish and respect the humanity of the students. Thus, I am a person-centred bureaucrat who

must reconcile the poles of instrumentality and caring. It helps that I have excellent support from the Assistant Director and the teaching team.

Each year the bureaucrat sets up an intensive person-centred learning community. I invite the trainees to put themselves in the pupil role for the year and see how that feels. The course is academically very demanding, but I tell them that its greatest impact will be on the way they see themselves. I warn them that their awareness of feelings will be heightened on the course, and they will experience, by turns, joy, depression, exhilaration, exhaustion, despair, contentment and more!

The trainees are highly selected and invariably a delight to work with. They come to the course with varied experience of academics. Depending on their experience, a few are inclined to trust me, some are mildly sceptical, and some find me totally phoney. By the end of the course most have accepted the validity of what I am trying to do. Some are enthusiastic about my approach, some retain their scepticism. Most of them feel changed, as persons and as professionals. Many have said it was the most memorable year of their lives. I ask them to take what they have learned back to their schools and apply it.

At the core of the course is the personal work done by the students. This occurs mostly in practical settings: counselling skills training, group work, supervision of counselling practice. My contribution is to lead the group work. It is a privilege to see the trainees take on the challenge of examining their whole way of being.

5. Researcher

My teaching is research-led in areas such as questionnaire design and professional ethics. For my Ph.D., I constructed and validated a questionnaire on student evaluation of teaching (Swain, 1977). My teaching of professional ethics is based on research and practical expertise (e.g. Swain, 1996, 1998, 2000), and I have drafted codes of ethics for five professional helping organisations.

Much of my research has been teaching-led. My teaching concerns have resulted in both empirical and theoretical research. The empirical work includes teaching evaluation, as indicated above (Swain, 1977), and outcomes of group work (Swain, 1989). I have also published theoretical reflections on various aspects of teaching, for example the Facilitator (Swain, 1984, 1991) and Developer (Swain, 1979) roles.

6. Gatekeeper

Gatekeepers are agents of an authority beyond themselves (Adelson, 1961), guardians of standards and values which they communicate to students. They have themselves been scrutinised before being admitted to the role, and are expected to exemplify the values and standards in their own behaviour.

In the case of University College Cork, many of the standards are written down, as in the rules for marking examinations, and it is my role as Gatekeeper role to implement them. The values may not be equally explicit, though the College's mission statement attempts to express their essence.

As a teacher of psychology at both undergraduate and postgraduate levels, I am also the guardian

of professional standards and values. I teach undergraduates formally about ethics and urge my students to join the professional association (I am chair of its disciplinary committee). My work with postgraduates is designed to promote high practitioner standards.

Conclusion

King (1993) focussed attention on two teaching roles in her paper *From sage on the stage to guide on the side*, and was widely believed to imply that the former is now irrelevant. I believe that a teacher should occupy both roles, and others, as and when appropriate.

The roles which I have described above may contradict each other (for example, Facilitator vs. Monitor). Guggenbuhl-Craig (1982) points out that *it is not easy for the human psyche to bear the tension of polarities. The ego loves clarity and tries to eradicate inner ambivalence*. I have found it possible to embrace that ambivalence, and doing so has allowed me to extend the range of my activities as a teacher. Thus, the only general statement which I can make about my philosophy of teaching is that it is complex and sometimes self-contradictory.

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PART I
SECTION 2



**ENACTING TEACHING: ENTRIES
FROM TEACHING AND COURSE PORTFOLIOS**

CHAPTER 3

THE PROTEIN DATABASE (PDB) AS AN ON-LINE RESOURCE FOR TEACHING ADVANCED PROTEIN STRUCTURE

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Introduction and Chronology

Advanced Protein Structure (course code BC4007) focuses on explaining how protein structures are formed in Biology and how we can determine these structures experimentally. Most of what actually *happens* in Biology is mediated ultimately by proteins. This course originated in a unit previously taught in the department which I was allocated in 1993. I was unhappy with teaching it then because it was slightly outside my immediate area of research expertise up to that point. To address this I applied for and was awarded a competitive research fellowship from the Spanish government to carry out a project in a specialist protein crystallography lab (Dr Miquel Coll, Consejo Superior de Investigaciones Cientificas - CSIC - Barcelona). This introduced me to practical problems associated with obtaining crystals of proteins (not a trivial research task), collecting a usable set of diffraction data and the suite of computer programmes used to generate an electron density map for a protein. It brought home to me the scope for *failure* in this whole process so one gains some appreciation of how hard-won is each unique protein structure.

On my return to UCC, I set about updating the course which became BC4007 on modularisation by including material collected in Barcelona. It quickly became obvious that there was scope to introduce an element of active learning by allowing students to access, download and manipulate atomic coordinates from the Protein Database (PDB), the central repository of macromolecular structures. In 1997, I introduced a computer-assisted learning exercise (CALE) as an individual activity (i.e. in their own time, students were allowed access to a PC in my research laboratory to download coordinates from the PDB, to visualise this with RasMol and to write a brief essay highlighting three aspects of interest about the structure of this protein). This portfolio entry focuses on how the CALE forms part of module BC4007 and includes some examples of student work.

Since this was an optional course (attracting less than 20 students), this “individual activity” approach was possible for two years. However, in 1999 and again in 2000 numbers attracted to this course swelled to 45 or so. In 2000/2001, an attempt to operate the CALE as a class-exercise foundered due to the lack of enough computers and my own inexperience at scaling up the activity. In the academic year 2001/2, I addressed these shortcomings principally by spending time to make myself expert in the packages involved which then gave me the credibility to get the support I needed from the university’s Computer Bureau. I ran a 2-hr tutorial on CALE which addressed three related issues relevant to the course: Protein identification in a sequence database from partial amino acid sequence; Downloading atomic coordinates for the protein from the PDB and visualisation with RasMol; Introduction to genome databases and their navigation. This

tutorial was carried out with a single protein for the whole group. I then gave each student an individual partial sequence and asked them, in their own time, to follow the same procedure as that of the tutorial - using a manual provided - to visualise and represent the structure for that protein. This to be followed by a brief (3,000 word) report highlighting three aspects of importance in the structure.

In the year 2002/3, marks & standards for this module (previously a voluntary exercise) will for the first time recognise the CALE essay as a formal continuous assessment component (30%) of the module.

The Entry: protein database (PDB) as an on-line resource for teaching advanced protein structure

1. The Protein Database (PDB)

Protein structures are determined in current practice by two complementary techniques; X-ray diffraction and nuclear magnetic resonance (NMR) spectroscopy. NMR picks up signals from hydrogen atoms while hydrogen atoms are invisible in electron density maps derived from X-ray diffraction. In NMR experiments, mobile regions give much stronger signals than flexible regions of structure unlike X-ray diffraction in which flexible regions are invisible. NMR is performed in liquid phase (solution) while the other technique is in the solid phase (i.e. crystalline). Where structures of proteins have been solved by both techniques, there is remarkably good agreement between them. There are methodological similarities in that identical computer programmes are used for modelling and refining protein structures in both methods which use common calculation tools (e.g. the Fourier transform, common modelling programmes). At the end of this process, a set of atomic coordinates is generated which defines the statistically best structure arising from the experiment. These are like Cartesian coordinates (x, y, z) for each atom which are stored as a file in the PDB which forms a crucial publicly-accessible resource for life-scientists internationally.

Since 2000, the PDB has been operated in the USA by the *Research Collaboratory for Structural Biology* (RCSB; <http://www.rcsb.org>). This consists of collaborators from the National Institute of Standards, Rutgers University (NJ) and the University of California. Since this is such an important on-line and web-accessible resource, it is key to the objectives of BC4007 that students are introduced to this database and learn how to access, download and analyse structural information. Currently, this is taught to them in a two-hour tutorial and they then carry out an individual computer-assisted learning exercise (CALE) which conforms with my philosophy of encouraging active rather than passive learning. While this approach is quite novel in the context of both my department and UCC, since developing it, I have come across similar courses in several other universities which suggests to me that my approach is converging on international best practice in the area of structural biochemistry. Examples can be found at the Universities of Maine:

(<http://www.usm.maine.edu/~rhodes/CMCC>) and Arizona
(<http://www.biochem.arizona.edu/classes/bioc462/462aH/1stpage.htm#graph>).

In developing the content of BC4007 into the future, these and other courses offer some interesting avenues to add significant intellectual value to the course as it presently stands.

2. Computer Assisted Learning Exercise (CALE)

The CALE consists of a 2-hr. tutorial plus an individual exercise in which the student is allocated a partial amino acid sequence which they use for database searching.

The tutorial takes the students through *three* activities aimed at highlighting common features of the organisation, accession and navigation of large-scale databases. The potential of such resources for locating primary literature citations is highlighted throughout as this is an example of “added value” from which benefit can be derived for example in preparing assignments, literature reviews, research project write-ups and even dissertation presentations.

1. Access the SwissProt database. This is one of the most-used sequence databases. I demonstrate how we can search this database for full-length sequences matching a short partial sequence so that we can identify a query protein. This can happen in a research context where we often obtain partial sequences from peptide maps, mass spectra and from identification of functionally conserved regions of related proteins. The tool used for this is the basic local alignment of sequence tool (BLAST) and such a search is called a BLAST search. In passing, other activities one might wish to carry out are mentioned briefly (e.g. prediction of hydrophathy or secondary structure, comparison of DNA with protein sequences or *vice versa*, *pairwise* comparison of full-length sequences). This step of the exercise identifies our query protein as insulin.

2. Access PDB looking for structures of insulin. Initially we look at some of the interesting statistics and information available in the PDB homepage. This reveals the almost exponential increase in entries in the PDB: In the year 2001 alone some 3,344 new structures were deposited which exceeds the cumulative total for the period 1970-1994. Notwithstanding this, the PDB is highly redundant containing many closely-related structures. Therefore the proportion of new folds is much less than the proportion of new structures. In lectures I explain that this is due to certain methodologies adopted during the process of generating the electron density map.

These statistics also reveal how relatively important X-ray diffraction is compared to NMR. For proteins, approx. 85% of structures come from the former technique and 15% from the latter. Interestingly, almost as many structures of nucleic acids (really just short oligonucleotides) are determined by NMR than by X-ray diffraction. Statistical tables like the following (updated weekly by the PDB) give students an accessible and up-to-date picture of where we are with determination of macromolecular structures at any point in time.

PDB Holdings List: 23 April 2002		Molecule Type				
		Proteins, Peptides and Viruses	Protein/Nucleic Acid Complexes	Nucleic Acids	Carbohydrates	Total
Exp Tech.	X-ray Diffraction and other	13490	643	607	14	14754
	NMR	2223	84	436	4	2747
	Theoretical Modelling	347	25	29	0	401
Total		16060	752	1072	18	17902

PDB Holdings List: 18 Dec 2001		Molecule Type				
		Proteins, Peptides and Viruses	Protein/Nucleic Acid Complexes	Nucleic Acids	Carbohydrates	Total
Exp Tech.	X-ray Diffraction and other	12746	610	598	14	13969
	NMR	2094	78	414	4	2589
	Theoretical Modelling	308	24	27	0	359
Total		15148	712	1039	18	16917

For background, I refer students to a particularly interesting web-site (<http://www.sdsc.edu/pb/edu/sdb/sdb.htm>) which gives information on how the PDB works, its history and recent development. We can search by term (e.g. "insulin") or by a special identification code. I emphasise that this is a common feature of structural databases since sequences also have unique accession numbers. This allows us to identify a file of atomic coordinates for insulin.

We download these coordinates to our local computer. A typical file might run to 70 or so printed pages. PDB files are highly-standardised and contain other useful pieces of information such as amino acid sequences, literature citations and methodology used in solving and refining the structure. In the tutorial, we scroll down the corresponding file for insulin so that I can explain what each section of the file is telling us.

The list of atoms for lysozyme, runs to 1,407 atoms excluding hydrogen atoms. The coordinates (essentially Cartesian coordinates e.g. 44.140 -3.376 8.756 are x,y,z numbers for atom 1) are interpreted by a freeware graphics programme called RasMol (available at: <http://www.bernstein-plus-sons.com/software/rasmol/>) which represents the list of atoms as a three-dimensional structure. If the students wish, they can take their downloaded PDB file home on a floppy disk so they can work with them at their convenience. By arrangement with the computer bureau, RasMol is now available on the desktop of all the computers in the Biochemistry/Zoology computer room in UCC. However, I also tell students how they can download it to their computer at home if they so wish. Again, these arrangements encourage students to learn in an active way at a pace and even in a location of their own choosing. The students now view the structure in a variety of formats using the commands of RasMol entered via a command line. Different aspects of structure can be highlighted in this way. For example, the structure can be represented in wireframe, "ribbons" or spacefilling formats.

Different parts of the protein or even non-protein ligands with which the protein was co-crystallised can be represented so as to highlight them and to emphasise their various spatial relationships. The protein can be rotated to give an impression of its three-dimensional structure and animations of this can be created. The "spacefilling" representation of the whole protein is particularly instructive as it emphasises that there are no open spaces in the interior of proteins and they are therefore very efficiently folded structures. Moreover, their surfaces are quite rough

with lots of crevices, grooves etc. which provide options for binding small ligands or for creating microenvironments suitable for enzyme active sites. These regions are crucial for the biological activity of proteins.

3. Navigating the human genome database (<http://www.sanger.ac.uk>).

This shows how tools similar to BLAST can be used to navigate genomes such as that of humans, mouse, yeast, fruit fly and more than 50 bacteria. These large-scale genome databases will represent much of the intellectual “capital” for the future of life-sciences and complement other structural databases such as the PDB.

The students are then asked to put into practice what they have learned in the tutorial by carrying out a CALE on their own initiative. This involves the identification of a protein corresponding to an individual query sequence by each student followed by downloading of coordinates and visualisation of structure. A short report is written which highlights three structurally important aspects of the protein.

4. Reflection on this Entry

A number of key points emerge on consideration of the area of the discipline of Biochemistry dealt with in this entry which interact with each other:

*1. The intellectual profile of students has noticeably changed over the last decade. More and more students have a relatively weak background in Chemistry and mathematics and are simply “turned off” by difficult physical concepts such as thermodynamics. This poses a pedagogical challenge to me in that I need to get these concepts across but essentially can only hope to do so in a non-mathematical way. Partly for this reason, I have emphasised computer-based learning as a complement to traditional lectures. This appeals to increasingly computer-literate students and also avails of the much greater web-based resources now available. *En passant*, it also serves to introduce students to the international and multinational dimension of science as an intellectual enterprise as well as stimulating active rather than passive learning. Developments in distance education make it likely that this approach to university teaching will be increasingly important in the next decade.*

*2. The intellectual context of my discipline has also changed with Structural Biochemistry now being a far more important component of life sciences than ever before. The Human genome is now available as a resource for molecular life science disciplines. A key area of investigation into the future will undoubtedly be understanding the population of proteins expressed by a genome under a given set of conditions; *proteomic analysis*. The genome contains relatively static *instructions* for genes and their regulation but the proteome is a dynamic population of protein molecules which is constantly changing in cells. Thus the proteome potentially poses more difficult analytical problems than the genome. Reviews of techniques for such analyses are highlighted in *Physical Biochemistry: Principles and Applications* (2000). A related development concerns the relationship between sequence data (as exemplified by genomes) and three-dimensional structural data; the Protein Folding Problem. It is likely that there will be a nexus in the next decade between these two areas: proteomic analysis and structure-function relationships in biomacromolecules. Thus, material covered in BC4007 will form an essential part of the knowledge-base of molecular life scientists well into the next decade.*

3. *Organisational changes within UCC have altered the academic context within which courses are delivered.* BC4007 evolved from a larger antecedent course as a result of the process of modularisation. This posed a pedagogical difficulty as modules were shorter, highly self-contained and more focused courses than their antecedents. The centrality of the material covered in BC4007 to molecular life sciences is exemplified by the fact that these modules form part of several new interdisciplinary programmes. This has introduced upper limit constraints to practical matters especially computer-based learning.

Increased emphasis on documenting student learning (e.g. the Universities Act, FOI) have placed an increasing onus on us as university teachers to be clear in our communication with students on everything from routine matters to descriptions of the more intellectual aspects of course content. I deal with this increasingly by giving students all important information in writing and hope in 2002 to set up a web-site for my courses.

These issues have informed changes and developments in my teaching, allowing me to modernise and adapt both course material and my delivery of it to improve quality. Benefits to my academic career have matched the extra effort involved. I have managed to improve my publication list considerably (30 refereed papers and two books in 8 years) and new skills acquired have fed into my research. This spin-off has also helped me in presenting research publications more effectively (e.g. Sheehan et al., 2001). This paper features three-dimensional structures as well as multimedia adjuncts (accessible at <http://www.biochemj.org/bj/360/bj3600001add.htm>). Conversely, such adjuncts have been used in teaching other courses, highlighting the fertile cross-reaction there can be between teaching and research.

Feedback (e.g. questionnaires) show that I have built up a reputation among students as one of the most effective lecturers in my department and faculty. I have introduced a strong theme of computer-assisted learning through most of my courses. This appeals to some students' preferred way of receiving knowledge, overcomes barriers to learning, encourages active over passive learning as well as helping them to appreciate web-accessible resources as part of the international dimension of science. The major downside to developing this has been practical difficulties posed by lack of adequate computer facilities up to now. However, new funding from a Science Faculty fund will allow development of a state-of-the-art computer room for delivery of such courses into the future.

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CHAPTER 4

DEVELOPING A COURSE IN BUSINESS ECONOMICS

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Introduction

The purpose of this entry is to share my instructive practices and learning experience from my teaching of *Industry, Market and Strategic Analysis*, the core-course of our transition programme in Business Economics.¹ The module is attended by nearly 20 postgraduate students whose record in Economics suggest that they require additional qualification to join our Master programmes, and in fact they have been deferred a placement. However, student concerns about their background, their performance, and the curriculum's relevance to the workplace, have prompted me to experiment with a number of ideas and effectively to redesign the course from beginning to end. The process started quite unwittingly in my first week in UCC, in October 1999, with the most inauspicious of starts. I had just arrived, so, quite predictably, I modelled my lectures on the syllabus of my predecessor and the course-pack I had been handed a few days earlier.

My first week

Halfway through my second lecture, I was informed by the somewhat bored (but apparently patient) students that they had already covered the same case-studies and the other topics in the previous year. I was stunned and embarrassed. I suppressed an instinctive urge to run to the department to seek explanations, and tried to compute what my next dignified step should be. Mechanically, I put the inherited outline and course-pack aside. The movement dictated my next utterance. I asked the students what they had covered in the past and to what extent. They started looking at each other, but I realised that my question was good. In fact it was part of the solution if we were to make a fresh start. So I elaborated that obviously their academic needs were different from what I thought, so I should know more about them before we continued. I proceeded to invite them to help me design a new outline for *their course*: a course that would fit with their backgrounds and address their academic or career interests. That touched a chord. They responded. This was followed by an exciting brainstorming of ideas. I wrote down students' concerns and ideas, however unconventional or ambitious these ideas sounded at the time. In the subsequent meetings I included them in our course outline and started implementing them. This showed to the students that I had listened and cared, and that their input and ideas were constructive. I believe it inspired a sense of participation, commitment to the new plan, and self-confidence. Additionally, the ideas worked well for us and a year ago we re-wrote the programme's brochure to include the new activities and scope.

¹ The programme is formally known as the Higher Diploma in Economic Science. Its curriculum consists of the 20-credit core-course and two 10-credit elective undergraduate modules that students have not taken as part of their primary degrees.

In retrospect, that second hour of that interrupted 1999 lecture set the tone for a friendly instructor-student interaction that lasted for the rest of the academic year and beyond. It also provided the students and me with an opportunity to design and experiment with what we wanted to experience, and to move away from the dry format of replicating a predetermined set of notes. The lecturer assumed the role of the facilitator, the students assumed the role of apprentice researchers, and we became friendly. The meetings came to resemble sessions of cooperative educational discovery, and on several occasions we ventured and sought knowledge outside the classroom, which may be typical in other academic fields such as Zoology, but it is novel in Economics. This cooperative course-design session is now an integral part of my introduction: I enquire into each new cohort's reasons for joining the programme and we set together the goals we wish to achieve. It is a great 'icebreaker' and generates enthusiasm and a two-way communication culture right from the start.

The experiences of the first year

The class generally lacked confidence and had a strong aversion towards the exam format of assessment. Indeed, the students expressed a desire that we move away from the final-exam method of assessment on the grounds that it did not suit them and it was both stressful and risky.² Moreover, a substantial portion of the class aspired to prepare for further postgraduate research. At the same time, those who intended to enter the job market wished to (a) reinforce their economic consulting and report-writing skills, and (b) find out how companies applied the theoretical tools they had been taught during the years. So we looked for something that suited these multiple goals. In the end we agreed that the students would explore, analyse, and submit written reports on the business strategies of select companies (accounting for three quarters of the final grade), and relate their findings to the rest of the class through presentations.

This endeavour would be supported by (a) Lectures on topics of advanced microeconomic theory (such as Industrial Organisation and Game Theory) that complemented the case-studies of the inherited outline; (b) a Discussion on academic writing; and (c) some Homework Exercises using statistical software applications, such as *SPSS* and *STATA*, to econometrically analyse micro-data.³ These were linked to a continuous assessment component, which was based on attendance and participation and would account for a quarter of the final grade. Once in the computer-lab, the students asked if I could help them improve their résumés with additional marketable skills, such as web-page design and construction. I showed them *Publisher* and *HoTMetaL*, and they practiced by composing CVs which we posted by linking them to the departmental site. Finally, we set up an e-mail list in order to communicate and coordinate with each other outside lectures.

Given that our search for knowledge and critical economic analysis was no longer confined to the university classroom and library, I arranged for us to visit a number of local companies, namely Apple, Pfizer, and the Port of Cork, as an organised group. This way the students were able to interview the managers and staff, get valuable insights on their visions and strategies, see the facilities first hand, and assess their operation. In addition, I invited a speaker from the Gas Board,

² A whole year's grade depends on a 3-hour performance and, students claimed, it could be adversely affected by a "bad" couple of days. They also added that they would rather focus on fewer exams in the final term (if that was the same with me) given that their other lecturers had not given them alternative assessment options

³ The data came out my own research dataset. The exercises helped students understand issues associated with applied microeconomics and strengthen their understanding of econometrics, in which they admitted to be very weak.

a public-utility type of company, whom we interviewed as well. By exposing my students to these speakers I achieved several of our goals. The students learned a lot about real-life business experiences, problems and solutions in the private and public sectors. This first-hand practical knowledge complemented their textbook knowledge, which is by nature more abstract. The conversations and interviews provided additional stimuli and allowed students to see how managers and staff (i.e., their prospective employers and co-workers) think and interact. Students became more confident, established contacts, and started networking. It was also great fun for all, especially when we drove to the plants, wore the protective gear, took pictures and joked, or the companies invited us for lunch. In one instance, after a longer-than-expected visit, I took the students out for dinner. This was reciprocated a few weeks later as the students invited me to a pub, and so on. In the process, and while outside campus, we became friends. When we returned to the classroom to discuss our findings or for me to present another analytical tool, the students were both relaxed and involved, the conversation was livelier, the topics and engagement exciting, the interrogatory (or question-based) format had been replaced by a dialogical format, and an exciting sense of cooperative educational discovery occurred.

The in-class presentations of the preliminary results allowed students to provide each other with some informal feedback, and see how their colleagues had used the same analytical frameworks (what worked or did not). This gave them additional ideas and helped them become more critical towards their own work. I made a mental note of this and in the following year I formalised the peer review element. In the meanwhile, I provided the presenters with my own comments. These were positive and encouraged students. *“Give them the confidence to deliver”*, I said to myself, and then, offered the students some additional motivation: Since we were devoting a whole academic year and so much energy in the endeavour to produce decent papers that would win over the external examiner and earn students high assessments, perhaps we could get more out of these projects. For those students who wished to join other academic programmes the papers could be used as samples of written work. For those who wished to boost their credentials as economic analysts before entering the job market, the papers could be viewed as samples of published work that enriched their CVs. Indeed, the quality work produced by those students who had invested precious time and effort ought to be made accessible to a wider readership, especially if the findings could be useful to others. That can be achieved only through publication.⁴ Like a coach, I had set my students’ eyes on a second trophy. Some would go for it, and at the end of the academic year they entrusted me with electronic copies of their papers.⁵ The following academic year [2000-2001] I issued the same invitation to the new students from the very beginning. They, too, liked the idea of publishing their articles. So at the end of that year, I put together a collection of papers from both classes and created the first Economics journal of our department, entitled *Economic Observer*. It was carefully budgeted and we were able to forward a number of issues to national and international libraries. As a result, the new students have come to consider report writing and research publication as part of the programme’s culture. They have read the frameworks employed by their predecessors and are tempted to emulate, even improve upon them.⁶

⁴ In my experience, lone copies of students’ projects end up stacked in university bookshelves forgotten by all and collecting dust, until their relevance becomes obsolete and are discarded by a secretary or the cleaning service.

⁵ As a result, I requested and acquired an International Standard Serial Number for a research publication. In addition, I set up an internet presence and I linked it to the *WebEc* network of resources for Education and Teaching in Economics.

⁶ The news spread to the other programmes, and now some Master students in UCC (prompted by my former students among their ranks) say they want to contribute to the next volume too. At the same time, the *Irish Society of New Economists* (consisting of postgraduate students and researchers from the other Irish universities) expressed the wish to use the publication as the outlet for the research of its members. The idea also appealed to colleagues in Applied Social Sciences who reviewed my issues and informed me that they wished to use them as prototype samples for a similar publication in their department.

Ten of my 1999-2000 students joined the workforce, two more gained acceptance to other postgraduate degrees, and the other six applied and were accepted in our 2000-1 Masters programme, which only enrolls 20 students. Upon review of their results, and after talking to their supervisors, I found out that their research was generally better than that of their colleagues who had entered the programme directly from undergraduate studies. So it seemed that the transition programme experience had made a difference and that the skills I helped develop, such as organisation of research material, use of computers, critical thinking in report writing, were maintained producing higher marks for that kind of work.

The experiences of the second year

Much like their previous cohort, the 2000-1 students had failed to join the Master programme but were determined to improve themselves in the transition programme in order to advance. As soon as our introductory and brainstorming sessions presented them with the prospect of continuous and research-based assessment, they voted to compose reports that matched those produced in the transition and Master programmes.⁷ We also came up with a more detailed assessment plan.⁸ As with the previous cohort, we (a) engaged in lectures of intermediate-to-advanced level Economic Theory, (b) visited the management of a number of companies (Apple, Irish Examiner, Lilly, Pepsi) in order to discuss their business strategies and efficiency, and compared them to the management of our institution,⁹ (c) practiced econometric software applications and web-page design/construction,¹⁰ (d) set up an e-mail list and engaged in out-of-class socialisation, (e) researched companies and engaged in report writing. However, this time I introduced a peer-review element whereby each student would review and comment on two other reports. This provided more detailed student-feedback than the previous year's presentations.

The plan was further enhanced by the outcome of two rather casual discussions. The first one occurred during a lecture-recess towards the end of the first-term. It revolved around student life, experiences, and access to overseas placements. I recalled my own student days and made a reference to the international association of students in Economics and Commerce, AIESEC.¹¹ Several students followed the recommendation and joined the association experimentally, reviving the UCC chapter. This put them in contact with students from other colleges, a national conference that they thoroughly enjoyed, and employment opportunities. They invited me to join them as the Association's friend and advisor. I saw them tackle organisational issues and increase student awareness and membership. Indeed, four of the seven students who advanced to the Masters are currently more involved with the club than ever before, and in the course of this academic year they invited several of the speakers we visited with our class last year. This initiative provided me with an additional resource for my current class.

⁷ The students were ambitious and strict, and even wished to self-impose final submission deadlines that would allow them to focus on the summer exams for their elective courses. In the end they failed to meet their own deadlines and we agreed to extend them. I did not mind as long as the final papers were submitted in time for me to assess prior to the Exam Board. Upon handing their papers, a couple of students suggested that they would have been more disciplined if I had issued strict deadlines for their draft work submission, as opposed to having them set up their own deadlines.

⁸ Attendance and participation would account for 10% of the total grade, the weekly assignments and presentations for 15%, the mid-term (draft) report for 15%, the two written peer reviews that students would provide for each other's work would count collectively for 10%, and the final research project would count for 50%.

⁹ The *UCC Vice President for Planning, Communications & Development* kindly agreed to a presentation and interview with us.

¹⁰ Once again, we posted the CVs on the web. The Department recognised my ability and interest in my students' career progression, and assigned me the advisory role of all students, as Chairperson of the Department's Careers Support Committee.

¹¹ i.e., the *Association Internationale des Etudiants en Sciences Economiques et Commerciales*.

The second discussion took place mid-way through the spring term, following an announcement that some undergraduate students were looking for private tutorials. In the course of the conversation I came to realise that the group was weak, borderline, scared of employing quantitative techniques or elementary microeconomic and macroeconomic diagrams, and was very uncertain of the intuition behind them. Since the discovery took place in the course of a conversation and not in an exam,¹² I concluded that for some reason my students had not assimilated a number of introductory microeconomic and quantitative topics from their undergraduate studies. This prompted me to contemplate the insertion of a review element for the following year. However, in the meanwhile, and in order to help my students overcome the fear of maths and integrate the economic intuitions we were talking about, I set up an ongoing Game that we played over the remainder of the term. It resembled *Monopoly*. Each student was given fake money and a fictitious company with a production function, as well as information on consumer demands for the products. Each week, players had to compute the price and quantity they would supply.¹³ These were announced simultaneously at the end of the lecture, for all to see which company made profitable moves and which lost money. The students were serious to keep the value of their companies up, and applied themselves in order to stay longer in the novel game. They worked individually and in groups over their calculations reviewing economic principles and cramming the material as if they studied for an exam, and also had fun. I saw them work on the functions for hours, trying to learn by trial and error from their moves, eventually figuring out basic microeconomic concepts, assimilating the mathematical methods of optimisation I had showed them, and incorporating other players' decision-making. They made extensive use of my office hours (individually and in 'co-operatives') asking me to go through their calculations. In the end, they were able to calculate their reaction functions themselves and could play two and three moves in a week.¹⁴

Despite the Game's popularity and usefulness in the integration of knowledge, I wished to find out more about the background gaps and needs of my students in quantitative and basic economic theory. So I went back to student records and followed up the performance of my former students who had progressed in the Masters programme. I reviewed their results in the taught courses they had taken, and compared their results to the results of their classmates who had entered the Masters programme directly on account of their high marks in undergraduate Economics. I discovered that the original disadvantage/weaknesses of the former transition students (whether due to lack of knowledge or relative unsuitability for exams) had not been eradicated in the transition year. But, more importantly, I was able to identify the subjects where most of the problems arose. So I decided to supplement the provision of additional skills in my class with the teaching of material presumed taught or integrated in previous years. This revision element ought to both support my teaching of advanced analytical frameworks and improve my students' research capabilities. So, in the course of the summer, I prepared a good set of revision notes involving

¹² I can easily concede the point that students who know the material may 'blackout' under the stress of the exam or that a certain type of student may systematically under-perform in exams.

¹³ According to the instructions I issued, the players could act as real life economic agents: compete, collude, enter or exit markets, invested selectively in order to reduce their variable of fixed costs for €1 or €2, attempt to influence demand by spending €2 and engaging in a marketing campaign. However, they had to budget themselves and figure how much they would produce, at what price (depending on the competitive or oligopolistic circumstances) using the production and demand functions they were given.

¹⁴ At some point two players researched their competitor's cost function and priced their goods such in order to run that player out of business. A few moves later, inspired by the Microsoft antitrust case, he responded by filing a law-suit. These were impressive tactical moves recalling real world situations, so I told them they had graduated

background micro-macro economics, as well as an essential mathematical/econometric element.¹⁵

Five of my 2000-1 students opted to join the workforce. We keep in contact through our e-mail list. The other seven students applied and were accepted in our 2001-2 Masters programme, and did (or do) well. They have maintained good contact with me by stopping at my office to chat or seek advice. I invited them all to my classroom one last time at the beginning of the new academic year. Those who were still in Cork joined me in the first lecture of 2001-2 in order to welcome the incoming class to the programme and describe the course to them.¹⁶ Thus, the overall spirit of last year's interaction with the open communication we had come to enjoy was, to some extent, transplanted to the new students.

The experiences of the third year

The 2001-2 class preserved the format established by its predecessors.¹⁷ At the same time, the Department adjusted my undergraduate teaching duties allowing for an extra teaching hour per week in the transition programme, which I utilised in order to engage in a series of Review sessions. This helped students integrate past knowledge, which - in turn - paid off (a) in their understanding of the more advanced theoretical lectures, (b) the quality and topical diversity of their reports,¹⁸ and (c) student performance in the business strategy Game.¹⁹ I also arranged for us to visit the local plants of Beamish & Crawford, EMC, Archer Daniels Midland, GlaxoSmithKlein, and interview their managers.

The mid-term evaluations and comments showed that students found the educational experience both useful and stimulating. The Department recognised my role, so at the beginning of the new term I was appointed the programme's coordinator. This may allow me to respond to broader

¹⁵ Preparing and distributing my notes is central to my teaching philosophy and delivery style, and I cannot emphasise enough the importance of issuing good notes in advance, in a discipline like Economics. I have found that by eliminating the need/distraction of constant note-taking in the lectures, students focus on the concepts I try to communicate and link. This gives them time to think and engage me in questions, get used to asking questions and seeking answers -thus, improving the overall in-class learning experience. Indeed, it is hard to switch gears and engage the lecturer while taking notes: The note-taking student rushes to copy things down in order to produce a meticulous record that he/she can study later. At the same time the student has to consider if there is a problem in the flow of the speaker's argument(s), engage quickly in critical thinking, master courage and then pick the moment to interrupt the speaker in order to seek the clarification -if it is not already too late for that. This set of obstacles very much hinders active student participation. Additionally, unlike the shorthand-trained court-scribes or the careful rabbis and monks of old who spent their days reproducing manuscripts, our students have to rush in order to write things down, which is likely to cause them to make many errors (some of which they can reproduce in the exams), and to waste even more time in order to reconcile their notes.

¹⁶ After we welcomed the new students into the programme, I asked my past students to offer us their insights and advice. They shared their experiences with the new students in small groups of 4-5 students without interference from me. When we regrouped I initiated a discussion during which my past students told the new students how they benefited from the course, what they would change, and so on. The friendly interaction of the past students with the lecturer showed to the new students the kind of relationship we enjoyed, made them feel comfortable and ask questions, thus helping them to both alleviate concerns and focus on making the course *their own* as well. In the subsequent session, the new students (i.e., the cohort of acad. year 2001-2) and I discussed and collectively planned our activities for this year, the methods of assessment, etc., and the students voted to preserve most of their predecessors' plan with minor modifications.

¹⁷ They asked to switch the weights of the attendance and assignment components from 10% and 15%, respectively, to 15% and 10%.

¹⁸ The topics are no longer limited to analyses of specific companies. Several of the students opted to focus on industries (such as the health and telecom industries, e-commerce, the computer entertainment market), econometric projects (on the labour market, the performance of teams), or macroeconomic themes (such as the impact of the 2002 Budget, the performance of the "Celtic Tiger", the recent economic history of Ireland).

¹⁹ Indeed, students solved the calculation problems much faster than their predecessors, colluded in one or more markets right from the start (in order to avoid mutual losses from competition), and 'cooperatives' sold their redundant factories for cash, which they used in order to build portfolios (consisting of saving accounts and shares). They engaged in cost reductions and marketing campaigns, aggressively imitated and matched each other's moves, or merged and bitted for their own and each other's stocks. In one case, a player managed to escape with relative impunity cheating in a one-shot price-collusion game in the final period. His cheated co-conspirators learned that they could neither reciprocate in another period nor bring charges against him for fear of implicating themselves.

student concerns in the future, but, for the moment, secured me a small budget, which I used to complement the site-visitation element. Indeed, I was able to invite and host several guest-lecturers from related disciplines (Strategic Management, Marketing, Accounting & Finance, Input-Output Modelling), to talk to my class about alternative theories and the analytical frameworks used in their fields, as well as their challenges and findings.²⁰ At the end, I invited my students to join me in taking our visitors out for lunch. They loved the idea, played wonderful co-hosts, and took advantage of the opportunity by engaging our speakers on the stimulating new topics they had been exposed to, questioning theories and authors. By the time the site-visits and business interviews were completed and our guest-lecturers left, my students seemed more seasoned, mature. They had become confident in dealing with other economists and accomplished researchers. Some of them joined me at the annual assembly of the Irish Society of New Economist that took place in Galway, where they met and interacted with advanced postgraduates from other Universities. They came back excited. We decided it was time to cap our experiences with one more. So I worked with the Society, with whom we share similar goals, and arranged to have my students present their papers at the Summer Conference in the University of Limerick.

Time for Reflection

It is so easy to neglect looking back, distracted by the daily routine of chores, deadlines, and the myriad of other interruptions that require attention or fill our lives. The commitment to compose an Entry on Teaching by putting my memories and materials in order, prompted me to look back at my teaching in a systematic fashion. It was time consuming. However, the reflection helped me identify patterns and understand myself better as a teacher, which was very fulfilling.

As a student I was brought up with in-class or final examinations, and got so used to them that never wondered of alternative assessments. However, as this entry reflects, as a teacher I was able to accommodate my students' request for a new type of assessment, and graded their performance by looking at their research projects, peer reviews, games, and participation. So, I guess I can perform my teaching duties without the ancient invention of exams, originally designed to assess public servants in Han-dynasty China.

As a student, I sat in many classes and had many teachers. Indeed, I had come to believe that a teacher is someone who lectures a specific body of knowledge and may issue notes for students to study and duplicate in exams, whereas a good teacher is one who presents the topics clearly (sometimes interactively) and issues good notes. And I hoped and thought I was the latter type of teacher. But this is not entirely true any more: Firstly, I don't have to lecture. I can teach through games, dialogues, experiments, and help students discover for themselves. Secondly, I now consider myself to be the kind of teacher that has (to a considerable extent) learned how to be a good teacher from his own students, by listening to their concerns, by observing, by adjusting, and offering a supportive environment for students to (a) learn from their own experiences, (b) grow confident in engaging each other, me, and other lecturers or businessmen, while (c) integrating research and teaching, and preparing for the workplace. These elements are compatible with my

²⁰ I am indebted to Prof. B.Leavy (DCU), Dr. R.O'Toole (TCD), Mr. D.Cotter (UCC), and Mr. S.Kent (a manager of Bulmers) for providing my students with a flavour of how topics are taught elsewhere, and supplying us with new perspectives. The Department decided to transplant the visiting speaker and site-visitation ideas to a second transition programme it wants to get off the ground, namely the *Higher Diploma on Policy Analysis and Forecasting*.

teaching disposition and character. In fact, it is my disposition and character that shaped this teaching model, little by little. And I am pleased with it, for I found that (a) both the model and my delivery techniques have generated student enthusiasm and commitment, and (b) the students came to consider the course both practical and interesting, asking more from me and from their other teachers, and graduating more confident in their abilities than ever before.

This is not to say that I am against conventional teaching methods, especially if they work for other teacher and students. At the same time, I cannot help wondering if the alternative approach that I outline here (consisting of lectures, participation, games, research projects and peer-reviews, in-class-presentations, site-visits, interviews of managers and economists, interaction with visiting speakers, and other activities) are not a more effective a system of supporting my educational mission. If I can consider a Montessori school²¹ for enrolling my child, I have to consider its philosophy as appropriate for my students as well.

In the end, it occurred to me that, as most things in life, the teaching method or “wheel” that I am proposing has actually been invented a long time ago and was the original mode of teaching. In *Economicus*,²² the first Teacher and founder of my discipline, Socrates, engaged in dialogue with his student offering stimuli in order to help him discover and learn, even by taking the aspiring economist to visit a good businessman. And he saw that not only as a means for training economists but also as a way of shaping well-rounded, inquiring and critical individuals/citizens. But that is a topic for another article.

²¹ That is a school whose teaching philosophy relies on the creed that the young of our species learn best when playing and creating with enthusiasm, rather than by passively accepting other people’s ideas and pre-existing knowledge.

²² It was authored by the Xenophon 24 centuries ago.

CHAPTER 5

COURSE PORTFOLIO FOR FLUID DYNAMICS

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Department of Process Engineering

Introduction

I compiled a course portfolio based on a course on Fluid Mechanics and Applied Thermodynamics which I teach to third year undergraduates studying for the Bachelor of Engineering (BE) degree in Food Process Engineering (module code: FN3023, changed to PE3001 from 2003/2004 for the BE in Process Engineering). I have taught the course since 1999/2000, originally jointly with another lecturer (when I taught the fluids mechanics section) but on my own for the past two years. In that time I have made a number of changes to the course in terms of content as I endeavoured to bring it from an engineering services orientated course (it was originally called 'Applied thermodynamics and engineering services') to one which provides a more rigorous training in fluid mechanics for the chemical engineer. I have enjoyed immensely the challenge of developing the course as well as teaching it, and look forward to developing it further in the future in tandem with developing my teaching skills.

The entry I have chosen is one which outlines my efforts to improve my teaching of the module and explores this under two headings; 'Innovative teaching practices' and 'Assessment of teaching effectiveness'. Of all the entries I included in my portfolio this is probably my favourite as it provided me with the opportunity to systematically contemplate the changes I had brought to the course over the past few years, which in turn allowed me to develop an overview of the changes (improvements?) I have brought to the module, to reflect on why I have made these changes and hence provide some ideas to help formulate the future strategic direction of the course and how it might best be taught.

Efforts to Improve Teaching: Innovative Teaching Practices.

I introduced a number of innovations into the module since 2000/2001 when I first began teaching the module alone. These include the introduction of the following to the module:

- ◆ Continuous Assessment Tests
- ◆ Increased Student Feedback (formal (QA Questionnaires) and informal)
- ◆ Multimedia Technologies
- ◆ Plant Visits
- ◆ Annually Review and Update of Module Content

It is not too difficult to see how these relate to the stated means of achieving the goal of excellence in teaching in the UCC Strategic Plan; Teaching Development, QA, ICT, Curriculum Review & Development. The last innovation listed really reflects the evolution of the course and this is dealt with more fully in a previous entry on the development and evolution of FN3023.

I introduced these innovations to the module for three reasons; firstly in an effort to improve the

quality of my teaching; secondly to try to understand why students scored relatively poorly in the exam in 1999/2000, and thirdly to help motivate the students to strive for better grades. The first two innovations were designed specifically to address these concerns and the following two innovations largely arose from the former two.

I feel that all of the innovations have helped me improve the quality of my teaching, if only due to the extra thought and effort involved. The formal student feedback I gathered through the questionnaires was helpful in trying to identify why the previous class had fared so poorly. For example, more of the class agreed than disagreed that FN3023 was 'one of the most difficult modules on the Food Process Engineering' course. This was supported by informal comment I elicited from the students when I asked them about the course and my teaching - they would typically say something like; 'yes the material is difficult, but not impossible' - though personal comments to the lecturer are naturally less objective than comments in an anonymous questionnaire.

In the assessment questionnaires I asked students to write down their criticisms of the lecturer and the course and for suggestions for improvement. Suggestions provided included the inclusion of 'more solving problems' and 'more industrial examples' while some were concerned about the exam papers themselves: 'The exam questions...are very detailed...probably too detailed to be able to think about the problem and eventually work it out all in an hour and a half exam.' And 'some of the problems appearing in past summer exam papers are difficult for me and as a result I feel worried that I may not make a good attempt in the limited time given.' Criticisms of the lecturer included those relating to voice projection and standing in front of the screen (easily solvable!), though one did mention they would like to see 'a more interesting method of presentation .. i.e. diagrams showing what's happening' while another called for 'more practical aspects of course e.g. visit factory to see e.g. pipe networks.'

These were all valid criticisms. Certainly those relating to the exam questions went some way towards explaining to me, in part at least, the very poor performance of some students in the 1999/2000 exam. While some students did exceptionally well in this exam (2 secured grades equivalent to a first class honour while five were awarded upper second class honours or better in the exam), others floundered desperately and couldn't even make a half decent start at many of the questions. I would agree that the questions were difficult, especially given that one has just thirty minutes to answer them, which can be very tight given the amount of thought and computation required. However, I would have thought, possibly in error, that even if a student could not answer all of a given question in the time allotted, then at least they could have attempted to answer it and hence secure a reasonable mark for a reasonable attempt. However, in an exam situation, students, particularly if they haven't a pretty clear and in-depth knowledge of the subject matter, may be put off by a seemingly difficult question, and their attempt may fall short of their best attempt.

My response to this would be governed by the fact that that I feel it is important to uphold the integrity of the exam by asking questions which will challenge the students. I remember sitting equally difficult exams as a student (in another college) so I would not like to insult the abilities of my own students or reduce the status of the exam by asking somewhat easier questions. Moreover, I feel that it is my job to help raise the students to a level which will allow them to succeed in the course, not to lower the barrier so they can more easily succeed. Anything else would be both unprofessional and lazy. Nevertheless, I am aware of the time constraints imposed by a 90 minute exam and would try to factor this in when setting the questions. I would thus try to ask equally

difficult questions though ones which may require slightly shorter answers. I've spoke to other lecturers in the department about the problem of time for the students in engineering exams (which by their nature require problem solving) and though it was not possible to extend the exam time to 2 hours without a change in college policy on the matter, we did succeed in introducing a 15 minute reading time prior to our exams for the students in our department.

On the matter raised regarding a request for plant visits, by the time the suggestion was forwarded, it was quite close to the Spring exams and I therefore did not have time to organise an industrial plant visit with the 2000/2001 class during their third year, so I brought them on a tour of the UCC Food Science and Technology Pilot Plant where they were shown a number of pipe configurations as well as number of pump types. I brought the 2001/2002 class on a visit to Irish Sugar, Mallow to see a similar situation. Likewise, I introduced some animation and video clips to the course at the end of 2001/2 in response to the suggestions made on the questionnaires and for the reason that they provide students with an ideal visual representation of various fluids phenomena which cannot be so easily achieved by other means, outside of labs.

I introduced continuous assessment tests (3 per annum) with credit to help motivate students to study the material at an early stage and thus to become more familiar with the material at an earlier stage, leading to improved learning. In order to facilitate this extra credit apportioned to continuous assessment tests, I increased the continuous assessment mark of the module from 15% to 25%, leaving the remaining 75% to end of year exam. It is generally agreed that assessment has a (positive) impact on learning as it provides students with a direction and a goal (Vos, 2000). This initiative was almost unanimously applauded by students (12 from 13 thought it was a very good idea in 2000/2001 and the students of 2001/2002 agreed at least as strongly with this sentiment. The holding of continuous assessment tests would also seem to have had the desired effect, by providing students with a useful mechanism for providing useful feedback on their progress (Rompelman, 2000) and hence by providing improved motivation for study and learning. This translated to vastly improved end of year results in 2001 in terms of success rate as no student failed the Spring exam.

Assessment of Teaching Effectiveness

On the basis of exam results, the innovations that I introduced into FN3023 would appear to have been extremely successful. However this alone is certainly not a definitive guide to one's teaching effectiveness as there are a myriad of other variables involved quite apart from there being only two consecutive years results under consideration.

One means I use to attempt to measure teaching effectiveness is to ask students questions during lectures and from the responses ventured make an assessment. Although this by its nature will yield a very subjective and intuitive response, it can be useful in offering a general impression of progress, particularly if one solicits a lot of feedback and responds to it in an open manner. This can be achieved by asking students why they came up with a given answer, and if they give an incorrect answer, by trying to discover what were their thought processes might have been in coming up with this response. One can then attempt to direct them towards the correct answer by for example, asking another question (and giving them some clues, pointers if necessary) which might cause them to reflect on the situation and hence be nudged towards the correct answer. This can both help them achieve a better understanding of the concept through interactive learning and

give them some confidence in their own ability to work through a problem while providing the lecturer with useful feedback and grounds for an assessment of their progress. The 2001/2002 class are quite a responsive lot (particularly one or two of them!) and are not afraid to venture a response to such questions - in general they provide quite accurate responses and seem to demonstrate to me that they are following the material. Of course the positive spin off from such an approach is that they are alert in class and actively involved in the learning process.

A more quantitative and objective assessment of my teaching effectiveness might be gleaned from the quality assessment questionnaire which I ask students to fill in and return anonymously. In general the 2001/2002 class does not seem any less satisfied with my performance than the previous class, and the number of criticisms has declined appreciably - but so too has the number of comments in general. One of the most encouraging pointers is that of the 2000/2001 class, all either disagreed (45%) or strongly disagreed (55%) that I was not one of the best lecturers around and the 2001/2002 class put me at least in their top 14 percentile in terms of overall performance relative to other lecturers.

Reflection

From my experiences of teaching FN3023, I feel that innovative teaching practices which engage and enthuse students are those which are most likely to succeed as they can lead to a greater degree of interactive learning and an altogether more motivated student. When such initiatives are employed, students are more likely to enjoy the subject, study it more thoroughly, better understand the material covered and succeed in exams. They also enjoy this approach and appreciate the effort put in by the lecturer. In this context I found that soliciting student feedback during lectures and introducing continuous assessment tests to be very useful. I also found the use of multimedia technologies (e.g. video animations in Powerpoint) to be useful for explaining concepts and hence for motivational purposes and I intend to extend the use of such in the future, particularly as projector facilities become more accessible in college lecture rooms. Formal questionnaires provided another means of feedback and I found these (together with informal feedback and continuous assessment tests) very useful in assessing the success of my teaching methods and in providing ideas on how I might improve them. The very act of soliciting feedback, processing it and consequently making changes/improvements to the process is generally noted, recognised and applauded by students. This in itself is one of the most satisfying aspects of my job as I see my position (along with all other staff at the university) as one which facilitates students in the learning process. They are the ultimate consumers and their contentedness with me in facilitating their learning goals through my teaching (as well as their future success) is what provides me with the most job satisfaction at work.

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CHAPTER 6

THE USE OF GAMES AND SIMULATIONS TO SCAFFOLD EXPERIENTIAL LEARNING

Mary McNulty & Mary O'Flynn
Careers Service

We, the authors of this entry, are two Careers Advisors (administrators) working in the Careers Service in University College Cork (UCC). We introduced Careers Education into University College Cork on a pilot basis in the academic year 2000-2001. The programme was reviewed and edited during the summer of 2001 and was delivered again during the academic year 2001-2002.

As Careers Advisors in UCC, we have had to question the cost-effectiveness of simply giving advice to students on a one-to-one basis. In response to increasing student numbers, we have moved away from the luxury of the one-to-one vocational guidance interview to less time consuming methods of seeing students - namely *Careers Education and Drop-in advice*.

Careers Education is the collective term used to describe a range of teaching and learning strategies designed to develop skills that enable students to be self-reliant. They include *self-awareness, opportunity awareness, decision-making* and *transition learning* (Ball & Butcher, 1993; Law and Watts, 1977; Watts & Hawthorn, 1992; Watts, 1997).

The UCC Strategic Development Plan 2000-2005 pays much attention to the idea of enhancing the undergraduate experience and providing students with 'essential skills'. One of the challenges facing Higher Education institutions in the twenty-first century is to provide an increasing student population with self-reliant skills to maintain employability and successfully negotiate their careers in a post industrial society. In addition to being cost-effective, Careers Education Programmes provide an excellent medium for developing students' transferable and job-search skills, and for incorporating into the programme design a progressive and developmental model of guidance. A Careers Programme supported by individual career counselling (drop-in advice) provides a comprehensive, efficient, student-centred and student-driven service to an increasing and diverse college population.

During the academic year 2000-2001, we delivered *174 hours* of a Careers Education Programme to almost *3,000 students*. Between October and December of the first academic term of 2001-2002, we have delivered *110 hours* of Careers Education to *2,000 students*.

The Use of Games and Simulations to Scaffold Experiential Learning.

Our teaching philosophy encompasses three experiential teaching strategies that we incorporate into the classroom, namely:

- ◆ Focusing on and adapting to different learning styles;
- ◆ Team teaching;
- ◆ The use of games and simulations to scaffold experiential learning.

For the purpose of this single entry we will focus on the use of games and simulations to scaffold experiential learning.

A unique characteristic of our work is the inclusion of games, simulations and case studies. Over a period of time, we have become fully convinced of the power and flexibility of gaming as a vehicle for developing transferable skills in a diverse student population.

Professor Henry Ellington, Head of the Centre for Learning and Assessment at the Robert Gordon University, Aberdeen, claims that gaming is an important element in the development of key skills and competencies.

“Ever since they started to be used for educational purposes during the 1960’s and 1970’s, it has been realized that games, simulations and case studies are extremely powerful vehicles for developing transferable skills of virtually all types”

(Ellington, 2001, pg 7).

We use gaming for three reasons:

1. To create a classroom which is a level playing field for students from different faculties, years, level of ability and to be inclusive of students who are non-traditional applicants. The games and case studies are easy in concept and design and few students would have prior knowledge or proficiency in the area. Students can engage freely without any pre-conceived assumptions of their own or others’ ability and potential to perform.
2. To foster a non-threatening atmosphere in the classroom where students will feel free to experiment and take risks in finding solutions to problems for themselves. Students on the whole are not familiar with collaborative working environments. They are more used to working independently and not sharing information. Gaming gives them permission to try new learning strategies in a short time span.
3. To introduce ‘fun’ into the learning process, to set the stage for collaboration. It is often easiest to begin by minimizing the significance of the initial problem or task. Make it fun, and students will find it more comfortable to work together rather than compete. A relaxed learning atmosphere encourages students to work collaboratively. The idea is that through a fun exercise, the whole may be greater than the sum of its parts.

Gaming Philosophy

Our underlying assumption for using gaming and collaborative activities is that skills learning, particularly personal transferable skills are created through simulation and interaction and not transferred from presenter to student. Games are used because simulations that reflect the work environment accurately would be too expensive to construct.

Our second assumption is that instructional activity must build on students’ current level of background knowledge, experience and understanding. Working with diverse student groups, no one can be confident of the standard of experience levels in the class but we have found that

gaming will bridge these barriers. Gaming is an inclusive medium to reach all students without an in-built bias.

Our third assumption is that the presenters' role is to create a context/environment in which learners can make the material their own through an active process of discovery. Gaming provides us with the perfect context. Students need to be prepared to perform collaborative work, and that preparation involves providing guidance on how to work as a group as well as subject matter information. One common obstacle to collaboration is that students have learned in school that individual work is valued, so their idea of work may include an underlying assumption of competition with other students. Gaming kick-starts the process for students to think as members of a team, because collaborative input is the norm in group games.

Finally, extensive preparation and classroom performance are vital to the success of using gaming techniques successfully. Normally presenters focus on showing students their mastery of the subject area. In the gaming lecture room, the presenter is congruent to what students do - interact, discuss, explore and think, problem solve and reach conclusions together. This is not to say we never lecture, but lecturing is integrated with collaborative activities. Covering material becomes less important than facilitating student mastery and performance of the skill at hand.

Gaming and collaborative activities require a lot of preparation, largely because we cannot control the agenda to the same extent we could in a lecture. Consequently we have to be more accommodating in dealing with material and responding to group needs than if we were just telling students what they should know.

Example of Gaming

Title of Workshop: 'Effective Team Building'
Duration: Two-hour interactive workshop
Class Size: Maximum of 25-30 students

Methodology Employed:

- * Lecture format presentation using an over-head projector
- * Feedback from group recorded on white-chart or blackboard
- * Belbin team psychometric test (self-scoring, self-perception inventory developed by Dr. Belbin, 1981, which enables an individual or team to benefit from self-knowledge and adjust accordingly to the demands being made by an external situation).
- * Belbin team combination exercise to ensure all the different roles are understood
- * Games (clothes-pegs and scrabble)
- * Supplementary handout material given throughout the talk

Artefact:

- * Photos of students during the Clothes Peg and Scrabble group exercises

Learning from the Entry

In the case of this entry, the main challenge was to get students to work in teams as early as possible. We needed to get them to consider from an early stage what makes one team more

effective than another. So, in keeping with a realistic approach we “borrowed” and adapted an exercise that is regularly used by *employers in assessment centres* (as the final stage in many major companies’ recruitment process). Students are placed in a room with other candidates and are asked to build a bridge or parachute out of the items given (this can vary from an egg and paper, to string and a rubber band etc.). Our exercise is to build the tallest freestanding tower possible from *clothes pegs* in 3 minutes. Usually the group starts off by making their own individual towers and then realises that they need to work together in order to make a substantial tower.

Once the exercise is complete, we review the process and find that students are now much more responsive in giving feedback on why teams are effective or not. After the theoretical and Belbin sections of this workshop, a second exercise - *Scrabble Scramble* is introduced and the teams are changed around. This receives positive feedback from the students as they enjoy the opportunity to work with different members of their class and in the case of a new group they get to meet other people for the first time.

Many students fear to speak in group situations during lectures because they feel that it is imperative for every comment to be novel, excellent or highly intellectual in order to be heard. In some groups students do not join in for fear that their contribution will be seen as trivial. The advantage of the clothes pegs and scrabble exercises is that they are a great leveller. No one has a Ph.D. in clothes peg tower design and the scrabble rules are changed for the duration of this exercise - so even if they have never played the game before, that could turn out to be an advantage. By the time the second exercise is complete, it is clear to the observer that a whole new approach to group work has been uncovered. They have had the opportunity to learn from the first exercise. Participants are now more eager to get everyone’s ideas up-front and then look at a consensus approach to completing the task. This is very different from the insular approach taken earlier.

We have learned the following from gaming:

- ◆ The goals/outcomes of the task must be very clear - extra slides have been compiled to ensure that the guidelines are visible at all stages during the tasks.
- ◆ All learning must be recognised. Previously we incorporated giving a box of sweets to the winning team of the final task. While the students enjoyed this reward, on reflection we decided that we did not want to evaluate the student’s work in this way as it could potentially undermine the work that other students on less creative teams did. Instead, we have now substituted a reflective questionnaire into the workshop. Students examine their own team abilities after each of these exercises and it gives them the opportunity to reflect and value their own contribution to the overall success of the team.
- ◆ Gaming addresses the “sound bite” culture where students today are exposed to information in short bursts. These students are used to television, videos, video games and computer programmes that deliver information in short, entertaining snapshots. We attempt to mirror students’ informal learning experiences.
- ◆ Students often learn more by listening to their peers than they would by just listening to us. Peers often have a better understanding of what other students don’t know. The focus is on the student not the teacher. The primary focus of peer learning is on the process of

learning and how individuals function within groups and independently, but not necessarily competitively. The high level of interaction and interdependence among group members leads to a learning goal instead of a performance goal.

- ◆ Johnson and Johnson (1992), feel that students working in groups enhances student metacognition. Discussion in groups requires more frequent oral summarising, explaining and elaboration of what one knows, which in turn consolidates and strengthens what is known through the rehearsal process. The heterogeneity of groups encourages students to accommodate themselves to their peer's perspectives, strategies and approaches, and to completing tasks. This stimulates divergent and creative thinking and a review of one's own thinking.
- ◆ Gaming allows for modelling of societal and work related roles. In our Careers Education workshops, students are assigned roles of presenter, employer, or a specific team role like 'shaper' - to build interdependence within the groups. Students are thus encouraged to develop and practice the skills, which will be needed to function in society and the working world (Johnson, Johnson and Holubec, 1984). These skills include leadership, information recording, and communication of results, orally and in writing, challenging ideas in a constructive manner, giving feedback, brainstorming, meeting deadlines and encouraging member participation. When students realise the direct applicability of group problem solving to their own and future work lives they all show a marked interest in participating and learning.

Reflection

Providing an active learning environment involves understanding how students learn and what obstacles to look out for.

Students' attention span is one area that, over the years, has given us much concern. In an area like careers work, we cannot afford to lose students' attention because it is not an exam or obligatory subject, so students are free to vote with their feet and walk out. Over the years we have endeavoured to make our presentations interesting, punctuated with changes in pace and teaching methodologies, to match the four different learning styles - activist, pragmatist, reflector or theorist (Honey and Mumford, 1992).

We learned the hard way, that students need stimulation every 15-20 minutes. We worked hard at changing the pace and introducing some modification on a recurring theme or instigated some kind of transition to re-engage students, every 20 minutes or so. Our workshops are so designed that depending on students' response and attention span on a particular day, there is in-built flexibility in all workshops to allow for a fresh transition to be introduced at various places. If we are maintaining interest we can hold off on a transition and continue with subject matter. However, if students become restless for whatever reason, we can introduce an interactive intervention at a natural break point and come back to the subject matter, when we have re-generated and regained interest.

The work of Johnstone and Percival (1976), supports the transition techniques we have developed through our own experience. In 1976, they observed students in over 90 lectures, with twelve

different lecturers, recording breaks in students' attention. They identified a pattern. After 3-5 minutes of settling down at the start of class, they found that the next lapse of attention usually occurred some 10-18 minutes later. As the class progressed, the students' attention span became shorter and shorter and sometimes fell to three or four minutes towards the end of a lecture hour. Johnstone and Percival concluded that lectures should be punctuated with periodic breaks.

In the workshop 'Effective Team Building', we have selected as artefacts some of the transitions and interventions to highlight how we achieve our dual goals of maintaining students' interest and fostering deeper learning.

Experiential learning paradigms represent a philosophy of life as well as a learning strategy. Our approach is never static. We are constantly learning from the students, inquiring into what works well and what needs to be reviewed. We are continually modifying our interventions and adopting new structures to deal with different classroom situations and populations. This is an aspect of our work that we find particularly rewarding.

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CHAPTER 7

TEACHING RESUSCITATION AND STABILIZATION OF NEWBORN INFANTS IN IRELAND: A COURSE PORTFOLIO INTEGRATING TEACHING AND RESEARCH

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Why Teach Resuscitation Education?

Neonates are more often subject to asphyxia (lack of oxygen) and are far more likely to be in need of resuscitation than any other age group. The World Health Organization (1995) estimates that every year there are one million neonatal deaths attributable to birth asphyxia.

Every newborn has the right to resuscitation performed at a high level of competence. In the first moments of her life, the infant is making an abrupt transition from the mother's uterus to an extra-uterine environment. Due to the unique aetiology and pathophysiology of neonatal arrests, successful resuscitation requires the application of knowledge and skills that require special training. The purpose of resuscitation training is to transfer the science of resuscitation into classroom performance, with the objective of transferring knowledge and skills into clinical practice. The ultimate goal of the process is to improve neonatal survival and decrease handicap. Therefore, it is clear that the way in which an asphyxiated infant is managed can directly affect the quality of the individual's life and have consequences over the entire lifetime.

The actual practice of properly performed newborn resuscitation is a beautiful thing to watch. A properly orchestrated, team-orientated resuscitation, with its high speed, skilful collaboration, resembles at its best, a beautifully choreographed ballet. Each player is prepared, organised, calm and collected, despite an often most challenging situation that requires character, endurance and professionalism.

"If my baby is sick, the hospital staff will know what to do for him,
no matter where I deliver."

This essentially is what the public believe and expect when they entrust their own health care and that of their loved ones to health professionals. The reality can sometimes be at odds with this belief, inasmuch as it is often a challenge for hospital staff to constantly maintain knowledge and skills, particularly in acute resuscitation scenarios. As a result, many nurses, physicians, and other members of the health care team have limited experience and often, even less training, in resuscitation and stabilizing sick newborns.

Indeed, the medical literature supports the fact that without proper training doctors could not be expected to perform optimally in acute situations. In Australia, where postgraduate medical training is relatively well developed, Brady and Raftos (1997) found that the average trainee

paediatrician was deficient in one quarter to one third of the theoretical precepts considered important for acute care. Furthermore, on average, the trainees required two minutes to establish effective bag-mask ventilation in an infant manikin. Similar concerns were expressed in an American study (White et al, 1998). In this context, it is not surprising that subsequent studies showed that the performance of Irish doctors was no different from their Australian or American counterparts (Smith et al 1996; Walsh et al 2000).

Aims and objectives of this teaching portfolio

I developed this Portfolio to help me understand, document, assess and enhance teaching and learning in the Neonatal Resuscitation Programme, which I have taught since the early 1990s and in the STABLE programme which I introduced into Ireland in 2000.

This teaching portfolio is concerned with the status of newborn resuscitation training and education in Ireland. It describes the introduction and evaluation of a structured Neonatal Resuscitation Programme (NRP) and a Neonatal Stabilization Programme (STABLE) into maternity hospitals throughout Ireland, under the auspices of UCC. The integration of teaching and research into professional practice, and an inquiry into such, is also explored. An evaluation of these programmes at various levels and by a number of different methodologies, is the cornerstone of the teaching portfolio.

This Course Portfolio is founded on three simple ideas; the first is that the primary aim of teaching is to enhance student learning, thinking and development. Teaching and learning are interdependent endeavours and, in my mind, it makes no sense to examine one without examining the other. This Course Portfolio is directed at student goals and intends to explain what resuscitation education is intended to accomplish for students. While many of the students in question are enrolled in courses in UCC, others are not, while some have never before entered the portals of a University. I wish to show how various teaching practices can be used to address the goals of such a multifaceted, multidisciplinary (medical, nursing and paramedical), group of students.

The second idea behind this portfolio is that a single course is an ideal context in which to explore relationships between teaching and learning as a specific research project. Courses represent coherent entities in which teachers integrate content and teaching practices to accomplish specific aims within a particular time period. Accurate evaluation is the cornerstone of research into teaching practices. The difficulties and restraints in designing and performing proper randomised controlled trials of resuscitation training and the ongoing tensions between research ideals and actual clinical practice are obvious to most educators. However, it is possible to perform a rigorous evaluation of a teaching programme through a variety of research methods, particularly if the programme contains a defined course, with sound underlying teaching principles, in a well-designed and reproducible format. The second aim of this portfolio therefore, is to present a variety of evaluative processes by which I have attempted to measure the impact of this programme in terms of student learning, thinking and development.

An important element of this portfolio relates to the fact that I am a primarily a clinician, in addition to being a University teacher. As a Paediatrician who specialises in Newborn Medicine (i.e. a Neonatologist), I am obliged to place my patients' (newborn infants and their families) best

interests to the foremost. However, as a teacher I must also meet the needs, goals and desires of my students (medical, nursing and allied health professionals at undergraduate and postgraduate levels). In many arenas of clinical medicine, the priorities of student education can often clash with the need to provide the best possible patient care. By investing my efforts into resuscitation education, I believed that, not only could such conflicts of interests be avoided, but that the ideals of both education and patient care could actually be enhanced by improved training in the clinical setting. The third aim of this portfolio is to present evidence that resuscitation training has been associated with improvement in patient care and indeed in clinical outcome.

The **specific objectives** of this project were as follows:

- ◆ To assess the need for a neonatal resuscitation programme, throughout Ireland, in terms of neonatal resuscitation preparation, protocols, training and staff availability.
- ◆ To determine, by means of an evidence-based systematic review, whether resuscitation training in hospital settings is associated with improvement and retention of knowledge and skills and whether such training impacted neonatal morbidity and mortality.
- ◆ To introduce and evaluate a recognised neonatal resuscitation programme into a Cork maternity hospital.
- ◆ To extend and evaluate this programme nationwide by means of UCC sponsored and certified outreach training courses.
- ◆ To evaluate this larger group of individuals in terms of course satisfaction and relevance to clinical practice.
- ◆ To develop a cross-disciplinary network of NRP instructors, which could provide opportunities for further programme developments in health services research into newborn care.
- ◆ To determine whether the NRP had any effect on patient care in terms of neonatal morbidity and/or mortality.
- ◆ To examine barriers to resuscitation training with the goal of engendering changes in attitudes in the Health Services towards resuscitation training.
- ◆ Finally, to explore my own teaching philosophy, experiences and development as a teacher, while teaching the NRP and NRP instructor courses.

Educational and Career Background

I graduated from Medicine in UCC with First Class Honours in Paediatrics in June 1977. Having obtained my membership of the Royal College of Physicians in Ireland in Internal Medicine, I began training in General Paediatrics. Once I had obtained my membership of the Royal College of Physicians (Edinburgh) in Paediatrics, I began to sub-specialise primarily in Neonatology (Newborn Medicine). Subsequently, I became dual-certified in both Neonatology (Royal College of Physicians of Canada) and in Paediatric Critical Care Medicine (American Board of Pediatrics).

Most of my professional life was spent in Canada where, following completion of my training, I worked as a staff member (Consultant) in Paediatric Intensive Care and in Neonatology at the University of Alberta. All of my appointments have been in university-based academic departments.

In 1994, I returned to Ireland to take up a position as Consultant Neonatologist to the Southern Health Board and as Statutory Lecturer in Paediatrics in UCC.

Clinical and Administrative Responsibilities

As Consultant Neonatologist to the Southern Health Board, I am responsible for the development of a regional centre of Neonatal Intensive Care to serve almost 8000 babies who are born each year in Cork and Kerry. My Health Board duties include perinatal consultation, neonatal intensive care (Erinville Hospital & St. Finbarr's Hospital) with continuing general paediatric interests (Cork University Hospital), neonatal and general paediatric follow-up clinics. I have served as Chairman, Division of Child Services, Cork University Hospitals Group from 1995 to June 2001. I am a member of the Amalgamated Maternity Hospital Design Team; planned opening by 2004.

I have three Ministerial appointments; the first as member of the 9th Comhairle na nHospideil (2001 -2006). This statutory body is responsible for all consultant appointments in Irish hospitals. I am a member of the Medical Advisory Group of the Pre-Hospital Emergency Care Committee, which regulates training of Emergency Medical Technicians. I was invited to be a member of the Commission on Artificial Human Reproduction, set up to advise the Minister of Health & Children on matters relating to *in-vitro* fertilization and other controversial issues related to human reproduction. I am also Convenor of the Neonatal Sub-Committee, Faculty of Paediatrics, Royal College of Physicians of Ireland.

Teaching History and Current Responsibilities

Ever since my graduation, I have been teaching; in Ireland, Scotland, England, Iraq, Canada and the United States. My teaching has included didactic lectures, tutorials, grand rounds, bedside teaching, outpatient clinical teaching, presentations and skills sessions. Students have come from a broad range of backgrounds including medicine (paediatric, obstetrical and anaesthetic junior house doctors), nursing (paediatric, midwifery and public health), respiratory technologists, ambulance and other paramedical specialties.

Since my appointment as Statutory Lecturer in the department of Paediatrics & Child Health, in 1994, I have taught up to 10 lectures per annum to Medical V students (90 students) on newborn medicine, critical care paediatric, pain relief, injury prevention and general paediatrics. I teach weekly bedside sessions (2 hours) with Med V students throughout the academic year. I supervise approximately 10 paediatric projects per annum by Med VI students. In addition, I supervise three new Med VI students, every three weeks, during their clinical clerkships in Paediatrics, which consist of daily ward rounds, two outpatient clinics per week, in addition to other informal teaching sessions. Evaluation of these students is by continual assessment, a new development in the Department and, currently, unique to the Medical School curriculum. I am an invited Lecturer for the Early Childhood Studies Degree programme (the Normal Newborn), for the Department of Pathology (Congenital Viral Infections in the Newborn) and also for the Department of Philosophy (Paediatric Ethics). I have also been an invited Lecturer to the Department of Nursing (Diploma in Midwifery) on Genetics and Malformations in the Newborn. In addition to undergraduate teaching, I am committed to postgraduate teaching to paediatric registrars and senior house officers, by means of weekly tutorials and bedside teaching.

Academic medicine in Ireland has a strange mix of academic and non-academic practice. Despite nominally having 3 sessions (9 hours) per week dedicated to academic practice, I do not have a recognisable period of time in any working day, which does not contain structured

patient care activities. As a result, I try to integrate teaching activities closely with patient care. I try to ensure that every patient care encounter has an academic aspect. Is my treatment of this patient evidence based? Can this patient illustrate an important teaching point to accompanying medical students or postgraduate doctors?

Theories of learning are important guides to teaching. In addition to learning how to teach from observing mentors, I have completed the University of Alberta Teaching course for University staff (TIPP). Other formal teaching seminars include instructor courses for Advanced Trauma Life Support, Paediatric Advanced Life Support and the Neonatal Resuscitation Programme. Small skills groups and skills teaching are emphasised in the latter courses. These teaching courses, I believe, have helped me develop a stronger knowledge of theories of learning and a fuller repertoire of skills and strategies to match these. As a result, my intuitions about good teaching practice have changed over time. I hope to be able to show how my teaching experience has influenced my teaching style and my philosophy of teaching.

Course Components: the NRP and STABLE Learner programmes and Instructor courses

This course portfolio has three component courses; the Neonatal Resuscitation Program Learner course (NRP); the STABLE (a neonatal Stabilization programme) Learner Programme and Instructor training programmes for both these courses. The Learner Courses teaches knowledge, attitudes and individual and group skills. Cooperation and teamwork are also emphasized, recognising the different expertise and different roles in clinical practice among the students. In both courses, there is an emphasis on teaching an andragogical model of learning.

The Neonatal Resuscitation Programme

The first course that I introduced into UCC was the NRP, originally known as Neonatal Advanced Life Support (NALS). This course was originally developed in 1985, at the Charles R. Drew Postgraduate School of Medicine in Los Angeles, California by Ronald S. Bloom, MD, and Catherine Cropley, RN, MN. In 1987, the first neonatal guidelines were adopted by the American Heart Association and the American Academy of Pediatrics, in New Orleans. In July 1988, the program was introduced in Canada with the endorsement of the Canadian Paediatric Society and the Heart & Stroke Foundation of Canada.

The Learner course is a modular program based on self-learning, didactic teaching and, most importantly, skills training. It can be offered in a one-day or two-day workshop format, or in a series of sessions spread over 3-6 weeks. The course is given under the direction of a NRP instructor. Prior to learning the hands-on skills, it is essential that the most current edition of the Textbook of Neonatal Resuscitation be studied in detail. The course develops and clarifies this material and includes time for participants to practice the skills outlined in the manual, under the guidance of the instructor. Testing consists of a written test for each lesson and a practical demonstration of skills where indicated. This Learner Course teaches knowledge, attitudes and individual and group skills. Cooperation and teamwork are also emphasized, recognizing the different expertise and different roles in clinical practice among the students. Therefore, at the end of the course, participants are asked to demonstrate all skills in the appropriate sequence, and to show how they would deal with problems in resuscitation, in a mock delivery situation or “Megacode”.

In brief, the NRP course participants should achieve the following objectives:

- ◆ Know the equipment and drugs required for neonatal resuscitation.
- ◆ Know the sequence and priorities for neonatal resuscitation.
- ◆ Know how to manage the infant who has passed meconium *in utero*.
- ◆ Know that oxygenation and ventilation are the keys to a successful newborn resuscitation.
- ◆ Recognize the importance of heat conservation in resuscitating infants.

The NRP course is now taught in 25 countries worldwide (see figure) and over 500,000 learners have been trained (Carlo & Kattwinkle 1996; Boo & Pong 2000; Deorari et al 2001).



Countries where NRP has been taught

The STABLE programme

The second component of newborn emergency care, which we introduced into Ireland, was the STABLE programme. This programme, originally developed by Kristin Karlsen, in Salt Lake City, Utah, was the first neonatal outreach education program to focus exclusively on the post-resuscitation/pre-transport stabilization care of sick newborns. This mnemonic-based resource, served as a concise guideline to organize the myriad of details and interventions necessary for stabilizing a sick infant. STABLE® is an educational mnemonic that stands for *Sugar, Temperature, Airway, Breathing, Laboratory and Emotional Support*.

Other countries where STABLE has been taught include Canada, the Bahamas, Guam, Cuba, Japan and Puerto Rico. The European première of this course was held in UCC in June 2000. Almost a dozen courses have been held since, in Cork, Dublin, Tralee, Limerick and Cavan. The first STABLE course in Northern Ireland is planned for June 2002, in Belfast.

NRP and STABLE Instructor Courses

The third component of this Portfolio is the Instructor Courses that allowed us to develop a cascade of competent instructors throughout Ireland, who were able and willing to administer these courses under the aegis of the Department of Paediatrics and Child Health, UCC. This format can be looked at as teaching through an intermediary and is an efficient and cost-effective

way of bringing the learner courses to other maternity units in Ireland. Since 1995, over 70 NRP and 40 STABLE instructors have been trained.

NRP in Ireland: Beginning in September 1994, the author, with the help of a coordinator and a group of trained NRP instructors, introduced the NRP into Cork and subsequently throughout the country on an out-reach basis. Between September 1994 and May 1999, we trained 1578 individuals (72% nurses/midwives, 22% doctors and 6% ambulance personnel) in 89 separate courses. These courses were held in 17 maternity hospitals throughout the country attracting participants from all 22 maternity sites and many Emergency Medical Technicians from the ambulance sector.

The evaluative component of this teaching portfolio

The only way of judging effectiveness of an educational intervention is through an examination of the published evidence and by appropriately rigorous evaluation of the teaching programme. I have already alluded to a *national descriptive study* on how the need for newborn resuscitation training was assessed (Ryan et al 1998). I then undertook a *systematic review* of the literature on the effectiveness of resuscitation training (Ryan and Barrington, 2000). This review demonstrated that healthcare professionals who had received training had improvements in knowledge and were significantly better at performing resuscitation skills than untrained controls in case scenario situations. However, these improvements were not retained beyond a few months. Since retention does not appear to be enhanced by current booster approaches such as video and mannequin refresher courses, other educational techniques such as repetition, reinforcement and feedback of information may need to be enhanced in the current teaching programmes.

I then introduced the programme into a maternity hospital in Cork and studied the *clinical practices* around resuscitation and newborn care before and after the training process (Ryan et al 1998). This study demonstrated a number of positive changes in attitudes and behaviour among health care professionals during clinical newborn resuscitation. Anticipation of potential problems was improved and better thermal management at birth resulted in less problems with neonatal hypothermia. Better evaluation of the infant at birth and more appropriate clinical responses were also noted.

Subsequently NRP was extended nationally by UCC sponsored Outreach Learner courses and UCC based Instructor Courses. This was followed by a *national evaluation of students* who had taken these courses (Ryan et al 1998). This study demonstrated that the NRP had been well received and could be taught, in entirety, to a broad range of Irish health care learners, with apparent satisfaction among multidisciplinary learners. Although NRP was originally designed for the U.S. health care system, the programme proved extremely robust and adaptable to the Irish health care system. *Anecdotal reports* of possible life saving benefits among newborn infants following NRP training, reported by a number of former students, were particularly encouraging.

In order to teach effectively, we must know, not just how and why people learn, but what *barriers exist to the learning process* and how these barriers can be overcome. In a qualitative study of a focus group, four general themes that act as barriers to NRP training were identified. These included limited employer acceptance; personal constraints including fear of failure; attitudinal barriers; and concerns regarding legal liability. The participants of this particular focus group, which included

nurses, doctors and ambulance personnel, not only brought an understanding of the difficulties they faced in introducing resuscitation training, they were also prepared to develop solutions to these barriers, many of which have already been implemented.

Barriers to learning and lessons learned and insights

BARRIERS	LESSONS LEARNED AND INSIGHTS
<p>1. Limited employer acceptance <i>For training</i> <i>For re-certification</i></p>	<p>Get senior administrators on-board Quality assurance evaluation both at the local hospital and regional levels Lobby to make NRP mandatory for employment Lobby insurance industry re risk management Lobby hospital credentialing agencies Lobby the Medical Council & Board Altranais</p>
<p>2. Personal barriers <i>Fear of failure</i> <i>Lack of confidence</i> <i>Lack of time</i> <i>Difficulties with scheduling</i> <i>Limited CME availability</i> <i>Financing uncertainties; Who pays?</i></p>	<p>Get course material well in advance Practice sessions with colleagues Non-stressful teaching environment Pre-view the NRP video Get CME recognition (Board Altranais, RCPI) Increase study leave for nurses & doctors Sponsorship for equipment Have local courses Arrange course to suit local needs Collaborate with regional instructors</p>
<p>3. Attitudinal barriers to training and re-certification <i>Motivating the sceptics</i></p>	<p>Encourage/Advertise Train nursing and medical students Get midwife tutors trained in NRP Give public recognition (certification ceremony) Audit current resuscitation practices Regional NRP protocol used by all participants Use “mock code” resuscitation drills Get NRP on Paediatric Specialist Training and Bord Altranais training curricula</p>
<p>4. Professional barriers <i>Legal liability concerns: Who is responsible?</i> <i>Maintaining standards and re-certification</i></p>	<p>Develop a National Multidisciplinary NRP Advisory Group Appoint a National NRP coordinator Clarify roles and responsibilities at national & local level</p>

Changing attitudes and behaviour in health care is always a difficult task. If there have been changes in attitudes regarding neonatal resuscitation training, this should be reflected in expansion and acceptance of NRP into the Irish health care system. This has been demonstrated by the number of outreach courses we have presented throughout the country. Other approaches have

also been made in attempts to engender change including the acceptance of *National Neonatal Resuscitation Guidelines* by the Faculty of Paediatrics. Much remains to be done in both teaching and lobbying. I envisage the appointment of a *national Co-ordinator* to oversee training, recertification and standards. The development of a *multidisciplinary Steering Committee* to oversee the development of NRP and STABLE is also a priority. A *national network* of committed Regional Instructors has been developed. These individuals must be encouraged and supported. The ability to show demonstrable relative advantage is crucial to the change process and this requires careful and appropriate monitoring and evaluation. *Regional audit* is therefore necessary and could be the remit of Regional Instructors. Continued *cooperation North/South* partnerships in education and training with Queen's University, Belfast, may prove a very fruitful exercise for both Health Services and Universities.

Randomised controlled studies to establish whether training programmes such as NRP could reduce neonatal mortality or neonatal asphyxia are difficult to envision, because of the multifactorial causes affecting infant mortality and asphyxia and ethical and logistical problems. Nevertheless, in a *retrospective study of infant mortality* in the Southern Health Board, we were able to demonstrate that neonatal mortality and asphyxia have indeed fallen since the introduction of NRP. However, because of many other confounding variables, one cannot draw the conclusion that these events are causally related.

Finally, the STABLE programme is relatively in its infancy stages of development compared to the NRP. Nevertheless, we have documented a significant improvement on knowledge as seen by the differences in the pre and post-test results. Of the 115 providers, 35 were physicians (33%), 66 were RN/Midwives (62%) and there were 6 EMT's (6%). The effect was greatest on the Emergency Medical Technicians, followed by RN's/ midwives and then physicians. These results only test knowledge, not skills and follow up research in terms of clinical performance will be required.

Pre- and post STABLE MCQ tests by speciality

	Pre	Post	%Change
Physicians	90.0	95.7	+5.7
RN/Midwives	85.8	95.4	+9.6
EMT	81.3	92.3	+11.0
Mean	86.9	95.3	+8.4

Teaching Strategies and the Enactment of Teaching

If I don't know I don't know, I think I know

If I don't know I know, I think I don't know.

R.D. Laing, *Knots*, 1971

Teachers not only must have a firm grasp of the course content, but also must have substantial knowledge of recognised teaching strategies, which strategies are most effective for different students and of how best to teach and model strategy use. Nevertheless, paraphrasing Laing's words, we often assume, (much to our own and our students' disadvantage) that we know more than we really do about effective teaching. At the same time, we are sometimes unaware that we already have natural or acquired teaching skills and abilities, but we keep trying to develop new

techniques, wasting precious time and resources when the basics are already in place. In some cases, we do not even know the right questions to ask about what we are doing as educators. Although I have always considered myself a good teacher, I am aware, in retrospect, that I was both confused and uninformed about teaching and learning, until I began to become seriously involved in resuscitation education. In the next couple of sections I hope to explore teaching strategies, skills and styles I have learned, employed and taught in Learner and Instructor training courses.

There are many, flexible ways in which the NRP course can be taught, using a variety of techniques and technologies. Most courses are taught in small group sessions (10 -20 students). A room large enough to accommodate this group comfortably is needed, in addition to another 2 breakout rooms for skills stations, which usually consist of 5 -6 students and an Instructor.

An excellent textbook is provided to the candidate at least 2 weeks in advance of the course to allow a period of self-study of the course content. In the text, the teaching goals of NRP and STABLE are well developed and well articulated. There is an award winning CD-ROM accompanying each NRP textbook, with many multimedia clips, including actual video footage of newborn delivery and resuscitation. Other technological teaching aids including a course specific video, wall charts and teaching slides.

We tried a number of different formats before deciding on the current teaching day. In the morning, the theory of newborn resuscitation is presented through small classroom lectures. The small size allows more of a discussion group atmosphere and open discussion is encouraged. I believe that teachers must not just be dispensers of knowledge, but rather the catalyst to empower students to be their own teachers. I encourage open discussion and honest criticism of the course content and ideas. Adults learn best from solving problems to meet their needs and interests, by drawing on their existing knowledge and prior experience in a democratic, non-hierarchic, non-authoritarian environment. I believe the multidisciplinary nature of our courses contributes to this interactive atmosphere.

A multiple choice question examination is held in the mid-morning followed by lunch. The afternoon consists of skills stations for the initial steps of resuscitation, bag-mask ventilation, chest compressions, intubation and medications. Candidates are evaluated on their ability to perform these skills in scenarios of increasing complexity.

Motivation to learn derives from the learner's estimates of the usefulness of the task and the probability of success. (People seldom undertake tasks where they feel guaranteed to fail). The *content* of the course must be relevant and have meaning and purpose for everyday issues. We usually have no difficulties here as most of our students have already experienced the anxieties of resuscitation in clinical practice, often without good preparation or supervision. Most will have made significant personal commitments to attend our courses, including preparatory self-study of approximately 18 hours prior to the actual course day.

Motivation is also enhanced if the teacher can ensure that the learner is actively involved, that *objectives* are defined and *goals* are set. *Positive feedback* must be provided through positive critiquing of the candidates performance and through positive reception of the candidates' contribution. *Reflection* should be encouraged through summaries and during lecture and skill station activities.

Teaching resuscitation to a multidisciplinary class demands a good repertoire of teaching skills including lecturing, leading workshops, skills teaching, and an awareness of group dynamics and assessment. In our courses I try to adapt my teaching to accommodate these features.

- ◆ *Giving a lecture:* Preparing the environment (lighting, heating, ventilation, equipment), the set (setting the mood and the objectives of the lecture), the dialogue (the body of the talk) and closure (questions, summarize and terminate) form the basis for good lecturing technique. In the NRP Instructor Course, we teach the student how to enhance their natural lecturing abilities (enthusiasm, approachability, humour), and correct poor techniques (voice projection, stance, etc), through role-playing and positive feedback.
- ◆ *Teaching a skill:* Skills are taught by perception (the student observes the instructor performing the skill) and guided response (the student performs the skill under supervision). We teach a 4-step system for skills teaching, originally developed to train children with disabilities to brush their teeth! First, the instructor performs the task, without commentary. She then repeats the task providing commentary on each step of the process. The instructor again demonstrates the skill and the student provides commentary. Finally, the student performs the task and provides commentary. With further practice, the student becomes proficient at performing the skill and with further experience performing mastery is achieved, at which point the skill becomes almost an automatic response. While the student may become proficient, mastery or autonomy is seldom achieved during short courses.
- ◆ *Giving positive feedback:* This refers to a process of critiquing the candidate's performance through a positive reception of the candidate's contribution, often involving the other students in the group. This is particularly useful in improving and assessing skills, since learners cannot improve unless they know where improvements are necessary and how the improvements may be made. A six-step outline is as follows: What did you do well? (to the student). What did (s)he do well? (to the group). What would you change/improve? (to the student). What should (s)he change/improve? (to the group). The leader then summarizes and shows once more how the skill should be done, reinforcing the positive aspects of the student's performance.

I hope to show in the following section how these theories of learning and my own teaching experiences have impacted on my style of teaching.

My Teaching Style

"If doctors make the worst patients, teachers make the worst students".

Marilla D. Svinicki 1996

Whatever about doctors making bad patients, it is obvious to any parent who has ever had a sick child, that a good children's doctor must be a good communicator and a good teacher. Communication, to parents and children alike, is essential to Paediatrics. I believe that my experiences as a teacher of newborn resuscitation and subsequent reflection upon my teaching style have not only made me a better teacher but also a better Paediatrician. (Incidentally, my efforts to coach rugby to 10-year olds on a Saturday morning have also been enhanced by my university teaching experiences and have been far more challenging in some ways!).

There are two basic pedagogical styles, the traditional, teacher-centred, didactic model, and the

more student-centred style. I favour the latter. I agree with the premise *that “teaching is not simply a matter of method and technique, but a matter of selecting, organising and transforming one’s field in ways that connect with students’ diverse mental worlds”* (M. Huber AAHE 1998). Students want teachers who show them respect, attend to their questions, and value their individual and unique responses. When they have teachers who respond to these needs, they know that they will be treated with fairness as valued persons and that their teachers will work to ensure that they acquire, the skills they need for academic success.

In one of the first teaching courses I attended, **learning** was defined as *a relatively permanent change in behaviour that comes about as a result of a planned experience*, with **teaching** being the planned experience. I try to practice what I preach, by preparing a planned teaching session, with the objective of engendering a change in attitudes and hopefully a change in behaviour, among at least some of my students. Ideally, in terms of neonatal resuscitation, I would like to see the students understand the physiological basis for neonatal resuscitation, to develop mastery in resuscitation skills, to enhance good clinical judgement (to know when to call for help), and maintain professionalism (to know how to work as a team with other disciplines). In the broader sense, I would like to see them engage in critical thinking (*“When we all think alike, no-one is thinking”*: W. Lippman *Public Opinion* 1922). Finally, I would see some of the students becoming teachers themselves, in a cascade process, so I would also wish to impart some useful teaching strategies to them, by example and as a mentor.

Today’s students are members of the “multimedia” generation and teaching must reflect this. I generally use technological aids when teaching, most recently, using a laptop computer to project my own slides (Microsoft Powerpoint®), with an increasing use of the Internet to download appropriate applications. There is nothing, apart from the actual event, that can show the drama of the birth of a newborn baby. However, video clips of the normal delivery and of complicated resuscitation scenarios are hard to beat as teaching aids. On the premise that technology is a means, not an end, in teaching, I try not to let audio-visuals become a distraction and I keep my slides simple and relevant to the subject matter. My writing is not that attractive and I find it difficult to write on a board or flip chart while talking, with the result that I reserve this teaching aid for brainstorming activities.

I am most comfortable teaching small groups, adopting an informal tone, and teaching in an interactive style. Even among larger groups, I try to create a small group atmosphere by encouraging the students to sit close together in the lecture hall. I am conscious of setting the mood appropriate to the talk and clarifying for the student the type of interaction I expect during the session. I do not believe in humiliating or embarrassing students in any way, conscious that anxiety and resentment are major barriers to effective learning. I am aware of the importance of presenting the objectives of my lecture at the outset (usually 5 or 6 important points I wish the student to remember) and constantly relating my ideas and student interaction to these fundamental points.

I try to teach with animation and enthusiasm, trying to create a dynamic mood. I use humour with care, drawing on a small repertoire of tried and tested jokes. I encourage the use of aphorisms and mnemonics, occasionally, to aid recall and retention. I try to enhance student motivation by demonstrating the usefulness of the content to them, using actual clinical scenarios and cases. I sometimes move about the classroom, making eye contact with students, asking questions. Asking

questions is an integral part of teaching, allowing active participation and helping the student to articulate views and reflect. Most importantly, from my own perspective, they give me feedback to level of knowledge and understanding of the student and the relevancy of the teaching matter. I am conscious that I need to repeat or rephrase the student's comment or question, so all the class can hear and stay involved. There are drawbacks with this style of teaching, which I will address by anecdote later.

Evaluation of my lecturing style:

At the end of a recent lecture to Medical IV students (September 2001) I handed each of the students a small blank card and asked them to write one comment they liked about my lecture on one side of the card and one comment on how I could improve my lecturing techniques on the other side.

The positive comments from the students were most encouraging. I do believe most were engaged by the lecture content and, hopefully, by the lecturer. I can see from the "What I can improve" comments that, in my enthusiasm to cover the topic in hand, I moved too quickly through the content and also that I spoke too quickly. Unfortunately, I did not make a printed copy of my slides available to the students for that particular lecture. (I have since corrected this omission and I have provided them with such for all my subsequent lectures. I hope to have these handouts available on the Department web page for the next term). By having this handout available, I find I can engage the students even more because they are not distracted in attempts to copy down the information in the slides.

In this evaluation, I also received a number of comments from students who felt embarrassed by being singled out and asked questions. In a subsequent lecture, I explored these fears with them. Some were genuinely embarrassed at being the centre of attention among their peers in such a large class. Others were afraid I was evaluating their performance during the lecture. They were reassured that the latter was certainly not the case. In addition, I was able to demonstrate to them by an actual case that occurred during the class, that one major reason for asking questions was for my own benefit; to see if students understood the concepts I was teaching. Following the provision of handouts and this discussion, I was able to note a general lightening of tensions when it came to being asked questions. The same class was subsequently evaluated independently for the President's Award in December 2001. I do not have the results of this evaluation, but I would be most interested in seeing if my evaluation has improved, especially as regards speed of delivery and handling of questions.

A Team Sport: Who were our students and what were their goals for learning?

Resuscitation and stabilizing of the newborn infant is a challenging and stressful event for all involved. But to be successful, it has to be a team sport. Thus the ideal outcome of resuscitation training should be to ensure that each participant in the resuscitation team knows their a defined roles and skills and that all members work in harmony and partnership. They must become team players. This is what we try to teach both in Learner and Instructor Courses.

Many other students of newborn resuscitation have been adult learners already working in maternity units around the country. They attended our courses with a prior wealth of experience

in the workplace, but may not have had formal education for many years. For them in particular, learning is a risky business and often associated with significant fears and anxieties. It takes courage and support to be an adult learner. Such students must be made to feel safe. They must be reassured that they will not be embarrassed or tricked into displaying a lack of skill, while their overall expertise and intelligence must be acknowledged.

During these courses, there can be varying degrees of preparation, expertise and involvement among students. Thus, much of the group's dynamics is dependent on the interpersonal skills of the members. This is similar to the clinical situation the students subsequently find themselves, when effective resuscitation of a newborn infant, depends on team rather than individual intervention. A team may be friendly/unfriendly, agreeing/disagreeing, or supportive/destructive. We teach instructors how to develop communication within a team, how to be creative, to recognise and use team strengths and how to evaluate the teams' performance. Practical ways of helping the "talkers" (enthusiastic but dominating participants), the "non-talkers" (the shy, nervous individual), and the "destroyer" (the aloof, obstinate or prejudiced candidate) are also discussed through role modelling and discussion. Participants must learn to work co-operatively to solve problems as well as to argue convincingly for their approach amid conflicting ideas and strategies. Thus, our curriculum places as much emphasis on process and collaboration as on content.

Epiphanies in teaching

There are certain experiences - teaching is one, and people tell me that childbirth is another - in which automatic acts of repression immediately follow the experience, wiping out both the painful and sometimes the pleasurable aspects of the experience, but leaving one fresh to try it again.

Lee Shulman.

Most of us hope we will teach our course better next time. However, in order to teach better, we must learn from past experience. Sometimes, the lessons forced upon us are humbling, sometimes uplifting. These moments in teaching, where we suddenly realise we have made a contribution or, alternatively, have missed the point completely, might be looked upon as *epiphanies*. An epiphany (from the Greek, 'a showing forth'), was as James Joyce conceived it, a fragmentary moment invested with significance (Jackson & McGinley 1993). The Stephen of *Stephen Hero* defined it as "a sudden spiritual manifestation, whether in the vulgarity of speech or of gesture or in a memorable phrase of the mind itself".

Even still, as I am evaluating a student's skill whether in a resuscitation scenario or medical examination in clinical practice, I have to stop myself from saying "What did you do *wrong* there?" When I do ask the right question ("What did you do *well* during that scenario?"), the student is usually reluctant to admit to any aspect of his performance being acceptable, let alone good. This is true of all disciplines from nursing, to medical student to paramedics. Thus, there are major cultural hurdles to be overcome in order to give good feedback. Having watched a performance in an area where I am relatively expert, my cultural inclination is to say what is wrong with it, thus demonstrating my own expertise. Learners share in this culture. They want to defend themselves, forestalling criticism by informing me that they are well aware of the inadequacies of their performance. When I get the learner to admit to some good points in their performance and then

request their accompanying colleagues, to give positive feedback, I find them smiling and positive about the encounter (epiphany?); relieved, I am convinced, that they themselves will be evaluated with fairness and respect. It is quite a remarkable experience.

One revelation that comes with adulthood is that every worthwhile occupation is a mixed bag of satisfactions and frustrations. Teaching is no exception. The satisfactions are clear: the student interactions, responses, smiles, the questions, the involvement and the feedback. Perhaps, as academics, we are just wistfully seeking to share the ineluctable, elixir of the eternal student, with their “charming illusion of changelessness and youthful immortality” (Murphy JA, *The College*: p.367). However, there are also frustrations: inadequate resources for professional development; poor physical environments for actual teaching; under-prepared students; lack of recognition for teaching faculty and the perception, although changing, that teaching is not an authentic scholarly activity and that research and teaching are, in fact, antithetical. Teaching portfolios are one way to document the scholarly activity of teaching, and, personally, I have found that the actual compilation of this Teaching Portfolio has been most satisfying.

Outreach NRP & STABLE Training in Ireland

Fin Barra, the patron saint of Cork..... left to his followers the charge of founding a seat of learning in this place: here, after nearly a thousand years, we open now the portals of this edifice and accept the task of training the youth of Munster.

Sir Robert Kane, Nov 7th 1849

Thus spoke the first President of Queen’s University Cork (now University College Cork), upon the inauguration of the University. One hundred and fifty years later, President Wrixon, re-emphasised the commitment of the University to Munster and beyond, when he wrote in UCC’s Home Web Page: *“We look forward to the new Millennium with confidence but also with an intense awareness of our obligations to the wider community”*.

A major focus of the recent Health strategy recently published by the Minister of Health & Children, Michael Martin T.D., is directed at reducing variations in care and improving equity of access to the Health Services. In keeping with this goal and Professor Wrixon’s dictum, University College Cork must have a role in ensuring high quality health care in the region and indeed nationally. Thus, it is the duty of the University to design, develop, evaluate and promote effective educational programmes that improve patient care. I see my role as a university teacher as extending beyond the traditional bounds of the University. I believe that providing resuscitation training to all professionals involved in newborn care is one way to ensure that neonates are not compromised by the geographical location of their place of birth. Therefore it was clear to me that the programmes we were introducing into Ireland should not be restricted to local institutions and that resuscitation education could open up new frontiers for the University.

Nevertheless, I was acutely aware that establishing a neonatal resuscitation training program is usually a much bigger problem in a small hospital than in a large teaching institution, where in-house registrars, neonatologists and specialized nursing staff provide an available pool of skilled individuals. In addition, resources for equipment may also more limited in a smaller hospital. For this reason, I directed a significant proportion of our resources on out-reach teaching programmes to the peripheral hospitals, a concept which has also been described in other countries (Bailey & Kattwinkel 1990; Kattwinkel 1984; Moore 1989).

In introducing this outreach programme country-wide, I was anxious to foster links between UCC and other professional organizations in the broader community, including nursing, midwifery, public health, general practice and the ambulance services. This approach has been most successful and has allowed us to develop a cohort of trained instructors throughout the country with strong commitments to UCC and who could form the basis for future co-operation in terms of training and research.

Outreach training is more likely to result in successful and effective change in clinical practice, in that it encourages local ownership of the programme. Change from within an organization is invariably more successful than when it is imposed or initiated from outside. While the initial outreach teaching came from the University, we provided the local trainers with all the necessary resources including manuals, equipment sources and advice to develop and sustain their own programmes. We also trained at least two individuals in each hospital as NRP instructors, recognising that successful change requires the co-operation and involvement of key local people who are likely to be affected by change.

Outreach courses directly from NRP (UCC) have been held in 19 of the 24 maternity units in the country (see table). The exceptions include Letterkenny General Hospital, Our Lady of Lourdes, Drogheda, and Portlaoise General Hospital. However, personnel from Letterkenny, including two Consultant Paediatricians, attended UCC learner and Instructor courses and now run regular learner courses for their own staff. Similarly the neonatologist in Drogheda is a recognised NRP Instructor and runs local courses for the North-Eastern Health Board region. In Dublin, UCC outreach Learner and Instructor courses have been held in the Coombe and the Rotunda Maternity Hospitals and Instructors from the National Maternity Hospital, Holles Street, have been trained in Cork based courses. Following on from start-up course in UCC, hospitals in some areas such as the South Eastern Health Board have collaborated together to train staff within their Health Board. At this point in time, almost all maternity hospitals in Ireland have NRP teaching resources at their disposal including the official NRP video and books. There has been widespread use of a set of teaching slides that were developed by NRP (UCC). The demand for NRP and STABLE courses remains buoyant, both for Learner and Instructor courses.

What Other Goals Have Been Achieved?

Apart from the actual numbers of people trained in both NRP and STABLE and the development of a network of Instructors across the country, we have achieved a number of other objectives

- ◆ The author has drawn up National Guidelines, which have been adopted by the Faculty of Paediatrics, Royal College of Physicians of Ireland, as a blueprint for future development of neonatal resuscitation education in Ireland.
- ◆ An increasing number of hospital systems now require the NRP and/or STABLE Programme as mandatory education for employment.
- ◆ We have developed and maintained a Neonatal Resuscitation Office, which includes a part-time secretary and a teaching co-ordinator. The office is based in the Department of Paediatrics and Child Health, at Cork University Hospital. The Office functions as a National Resource Centre for Paediatric Resuscitation, including the NRP, STABLE, Cork Babysafe Programme and the Paediatric Advanced Life Support Courses in its remit.
- ◆ Securing funds for education is always challenging. Yet resource allocations often determine the success or failure of programmes.

- ◆ Monthly resuscitation meetings are held with the author as NRP Director, the NRP Co-ordinator, the NRP Secretary and the local Instructors. We use these meetings to explore and enhance the quality of teaching and learning, to plan future courses and to evaluate recent courses.
- ◆ Local course are used to promote good teaching by mentoring new instructors. New Instructors are invited to present their first courses under our guidance at UCC-based courses.
- ◆ We see ourselves as part of the international community of Paediatric Resuscitation Training. I am a Fellow of the American Academy of Pediatrics (AAP). We have close links with the Academy and the NRP organization (a subsidiary of the AAP) in the United States. In addition, we have maintained links with the STABLE organization for ongoing collaborative efforts (bringing STABLE to Northern Ireland, June 2002) and for certification purposes.

What is my teaching philosophy?

“The most critical task is reorientating ourselves to the essence of what we do”.

LF Nazarian

A teaching philosophy is the foundation of a teaching portfolio. It is customary, therefore, to present one’s teaching philosophy at the very outset. I have held my statement of teaching philosophy to this juncture because it has been influenced and nurtured by much of what has gone before, and described above.

Although most doctors begin teaching during their internship, when they are expected to make presentations to their peers, nurses and various societies, there is no formal instruction on the theories of education in the medical undergraduate curriculum. I had been lecturing and teaching skills for many years before I became aware of this literature, which was first presented to me during my first Instructor training course in 1985 at the University of Alberta.

As I taught these resuscitation courses and especially as I taught my own Instructor courses, I became aware of the wider implications of the theories of education. I observed nursing, medical and paramedical colleagues, many of whom had never taught formally before, grow in stature and confidence, as they became lead instructors. I travelled with these teachers to maternity hospitals around Ireland and even the U.K. (Birmingham, 1998) and observed how resuscitation education broke down many of the barriers between hospitals and between professions. My teaching philosophy, the “whys” of teaching, encompass these experiences and is the focus here.

- ◆ I teach resuscitation training in order to transmit the knowledge, and skills of evidenced based resuscitation of newborns.
- ◆ I teach because I want to bring about a change of behaviour in the student, initially in the classroom scenario but more importantly in actual clinical practice, when they transform from student into practitioners.
- ◆ I teach because I want a better clinical outcome for my patients, i.e. newborn babies, when their carers are proficient in resuscitation training and work together as a team.
- ◆ I teach because I want students to feel secure about their skills in the very challenging clinical situation of trying to save a newborn baby’s life.

- ◆ I teach because I want students to make connections between the basic sciences and clinical sciences.
- ◆ I teach because I want students to feel good about themselves, to feel good about learning and for them to enjoy a sense of accomplishment.
- ◆ I teach because I believe that adult students should be treated with respect. The content of the course should be relevant and have meaning and purpose for everyday issues in their lives. As a teacher, I want to ensure the learner is actively involved, that objectives are defined and goals are set. Positive feedback must be provided and time for reflection should be encouraged.
- ◆ I teach Instructor training because I believe effective teaching skills can be taught, learned and developed.
- ◆ I teach Instructor training because I believe that an effective teacher must have a good understanding of the subject matter being taught as well as of the underlying pedagogical theory. Teachers should be able to vary teaching styles and should expect students to participate in a mixture of lecture, discussion, and group activities. Technology is important in the classroom since it is a vehicle for instruction and can be an invaluable tool for addressing different learning styles.
- ◆ I teach Instructor training because being an effective teacher can be a difficult task, requiring practice and dedication, but can provide rewards that are well worth the effort.
- ◆ I teach because I want to be part of a global community that believes in teaching as a field of inquiry, dedicated to the scholarship of that field. I believe that it is a teacher's responsibility to stay current in a field, engaging in research and participating in classes, conferences, workshops and mentoring.

Present State and Future goals

“If you're not living on the edge, you're taking up too much space”.

Anonymous

This project, by the integration of teaching and research, has described a journey in teaching from the local introduction of a specific teaching course, through national propagation and evaluation of this course. The strength of this teaching portfolio lies in the comprehensive, authentic, evaluation of the various, interlinked, leading-edged, resuscitation courses which we have introduced throughout Ireland, from UCC.

Resuscitation training is a limited area of education and some might argue that any form of “training” lacks scholarship. However, Lyons (1998 & 2001) has argued that *“the design, enactment and analysis of a course is as much an act of inquiry as any other activity more traditionally called research or the scholarship of teaching”*. Thus, although the subject matter of resuscitation training is relatively limited, scholarly reflection on the teaching of adult learners and engendering changes in behaviour are challenging tasks, worthy of inquiry. I believe we not only ‘provide instruction’ but we also ‘produce learning’. The courses are learner centred and reflect what some educators call “a paradigm shift from teaching to learning”.

“We close the classroom door and experience pedagogical solitude.” (Lee Shulman 1992). Grubb found that faculty isolation is a key obstacle to effective instruction: *“Except in a small number of exemplary institutions, most instructors speak of their lives and work as individual, isolated, lonely. A teacher's job is*

a series of classes, with the door metaphorically if not physically closed". This analysis of my teaching experiences has shown that teaching need not occur in solitude and is, like the act of newborn resuscitation itself, a team sport involving a local, national and international teaching community.

Developing a description of one's philosophy or pedagogical goals by means of a teaching portfolio, within the community of teaching, is a movement towards more meaningful teaching. My own philosophy of teaching has evolved, prompted, in particular, by my experience of teaching the Instructor Courses. I believe that my "teaching capital" has increased in depth, breadth and quality as I have advanced through this project. Teaching these courses has engendered a greater appreciation of the special needs of adult learners, has involved me in a greater community of teaching, has highlighted for me the need for innovative ways of teaching and has encouraged me to explore my own strength and weaknesses as a teacher and mentor.

Since this teaching project was also a research project, an evaluation of the programmes was done at various levels. Evaluation of a teaching programme can have a formative role, identifying areas where one's teaching can be improved, or a summative role, judging the effectiveness of teaching. I have tried to address both in this portfolio. The key question in summative evaluation is whether the students grasped the key ideas, methods, skills and values of the course. Summative evaluation cannot rely on a single assessment tool but must include measures of skill, knowledge, behaviour, and attitude. We have shown improvements in knowledge comparing pre- and post-course MCQ tests. Skills are more difficult to measure; however, we were able to show improvements in clinical skills and behaviour in a controlled, time interrupted, investigation. I have also shown that attitudes have changed by the acceptance of these programmes into undergraduate and post-graduate education for doctors, nurses and midwives and into the mainstream of Irish hospital paediatrics. Nevertheless, significant obstacles to resuscitation education and training remain. Another important objective of this portfolio was to translate the science of resuscitation education into the clinical setting and improve patient care in the process. The results of this study in terms of neonatal morbidity and perhaps neonatal mortality, although not conclusive because of other variables, were most encouraging.

Realising the Promise

To date, we have trained over 2000 health care workers, including midwives, physicians and ambulance personnel, throughout the Republic of Ireland. There is little doubt that widespread training in a formal program of neonatal resuscitation and stabilization is associated with certain economic costs related to training. However, in terms of risk-management in high-risk sub-specialities such as obstetrics and neonatology, increased training costs would possibly be balanced by reduced professional liability claims stemming from alleged birth injuries. (In 1999 alone, over £4 million was paid out to settle just four Irish obstetric claims, the average cost of settling such claims having increased more than four-fold since 1990; Irish Medical Times, 1999). In 2001, the Medical Defence Union has indicated that the average successful award for a child with cerebral palsy is over £3 million per claim, with up to 8 claims expected annually in Ireland.

While it is known that less than a fifth of cases of cerebral palsy derive from events in the perinatal period (Perlman et al 1997), avoidable factors, including inadequate resuscitation skills and practices, are still present in many cases of perinatal brain injuries. In the 1995 Confidential Enquiry into Stillbirths and Deaths in Infancy (CESDI), 43 cases of 388 deaths investigated had evidence of poor resuscitation technique that contributed to the babies' deaths. Neonatal outcome

may improve and, at the very least, public confidence in the events surrounding birth will be enhanced by the knowledge that health care professionals are properly trained in the important area of newborn resuscitation. Indeed, the current developments in relationship to Clinical Governance and the rising demand from stakeholders (the public, Government, employers, policymakers, accreditation and licensing bodies) for more accountability, will dictate that health professionals undertake proper training and re-certification in resuscitation, so that unacceptable variations in the quality and outcome of clinical care are minimized.

Historically, medical education has always been grounded in the perception of the specific health care needs of patients. This teaching portfolio was developed along a similar premise: that every baby has the right to expert resuscitation by properly trained individuals. The number of professionals involved and the importance of their ability to work collaboratively has illustrated that newborn resuscitation is a 'team sport' of increasing complexity and demands. Much remains to be done to improve the teaching and delivery of these programmes so that skills can be maintained. New initiatives to improve teaching will involve many different groups. The ancient Chinese philosopher Lao-tzu pointed out that "*a journey of a thousand miles begins with one step.*" The more bridges that can be created among Health Care professionals, the Universities, Health Services Administrators, Educators, and Technology Experts, the more steps we will take along this journey.

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CHAPTER 8

TEACHING RESEARCH METHODS TO POST-GRADUATE STUDENTS OF ECONOMICS

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Introduction

This section presents biographical information and contextual information on the course ECN 524, which is the subject of this portfolio entry. It covers an outline of the particular course and programme involved and the number of students taking the course.

Since 1992, I have been a full-time permanent College Lecturer in the Department of Economics, UCC. Previously, I lectured full-time at Waterford Institute of Technology from 1984 to 1991 and part-time at UCC from 1986 to 1992. My teaching specialisms are in the areas of economic growth/technology and research methods.

My teaching portfolio entry is based on one of the courses for which I was given responsibility during the 2001/02 academic year. The course involved is *ECN 524: Research Methods - The Professional Research and Publication Process* to M.A./M.Econ. Sc. students. This is a 5 credit module delivered by me in the first term. I have been teaching this course for 7 years.

The MA/MEcon Sc is a postgraduate programme offered through the Arts and Commerce Faculties. The objective of the programme is to prepare students “for careers as professional economists in business, the financial sector, the public sector and the media; - economic researchers in public bodies and private consultancy companies and; economic lecturers in third-level institutions. It also provides foundations for undertaking further postgraduate studies including PhD programmes in Ireland and internationally” [<http://www.ucc.ie/ucc/depts/economics/program/maeconb.html>]. The course is an integral part of this intensive masters programme. There are 24 highly motivated students taking the programme this year.

Teaching Philosophy

My teaching philosophy is that my role as a teacher is to facilitate active learning by students. I do not subscribe to the view that the lecturer's primary role is to impart knowledge to students, for two reasons. First, it appears to absolve the lecturer of the responsibility of tailoring his knowledge to the target audience. It also ignores the possibility that the lecturer might learn something by doing so. Second, by making students passive recipients, it implies that students are incapable of taking ownership of their own learning. My experience from 17 years teaching is that, by and large, students rise to a challenge.

The primary objective of university education is for students to learn to think for themselves in their chosen disciplines. As a subject, Economics is not a body of concrete knowledge. It is method of reasoning about particular issues in the business world. As such the role of the Economics

teacher, especially in more advanced courses, is to facilitate students thinking as Economists about real world issues.

In order to put this philosophy into practice in *ECN 524: Research Methods - The Professional Research and Publication Process* the challenge is to guide highly motivated students in their economic research leading to a research article.

I believe that teaching and assessment are intimately related. When a student registers for a course, they are basically forming a contract with the teacher. Aside from the student's long-term educational objectives, their immediate interest is in the grade they achieve in a course. Accordingly, assessment methods should be clearly outlined at the outset and should be consistent with the objectives of a course. By providing a link between effort and reward, assessment acts as the key incentive mechanism on a course.

Teaching Objectives

The course objectives, learning outcomes, teaching strategies and assessment methods for *ECN 524: Research Methods - The Professional Research and Publication* are presented in this section.

Details of this module are available in Departmental brochures (see <http://www.ucc.ie/ucc/depts/economics/program/maeconb.html>). These are presented in greater detail in the course outline handout.

Course Objectives

This module prepares the student for writing their research article (ie examined in Part II of the programme). It does so by showing students how to construct a Research Proposal for their topic and write a Preliminary Research Report on the literature review and data sections of the research article. Both the Research Proposal and the Preliminary Research Report are examined in Part I of the programme.

The course is run as a 2-hour workshop during the first term. Every student is expected to prepare in advance and participate in group discussions. Up to 5% of the marks are available for in-class participation, the most important part of which is in-class presentations.

Learning Outcomes

Professional publication involves having a research article accepted for publication in a peer-refereed journal (eg. *Economic and Social Review; Applied Financial Economics; Journal of Law and Economics*). Having completed this course (ie Part II) the student will be in a position to prepare a research article for submission to such a journal.

Teaching Strategy

Given the objectives of the course and that the 24 students taking the course have very little experience of research, a hands-on approach is essential, as it is not possible to teach students how to do research, they have to learn by doing it themselves. Therefore my job is to guide their

learning. The strategy used is to run the course completely as workshops, where students are assigned reading and practical exercises in advance and group discussions are held. The assigned room, which was Aras Na Laoi 2.01, was well suited to conducting workshops.

Assessment Methods

This course is examined completely by coursework, with an increasing proportion of the marks being awarded as the research progresses. Thus, the trial research proposal counts for 10%, the research proposal 20% and the preliminary research report 65%. Up to 5% of the marks are available for in-class participation, the most important part of which is in-class presentations. The research article, which is completed during the summer is examined in Part 2, which accounts for 25% of overall programme marks.

Teaching Delivery and Student Feedback

This section presents an objective account of how the course was delivered. Also included are references to student feedback and student work, which are reproduced in the appendices. No attempt is made here at reflection on the extent to which the courses were successfully delivered, as this is left to the next section.

The objective of the first week was to present the course outline. Even though the course is compulsory, it is very important to provide a confidence builder for these highly motivated students, the vast majority of whom are attempting economic research for the first time. I attempted to de-mystify economic research. For example, I told the students that, from my experience of teaching this course for the last 6 years, each and every one of them would, in 12 months time, be binding their research articles for submission to the Examinations Office. I then conducted an interactive discussion session with the students where I asked them to identify the jobs of professional economists and what they produce, with a view to getting them to see that their future careers would involve the writing of various kinds of reports and that the skills acquired on the course are life-long skills. I then gave the students an exercise on selecting a research topic, which they had 5 days to submit.

In the 2nd week I began by asking for feedback on the above exercise, which the students had completed by themselves ('a bit like being pushed off the deep end'). In this context, I outlined aids for selecting research topics, which they could use in their research proposals. I also presented the formal requirements for the research proposal, which is the first major task facing the students to be submitted at the end of the first term. Finally, I circulated and explained Exercise 1: Trial Research Proposal, which had a deadline for mid November. At this stage the process of assigning each student a research advisor was underway in the Department. Students were told to begin working with their advisors on Exercise 1 immediately. Once research advisors were assigned, I kept them fully informed by e-mail of my course deadlines and provided them with copies of my course handouts.

For the next workshop on 25th Oct, reading was circulated a week in advance. At the outset of the workshop I asking students to form into groups of 3 and asked the groups to identify what they learned from the reading about how to organize their research. I moved around between the groups, listening to the discussions and offering suggestions as appropriate, after which I opened

out the discussion to the full group and asked individuals to share ideas with everyone. Virtually every student had read and thought about the reading and actively participated in the discussion.

Reading for the next workshop (1st Nov) was circulated in advance and students were asked to answer particular questions. The workshop was conducted in the same manner as above. However, given the difficulty of some of the reading and the need to summarise the main learning points, a further handout was prepared. This was only presented in the workshop after the group discussion phase had ended. The same format was followed for the next workshop on 15th Nov. I introduced a feedback questionnaire on this workshop in order to identify any improvements that could be made. Both this and the previous workshop witnessed a high level of participation from students.

On my grading Exercise 1, the Trial Research Proposal, each student received a mark with written feedback. I also set aside time for students to make an appointment to meet me to discuss the feedback. Approximately, half of the class availed of this opportunity.

Delays in installing new computers into the Department's postgraduate laboratory resulted in students being unable to access databases such as Datastream. Once the laboratory was open I organized for another member of staff to demonstrate Datastream.

The next session on 13th Dec involved students making presentations of their research proposals to the class. Presentations do not involve the students defending their work. They are not adversarial. The purpose of the presentations is to help in the formulation of student proposals. This can only be achieved in a supportive environment. Students also benefit from the experience of giving a presentation. Each presentation was to last 5 minutes with 5 minutes for questions. The class was divided into 2 groups for the presentations. Other members of the academic staff in the Department kindly accompanied me for each group and also asked questions. Every student made a presentation. The academics who attended, remarked that the standard of work being done was very high.

In the final workshop, I passed on and reinforced this feedback that the standard of work presented by the class was very high. I then went on to present the requirements for the preliminary research report and research article, which are completed by students in the second term and during the summer respectively. A final student feedback exercise was conducted in the class as part of the Department's Quality Assurance Committee's procedures.

Teaching Evaluation

This section presents an evaluation of the degree to which *ECN 524: Research Methods - The Professional Research and Publication* was successfully delivered. Success here is defined primarily in terms of the fulfillment of teaching objectives. Student feedback, student work and my own reflections on the course form the basic raw material for the evaluation.

Issues to Consider:

- ◆ My role in this course is to teach research methods. Each student is assigned a research advisor by the Graduate Studies and Workload committees in our Department. The research advisor guides the student on the particular research topic chosen. Research advisors were not assigned early enough this year. This resulted in some re-scheduling of workshops and deadlines.

- ◆ Overall, students responded well by preparing in advance for workshops. They also participated actively in workshops and seemed to like the approach taken in the discussion sessions. The only issue that arose was that they were not always clear what they were to learn from each session.
- ◆ My feedback on Exercise 1 seemed to go well, although not all students availed of the offer to meet me.
- ◆ It is not clear whether the students see the benefits of presenting their work. The feedback questionnaires did not provide any insight here.
- ◆ Delays with the post-graduate laboratory frustrated the student's access to databases.
- ◆ The assessment methods seemed to be closely aligned to the teaching strategy. However, there may be scope to increase the weight given to the preliminary research report (which is an 8,000 word assignment), and correspondingly decrease the weights for Exercise 1 (500 words) and the research proposal (2,000 words).

Possible Responses

- ◆ I should re-iterate my request for research advisors to be assigned at an early stage. Perhaps I should also arrange a meeting between the research advisors, and myself to familiarize them more fully with my work on this course.
- ◆ Students might be encouraged to keep learning logs so that they would have to articulate the learning points from the various workshops. It might be possible to award a certain small percentage of the marks for learning logs.
- ◆ Sessions on Datastream and perhaps some other data sources to be organized earlier.
- ◆ Students should be asked for specific feedback on their presentations, both before and after giving them.
- ◆ Regarding changes to the weighting of assessments, once again student feedback should be sought before any changes are made. Students may prefer to be rewarded for the effort they put in at the topic selection stage.

Overall Evaluation

I believe that I have been moderately successful in fulfilling my teaching objectives, although it should be noted that evaluation can only be partial at this time of the year, as the quality of student work also plays a key role. The teaching philosophy involves engaging the student in active learning through the use of workshops. This approach was facilitated by the small number of students taking the course. The process of evaluating the course has been useful as it has resulted in possible changes which might improve the course in future years.

CHAPTER 9

LABORATORY CLASSES IN FOOD CHEMISTRY – A STRUCTURED AND TEAM-ORIENTED APPROACH TO DEVELOPMENT OF LABORATORY SKILLS IN FOOD SCIENCE STUDENTS.

*Dr Tom O'Connor,
Department of Food Science*

Background and Rationale

Food Science students take laboratory classes in Food Chemistry in 2nd, 3rd and 4th year of their programme. In 2nd year they take FC2001, Introductory Food Chemistry - Food Analysis which consists of 20 X 4h laboratory sessions. In 3rd year students take FC3001/2/3 which are lecture modules with associated laboratory sessions (a total of 20 X 4h sessions). Both the 2nd and 3rd year laboratory sessions emphasize general laboratory skills with particular emphasis on “wet” laboratory skills, i.e., traditional test-tube type analysis of foods. Instrumentation in the food analysis laboratory is covered from a theoretical perspective and instrumentation is demonstrated to students but students get little “hands-on” experience of instrumental analysis. This type of approach to laboratory classes is typical of Food Science programmes worldwide, particularly where large numbers of students are involved as in our programme. For many years I taught FC2001 (formerly FC202) and I currently teach a substantial block of our 3rd year laboratory classes. I also teach part of FC4011 as outlined below.

Reflection

A key problem for us (and other Food Science programmes worldwide) is that while it is essential that students develop the traditional “wet” laboratory skills covered in our 2nd and 3rd year courses, most modern food analysis involves sophisticated, expensive instrumental procedures. While our laboratory is equipped with such instrumentation, given its costs (e.g., GC/MS in excess of EUR 100,000), often only one instrument is available. While we demonstrate these instrumental methods to 2nd and 3rd year students, this does not allow them meaningful, individual “hands-on” experience with the instruments.

Thus, we have introduced FC4011 Advanced Food Analysis Laboratory for our 4th year students to address this problem, i.e., the objective is to provide detailed “hands-on” experience with instrumental methods. The module is currently coordinated by my colleague, Dr. Paul McSweeney. It is delivered by dividing our 4th year class into small groups (5-6 students) and organizing them among 10 laboratory sessions in rotation before and after Christmas. All academic staff currently teaching in the Food Chemistry subject area (Professors Morris, Mulvihill, Fox, Drs. McSweeney, O'Neill and myself) are responsible for teaching aspects of this module. Each laboratory session also involves a senior Post-doctoral, PhD or research assistant as demonstrators. The three technical staff in the Food Chemistry subject area provide technical back-up. Thus, delivery of the module involves a team-oriented approach.

Each laboratory session involves approximately one hour lecture on background theory (I typically lecture to the 5-6 students in my office) followed by approximately a three hour “hands-on” laboratory session involving the students, the academic staff member and the post-doctoral/research assistant/PhD student demonstrator. The 5 credit module is assessed continuously with 50 marks for laboratory attendance, performance and reports and 50 marks for a written term examination on the theory of the methods covered. Students typically display excellent learning outcomes. Student feedback is very positive and the learning outcome is apparent in laboratory reports. Furthermore, this module facilitates students in their 4th year Research Project (FS4001).

The module allows close and regular interaction of all academic staff members in the Food Chemistry subject area with all 4th year Food Science students. It facilitates good relations and discussions between academic staff and students on a wide range of academic/non-academic issues which is good for morale on both sides. It allows close interaction between students and postdoctoral staff, senior PhD students and technical staff. This allows students to get a flavour of what postgraduate research involves in addition to the experience they gain during their own individual Research Projects (FS4001).

Finally, the module enhances the already very good relations between all academic and technical staff in the Food Chemistry subject area as successful provision of the module involves a very significant cooperative team effort. I am proud and privileged to work with such a great group of colleagues.

The obvious disadvantage of the module is that it is very labour intensive and expensive in terms of the capital cost of the equipment. Virtually all of this equipment has been purchased using externally obtained research funding - an example of research supporting undergraduate teaching.

However, the overwhelming consensus is that the positive aspects of the module and the student learning experience far outweigh the difficulties involved in delivering the module.

PART II



REFLECTIONS ON LEARNING

CHAPTER 10

IT'S THE TAUGHT THAT COUNT – A DIARY OF TEACHING REFLECTION

Derry Cotter

Department of Accounting, Finance and Information Systems, UCC

As I readied for the imminent fray of the 2001/2002 academic year, I had no reason to believe that it would be any different to the twenty that had gone before. I prepared as I had always done - like the title holder defending his crown - the same training methods, the same trainer (myself!) and, as ever, the same attention to detail.

A September e-mail flashed details of a UCC course called 'Multiple Approaches to Teaching and Learning'. I asked myself what I could learn that twenty years of teaching experience hadn't taught me already. Still, the course had a certain curiosity value. Why not go along and find out? Maybe I could brush up on this or that. Haul in a visiting speaker, or revamp and update the course outlines a bit. A bit to the left, maybe an inch or two higher, or nearer to the centre. After all, why change a winning team? The course would probably turn out to be a waste of time, but so what?

On day one the course venue was freezing - any heat that there was disappearing towards the lofty ceiling beams of the North Wing Council room. Battening down the hatches, I buttoned up my jacket, the cold succeeding only to enwrap me in expectations of futility. How wrong I was! In the face of adversity, Marian McCarthy's enthusiasm persevered, and gradually my resistance began to thaw:

- ◆ Perkins' Dimensions of understanding
- ◆ Gardner's theory of multiple intelligences
- ◆ Student centred learning
- ◆ Active learning in the lecture theatre
- ◆ Teaching for understanding

Marian, as facilitator, mentioned these and more. The next morning, she brought the same enthusiasm and more new ideas. It was then that I experienced the Damascian realisation: - *'It's the Taught that Count'*. Because teaching surely must be about *student*-centred learning. *Active learning*, where the students take centre stage, as they participate actively in the lecture room. Because in *doing*, one is learning, testing and reinforcing simultaneously. Only then does knowledge become part of one's natural armoury, a skill that can be employed whenever the occasion demands it.

Steeped in my new found wisdom, I looked again at term one of Academic Year 2001/2002. Putting pen to paper, I decided to keep a teaching diary - Bridget Jones and Adrian Mole eat your heart out!

*Extracts from Teaching Diary and Reflections on Course AC 3111
'Financial Reporting 2' - 1st term Autumn 2001:*

Lecture 1: Introductory Lecture

Topic: Course Introduction and the Regulation of Accounting

Understanding goals

(i) That students should be able to relate the AC 3111 course to their prior knowledge of Financial Reporting.

(ii) That students should identify the generative topic of the course as being the *evolution, content and economic consequences of the Corporate Annual Report*

Preparation:

It is that time of year again. Already the students have begun to breathe new life into a campus that had become Summer-dominated by staff. They are younger looking again this year. Or is it that I have another 12 months on the clock myself? Still, what's another year?

My tailored AC 3111 coursepacks (one for lectures, the other for tutorial material and past examinations questions and solutions) have been sent to the College printing office. These will (hopefully!) be purchased by the students for a total cost of about £12.

It is Monday 8th October (2 days before my first lecture), and I feel the adrenaline starting to build. It is always the same. A new academic year, and a new class. Nervous energy drives me on as I copy the introductory lecture handout. I have put a lot of work into designing and integrating this year's course, and I hope that it will pay dividends.

Lecture plan:

- ◆ Introduce myself
- ◆ Discuss the course outline/syllabus
- ◆ Discuss the interim assignment
- ◆ Tell the students that they will be expected to buy two coursepacks, costing a total of about £12
- ◆ Outline the generative topic of the course
- ◆ Work through my powerpoint slides on the regulation of Financial Reporting - this should take about 35 minutes.

The lecture

Number of students present: About 55

It is 1.00 p.m. I am alone in the lecture room. It will be another 10 minutes before the students arrive - the length of a brisk walk from the Lee Maltings (the location of their 12 o'clock Law lecture).

The students drift in, and I introduce myself and explain what the course will be about. I emphasise the aspects of the course which will involve their prior knowledge of Financial Reporting. I then move on to describe the generative topic of the course.

I tell them about the coursepacks, mentioning that they will be expected to pay about £12 for them. They nod indifferently, displaying more interest in the coursework assignment, which will count as an interim assignment. I then take them through the course outline, trying to reflect the

range of skills which they will need to employ during the year. This latter approach is a crudely disguised attempt at applying Gardner's Multiple Intelligences Theory, which I have only read about recently. It may be important for some of the students however, particularly those who are less skilled in the numerate area.

Now I'm into my slides on Accounting Regulation, the laptop computer behaving impeccably as I try to make it as interesting as I can. It takes about an hour (it will normally be a two hour lecture), and I finish somewhat abruptly. Three French students stay behind and introduce themselves, as the others drift away.

Reflection

It is difficult to know what to think. As usual they were impassive, their poker-like faces revealing little of what they thought. I wonder if the introspective nature of the subject has damaged their personalities, and killed their passion. Or is it 1st day back syndrome? A temporary malaise, as their minds re-adjust from faraway places. Either way, nothing has changed - I talk, they listen. Or do they?

The question goes around in my head as I sit in my room and think. There is a knock, and another of the visiting French students appears in the doorway.

Lecture 3

Topic: Review of the Corporate Annual Report

Understanding goals: (i) That students should understand the factors which have influenced the evolution of the Annual Report

Preparation

Attendance at the UCC Multiple Approaches to Teaching and Learning course has heightened my awareness of student centred learning. I am intent on getting them more involved this week. The image of my ex-teacher 'The Tomb' flashes before my eyes;

'Steady on, Cotter. You're a lecturer now, you know'

'But students learn better by doing, Sir. Not by listening. That's what they said on the course, Sir'

'Never mind your courses, Cotter. You're not some kind of discussant. They'll have you jumping through hoops next'

'But they're third level students, Sir. They need to think for themselves'

'Think for themselves, Cotter? Students are for learning, not for thinking'

'But these people will be the policy makers of the future, Sir. If they don't learn to think for themselves...'

'They'll have to learn before they can think, Cotter. There's no point in putting the cart before the horse'

'But Sir...'

'Anyway, this thinking thing is for the birds, Cotter. They'll walk all over you'

I dismiss this idea out of hand. Discipline has never been a problem in UCC. At least not in my

experience. A final year undergraduate class is hardly going to change that! So what will I need? If I want to get them involved, that is. For a while inspiration evades me, but eventually I think of something. Record cards! That's what I need. I remember having seen some in the stationery cupboard. About 6" x 4" - just the right size for some comments. I collect a bundle and leave them on my desk.

Lecture plan

- ◆ Ask students to form buzz groups of about 4 or 5
- ◆ Get each group to write down (on the record cards which I will be providing) what they think is contained in a Corporate Annual Report
- ◆ Review the detail of what they have written down
- ◆ Go through the annual report of Irish Wire Products (I will be giving each student a copy) in detail
- ◆ Take a short break.
- ◆ Discuss how the content of the IWP Annual Report compares with the students' expectations
- ◆ Outline, using a generative chart slide, the importance of the Annual Report

The lecture

'Good afternoon everybody. Today we're going to look at the Annual Report. I want you to break into groups of four or five (I resist the temptation to use the term 'buzz group' in case they think me to be any madder than is necessary).

'Basically, I want you to tell me what you think goes into an Annual Report. Here are some record cards'
They stare at me blankly. I feel like a comedian whose funniest joke has fallen flat.

'Turn around please and face the people behind you. Move your chairs. Come on, let's make an effort'
There is a surge of chatter as they come to terms with what I've asked them to do. Move their chairs, write things down, interact. The noise of shifting chairs rises above the chatter as they feel compelled to comply. Has Cotter taken leave of his senses? I can see it in their eyes. Nonetheless, they decide to get on with it. After a few minutes the chatter, which had subsided, begins to rise again.

'The Tomb' smirks at me from inside my head'

'I told you so, Cotter. I told you they wanted to learn. That thinking stuff is only for teachers'
I mutter some dismissive under my breath. I look at the room again and, to my surprise, they are actually writing something. At least one out of each group is. They're still chatting of course. But they're doing what I asked them to do. Or at least they seem to be. I let them continue until the chatter reaches a crescendo.

'Time up. Pass your comments this way please if you're finished'

I ask a spokesperson from each group to read out the group's comments, which I record on the overhead projector.

Reflection

Not bad. They can think. Yes, they can think for themselves. I congratulate myself for ignoring 'The Tomb's' advice. It hasn't been easy. But then, it hasn't been hard either. It is obvious now that they have spent too much time listening. Listening instead of doing. It's a hard change. For them as well as me. Interaction shouldn't come suddenly; it should be built up over months, even years. But better late than never. And today has set the ball rolling. Now for my next trick!

Lecture 5

Topic: Intangibles and Economic Consequences

Understanding goals: (i) To create an appreciation that accounting standards can have a range of economic consequences

Preparation

It is the students' turn to be under pressure. I have arranged for them to make group presentations on the annual accounts of Irish Companies. I do a phone round of Companies to procure the Annual Reports which they will need in the weeks ahead. An hour later I have nine companies in the bag.

It is Tuesday morning (a day before my lecture), and I am visited by two of group number one. I wonder what additional information they are looking for. Hopefully I'll be able to help them out.

'We're from the IWP Group. We're doing the presentation tomorrow'

'Yes, can I help you out with something?'

'We were wondering...'

'Yes?'

'We were wondering if we could do it next week instead'

'Have you run into problems?'

'It's the job application forms. You see we've spent nearly all the week filling them up'

'Yeah, that's okay I suppose. I'll be expecting a great presentation from you next week mind'

'Thanks'

So I'm back in the limelight. I suppose I should be pleased, but actually I'm a bit disappointed. I had been curious to know how it would go. I'll have to wait for another week now. Soon I realise that it's only a minor setback and I search for some alternative way of keeping them involved.

Participation and feedback are crucial elements of student centred learning. I have learned this by reading up on teaching methods. It's how we all learn things. Whether it's driving a car, swimming a length, or changing a wheel. You do it, and you know it. So I need to get them doing. I look at my course outline and wonder what can be done.

A review test! That's what I've decided on. I'll put together ten or twelve questions, covering the course to date. And I'll get the students to do them in class. It will give them practice at questions, get them to focus on prior material and, most of all, give them feedback on their progress.

The lecture

'We're putting the presentations back a week. Group one needed more time, so we'll start with them next week'

The stay of execution brings little by way of elation. I begin by discussing the economic consequences of accounting standards. How Accounting supported the slave trade in the southern states of America, and the closure of Welsh coal mines in the 1970/80s. We continue with more technical coverage of the economic consequences of leasing. I feel that I have done the topic justice, and I circulate the review questionnaire.

'Okay, have a look at question one, please. We'll discuss it in a couple of minutes'

One or two use calculators as they work out the details of question one. Others discuss it in little groups, finding it to be more humorous than I had expected.

'Okay, has anyone come up with an answer to question one?'

At first there is no response. I use a cartoon to encourage them to be first in with their point. Someone offers a view. Then someone else. It is hardly a chorus, but at least they are finding their courage.

Reflection

I am no sooner back in my room than 'The Tomb' sneers at my efforts.

'I told you Cotter'

'Told me what Sir?'

'That they only wanted to learn'

'But they are learning Sir'

'This thinking and presenting thing is for the birds Cotter'

'But...'

'What they want is to be spoon-fed. That's what's tried and tested. You talk, they listen. It's the formula that's worked for generations'

'But this is third level, Sir...'

'Third level? What difference does that make Cotter? You just have a brainier class of sponge. Give them what they want and they'll thank you for it. Make them work and they'll resent it. Wait until they fill up your evaluation. You'll pay for it then'

I am left with the thought that he could be right. I am forcing this active learning thing on them. It may be for their own good, but is it what they would choose if they had a choice? Doing is harder than listening.

The conflict bothers me. I am working my butt off to improve the quality of my lectures. But what reception is it getting from my audience? Maybe they would prefer to be spoon-fed. That's what they've been used to since the age of four. Why try to change things sixteen years later. Chances are that they'll crease me. That Cotter went too far. Didn't teach them like he should have. Made *them* do the work instead. First it was buzz groups. Then record cards. And now presentations! Who knows what he'll will come up with next.

I consider my predicament as I relax at home. Somehow the Teachers whiskey doesn't taste the same tonight. More mature maybe, but less well liked nonetheless.

Lecture 9

Topic: Earnings per share (EPS)

Understanding goals:

- (i) That students should be able to compute EPS, and appreciate its importance as an important stock market indicator
- (ii) That students should be aware of current practice in respect of EPS disclosure and policy adopted by companies

Preparation

I check my progress to date against the course outline. Not bad. My efforts to employ active learning have slowed things up a bit, but I am still on track to have half the course covered by Christmas. With a bit of luck I might even do a bit better.

On Wednesday morning a member of group three catches me in the corridor.

‘Would you mind bringing the computer projector along with you to the lecture this afternoon?’

‘Sure. Will you be using it?’

‘We’re using powerpoint for our presentation’

‘I’m impressed!’

‘Well, we had a bit of time on our hands, so we thought we’d give it a go’

‘Okay, no problem. I’ll bring it along’

I return to my room and allow myself a quiet smile of satisfaction. A powerpoint presentation by my undergraduate students. We are moving upmarket! For once, I have the upperhand on ‘The Tomb’.

Lecture Plan

(i) Feedback about tutorials from students

(ii) Earnings Per Share (EPS)

- ◆ Explain importance of EPS as a stock market indicator
- ◆ Outline how Basic EPS is computed:
- ◆ Explain how it may be necessary to adjust the previous year’s EPS figure;

(iii) Take a short break

(iv) Student presentation of Annual Report findings

The lecture

EPS is a topic which is likely to pass through your life without causing waves. It has a significance, of that there is no doubt. But its importance is shrouded in detailed and complex computations, which render one’s imagination more or less redundant. I plough through it with as much enthusiasm as I can muster, and I have covered a decent amount of ground before I take a break and help Group Three set up their computer presentation.

The presentation is about Cement Roadstone Holdings, and it is slick and professional. I have seen MBA presentations fall short of this standard. It contains humour too, including a less than complimentary picture of myself. It runs to twenty minutes, gets a good round of applause, and raises several discussion points which take up the rest of the lecture.

Reflection

‘So what did you think of that, Sir? Not bad huh?’

‘It’s nothing to get carried away with Cotter. Just a couple of fancy slides’

‘Were we watching the same presentation Sir?’

‘They’re just trying to blind you with science if you ask me’

‘But didn’t you see the trouble they went to?’

‘A bit of chalk would have done the job just as well. It would have been easier on the eyes too’

I am above 'The Tomb's' cynicism as I reflect on the students' presentation. It was professional, insightful and thorough. We're on a roll now!

Lecture 12

Topic: Review lecture

Understanding goals:

- (i) That students should be aware of the need to integrate:
 - prior year material
 - material of the first 10 weeks
- (ii) That students should be able to relate all of the material to the generative topic for course AC 3111, as identified at the outset of the course.

Preparation:

The term is nearly over. A lot has been achieved, but a lot still remains to be done. Most importantly I need to get a clear picture in my own mind of how each of the areas relates to the generative topic. This type of preparation is essential. Only rarely can you manage to lecture well if your mind is not clearly focused beforehand.

By Tuesday afternoon I have everything more or less organised. I have arranged as well to get a visiting speaker in during January. As it happens, he is a personal friend of mine, and I am confident that he will do a very good job. I have arranged to get some funding from the Head of Department, which I will use for a small gift which I am hoping the class rep will present to him.

Lecture plan

- (i) Feedback from students about tutorials
- (ii) Review
 - ◆ Open discussion on generative topic
 - ◆ Review each individual area covered, in the overall context of the generative topic

The lecture

Number of students present: About 60

The lecture turns out to be a useful exercise, and the material integrates well. Relating it to the generative topic (the evolution, content and economic consequences of the Annual Report), also works out well, and I learn from the discussion myself too. The student presentation goes well. A certain standard has been reached by now, and this is maintained by each new group. The announcement of the visiting speaker is received well. By now they've had buzz groups, record cards, acetate sheet records, group presentations and an interim review Q&A session. I finish by discussing their interim assessment - an essay due for submission in January, which will count for 15% of the total grade on the course.

Reflection

'So you're still carrying on with this new-fangled learning thing, Cotter?'
'That's right, Sir. Active learning is what it's all about'

'God be with the chalk and inkwell days'
'Chalk and inkwells?'
'That's when teachers were teachers, and boys were boys'
'Boys are still boys, Sir'
'The next thing you'll be using this internet gadget'
'The internet Sir? How did you know about that?'
'Sure isn't it all the rage now. Or at least it was before the tech crash. Maybe they're getting sense at last'

'The Tomb's' words go around in my head. The internet gadget thing. Using it for learning. Why didn't I think of it before? An internet site. My own site. I could put review questions and answers on it. And other ideas and updates as well. But this would require the use of HTML or some other programming language. What do I know about this? Nothing. But I could find out, couldn't I?

A final reflection

The first term of 2001/2002 has taught me much. Most of all it has confirmed my commitment to student-centred learning, where the students become active participants in the classroom. It is, after all, *their* forum - a forum in which the lecturer should play at most a co-starring, though pivotal, role. Because ultimately... *"It's the Taught that Counts"*.

CHAPTER 11

IS THERE A SCHOLARSHIP OF TEACHING?

*An Interview with Bettie Higgs, Department of Geology
and a Discussion with members of the academic staff of University College Cork
(Edited by Nona Lyons)*

At the last Portfolio Seminar, in May of 2002, a group of six UCC faculty members who had created a teaching or course portfolio, met to share their reflections on the portfolio process. During the conversation, Bettie Higgs, a member of the Geology faculty, raised a question: What is a scholarship of teaching? and What does it entail? What does or should count as scholarship? A lively discussion ensued. Later, in an interview, Bettie talked about how her own thinking about a scholarship of teaching had developed over the year, as she put together a teaching portfolio and simultaneously entered study of third level teaching. One important element of Bettie's journey is her context: Bettie came into third level teaching some 14 years earlier without any formal education in teaching or learning. Like so many others, she was simply given a syllabus and asked to take over a class. Two years ago, Bettie committed herself to deepening her own knowledge of teaching and learning. The following interview, Part I of this chapter, uncovers that journey and her unfolding ideas about a scholarship of teaching. Part II of the chapter returns to the May seminar and picks up the discussion that Bettie's question sparked with other UCC faculty on the idea of a scholarship of teaching.

Part I: A Conversation with Bettie Higgs

I: Is there anything you'd like to say about your own processes of thinking, considering the broad topic of the scholarship of teaching and your question: What is a scholarship of teaching?

B: I suppose going right back to the start when I had already begun doing some development of my own teaching, I saw this flyer on the scholarship of teaching and the announcement of the UCC Portfolio Seminars.

I had begun to look at journals on web sites and saw information on submitting papers. And I thought, "Well, I'll never be able to do that. I am a geologist not an education person." I would not be able to write those sorts of articles. Then I thought, What is a scholarship of teaching, if you cannot do all that? Do you have to write papers, journal articles?

But simultaneously, my thoughts developed as I started to become a student of Teaching and Learning. After 14 years, I decided that I would like some stimulus to develop further as a teacher. I felt I had developed into a competent teacher, but feared my courses and teaching methods were becoming "stale" through repetition. I wanted new ideas and debate to inject life into existing courses and to inform my design of new courses. Students deserve good teaching, and I needed to be intellectually and personally challenged in my teaching.

After consideration, I decided to become a student myself and I had enrolled in a course on "Teaching and Learning at Third Level" with the Open University. Materials - books, articles -

were being sent to me. In the back of those books were references and I began to see titles relevant to me, for example, "What's the use of lectures?" I got one or two photocopies from the library and began to build up my own library and do a little reading. So then I thought, the scholarship of teaching is reading this research literature. That is the beginning of it- or so it was in my mind.

I: And that was new. You had not done this before?

B: No. And I was reading about other peoples' surveys and research either with students or teachers. That was challenging. But because I had been teaching for a number of years, I could see that there were things in the articles that I agreed with and things I disagreed with. Or I could see that some were valid only in certain, limited situations.

So once I began to see that I could criticize or evaluate other people's work, I began to get the feeling that I was beginning to engage in a scholarly activity. Then, focussing on my own teaching with different groups of students from 1st to 4th year, just reflecting on what they were learning, and trying to write something about the relevance of this research to my own teaching, I thought that was scholarship. Now I was not just teaching, I was going a bit further, doing what secondary teachers do when they go and do a year of training. But we don't do that at third level. And maybe that's all I've been doing. But maybe that could be counted as scholarship. That's what you might do with any subject you considered as scholarship-you get to the stage where you write and get something published.

So I decided to do some research and carry out a survey. I did a survey with two groups of students. They were both taking a module of mine but coming from two different backgrounds. I administered a Learning Styles Inventory to see if there were differences in their learning preferences. But my numbers were not great-there were only 12 students in each group-and the numbers were not enough to see significance. But I began to think that each year there are similar students coming into this Module with these two backgrounds and maybe it would be interesting to monitor this over time. For the survey did show quite clearly the breadth of learning preference across the groups.

The Learning Styles Questionnaire - similar to Kolb's - was one I used. And I found that the students were quite interested in it. They would end up characterized by the survey as "theorists" or "reflectors," etc. and they were interested in realizing that there were styles other than their own, different styles they didn't even know about. I began to think that maybe I could try to encourage a broader view among the students. If you were a theorist, maybe there were ways to be engaged as an activist-broadening a way of learning.

I: So what difference would you say that made to you and to them?

B: For the students, they got a message that they might not be getting the most out of a session if they had only developed one style. For me, it confirmed my feeling and expanded the idea that you should have a variety of things going on in a class. I had read that there were students who did not like or want videos, or handouts, or whatever. Sometimes it could be useful to have 5 minutes of a video-but not for the duration of a whole class.

This confirmed what I was doing. And it made me think to apply for one of the UCC Research Awards. My proposal was to create Virtual Field Trips for study in geology. I wanted to add value to field trips by taking video clips of particular things in context, such as a geological site. We could

bring these video clips back to the classroom and could better debate some things, adding value to the debate-better than what you might actually do at a real site, if it were a rainy day or a noisy place.

I also saw that video clips could enhance my training of the demonstrators who work with my classes and go on trips with us. For example, on a reconnaissance to Antrim we were taking 70 first year students. I did go beforehand to take some video clips and came back and used them with the demonstrators who were to take students to the site and had not been there themselves. We were able to sit in a room, review the site we were to visit, and identify what students were to notice and learn from it. I could point out things in context. So this is one piece of research that I have begun. Doing the Learning Preferences survey led me to think of having another tool for learning, such as the video clips that would be helpful for some students.

I: So the Learning Styles discovery actually generated some new research on your part and a change in your own teaching.

B: I suppose one of the things that has stuck in my mind from reading is: student-centered teaching, to be more student-centered. I think the more comfortable you are about your teaching, the more you can think about the students. When you are new to teaching, you are thinking about the subject and yourself: Do I know enough? But if you are comfortable with the subject, you are thinking about students, or how best to explain things to them.

I: When you look back on this journey you have been describing, how do you consider the scholarship of teaching?

B: I suppose I'd like UCC to do more to support it.

I: What is "it"?

B: Well, I want to continue learning. I plan to join the Institute for Teaching and Learning in England and take another course, go to conferences - do things like that. In some way to try to keep up my development, keep up with Teaching and Learning, especially in science. Keep up with computer-based teaching. I am concerned with that: Are we going to get that right. There is a debate on that right now. Are we getting it right?

I: How would you define the work you are doing?

B: I suppose it is discovery and expansion of what I have been doing already. But it doesn't happen by chance. Unless you are talking and seeking out new ideas and ways of teaching and learning, discussing these things with colleagues, you are not learning. So you must be seeking it out. I think ideas come to us all if we are interested. But you must stay with it. I remember that I started this course in the summer of 2000 when I registered for the Teaching and Learning in Higher Education course. It took 10 months of research readings, literature, etc. Then I did the Learning Preferences Survey. After that I decided to do a second course called "Designing Courses in Higher Education." I am doing this one at the moment and, when I complete it, I will receive a Post-graduate Certificate in Teaching and Learning in Higher Education. And that will make it possible to continue study at the Institute for Teaching and Learning. But I always begin with the necessary theory and evidence from the readings. You must keep up with the theory and evidence-not just some reading on teaching in a practical way, teaching simply as a strategy, but the theory behind it and the evidence for it. It is

interesting to me how researchers are trying to investigate and quantify the evidence of learning. Being from science, I can identify with that. And that made me reflect on my own teaching.

I: Do you include all of that in a Scholarship of Teaching?

B: I include the seeking and finding out, the research, reading others' ideas-especially those who specialize in education. You get ideas, insights. And it is interesting to hear what other people do. I've tried out things that we talked about in our Portfolio Seminars. And I look for new ways to find things out, to uncover what students know and are learning. I believe students can get tired of questionnaire surveys. We need different ways.

I: So when you think about the future, how do you think about it? Will you finish the course and go on . . .

B: Yes, I will go on to the Institute of Teaching and Learning . . . We should think about our continuous professional development. Continuing professional development is something I feel strongly about. We should do it for our teaching. We do it for our research. But we need to do it for our teaching. People could enjoy their teaching more; see the validity of it, of putting effort into teaching. You often hear people say that only research counts at third level. I think what has happened here in the last year, because of the Awards for Excellence in Teaching and the Portfolio Seminars, is that there is now some credibility and validity here for teaching at UCC and, importantly, reason for improving teaching, for trying to develop your own teaching. That is a scholarship of teaching.

Part II: A Discussion with UCC Staff:

What is a scholarship of teaching?

Here we return to the May Portfolio Seminar discussion in which Bettie Higgs first asked her question: What is a scholarship of teaching? The discussion that ensued involved the following staff: Áine Hyland, Vice President and Department of Education; Dave Sheehan, Department of Biochemistry; Denis Kelliher, Department of Environmental Engineering; Mark Chu and Silvia Ross, Department of Italian; Bridget McAdam-O'Connell, Department of Sociology; and Bettie Higgs. This discussion mirrors a larger debate first introduced in 1990 by Ernest Boyer of the Carnegie Foundation for the Advancement of Teaching with his book, *Scholarship Reconsidered*. There Boyer had argued for new forms of scholarship for the academy, including a scholarship of teaching. In their May meeting, UCC staff joined the debate. Here, Bettie Higgs opens the conversation in response to another of the interviewer's questions.

I: Looking back over the experience of creating a portfolio, what would you say you learned from this portfolio process?

BH: What I learned is that learning is an on-going process. You don't just do a portfolio and stop. But now that I've done it, I now know better where I am heading ...to get excellence in teaching. When I started, I probably really did not know. You think you are doing all right in your teaching. But until you read, and look up various methods of teaching, you do not really know how you can develop....We need a challenge. We need to be challenged in our teaching and to improve our students' learning experiences. I've learned a kind of language that people in education use. I didn't know what all these things meant before-such as active learning, learning outcomes, student-centered

learning, objectives, goals, etc. I am now at a stage where I want to re-write all of my courses.

When I was doing the portfolio, I ran across a few quotations related to what I was doing. Let me share these. This is one I found early on: "The assumption has been that the possession of a Ph D is all the aspiring lecturer needs in order to teach in the university. The rest will be imbibed by osmosis." Shortly after I discovered another: "Excellence in teaching must be nurtured." Then I thought, What is excellence? But I would like to add another quote: "Excellence is not a state. It is a process. Excellent teachers engage in a process of development." That made me wonder: What is a scholarship of teaching? What does it mean? At that time I don't think I knew what a scholarship of teaching meant. I did not talk with colleagues about these things, especially in science. So I was having a conversation with myself. But I wondered what people would think. How should we talk about a scholarship of teaching? Does it mean doing research and publishing?

I: That's a good question: What is a scholarship of teaching?. What would you say it is? How should we be thinking about it?

AH: Yes, some people are being quite critical of an over emphasis on teaching. Some are categorically rejecting the idea, saying there is no way that teaching is a form of scholarship. That brought me up short. I thought that Ernest Boyer's argument and presentation for the legitimacy of a scholarship of teaching was quite convincing.

DS: What complicates this is that we are all broken up into different disciplines. It is hard to have common knowledge without a common language.

DK: It is a great question. I think that everyone here is saying that teaching is a very important part of the whole university, as well as for us and our students. Anything important needs to be documented. In doing research, I start by writing. It clarifies your ideas. And I think it is the same for teaching. But we must start with the idea that teaching is very important. Scholarship is very important. It has consequences. I found that I have thought more about my course and my teaching from this portfolio process and the experience of reflective writing. I like the definition of "Excellence in teaching is a process." You have to change; you must experiment for that to happen. If you do not, things go stale. I discovered you must do this kind of thinking about your courses for yourself. You must change. That is a scholarship of teaching.

DS: I felt very strongly that a lot of the process is an investigation and a lot is a process of self-discovery, a journey of discovering your own involvement. It involves learning about yourself, about students, and about the materials you teach. You've got to synthesize that knowledge. The process does result in new knowledge. We look for patterns. Every generation that comes along brings to it a different view. And the knowledge uncovered falls into the definition of scholarship. And it is valuable. Dante's *Purgatorio* is the same text. But no one would say, Why another critique of that or of *Finnegan's Wake*? Our discoveries in teaching are similar discoveries.

BMcA-O'C: I think a scholarship of teaching must also involve students. It is not done alone, only in relation to the self. It is simply not self-referential. It creates a new discourse about students and their learning. That is part of a scholarship of teaching. It creates a new discourse and it invites people to join in this community of discourse. This group has been creating such a new dialogue, a new community of discourse.

CHAPTER 12

RESULTS: WHAT FACULTY SAY THEY LEARN AND VALUE

Nona Lyons

The initial results of this Scholarship of Teaching project while clearly gratifying must be looked at in the light of hard questions about its sustainability. How can this work be supported so that it can survive and thrive? How should it be sustained? Does it warrant such consideration? This chapter addresses these questions, first examining the value of the work begun and the question of its institutional sustainability.

Ernest Boyer's vision of new priorities for the professoriate carried a view of universities in which the full range of human talent is celebrated and recorded. He argued that campuses "should be encouraged to pursue their own distinctive missions, and innovation should be rewarded, not restricted" (Boyer, 1990, p.80). In such a system, Boyer believed, the "discovery of knowledge, the integration of knowledge, the application of knowledge, and great teaching would be fully honoured, powerfully reinforcing one another. If the vision of scholarship can be so enlarged on every campus, it seems reasonable to expect that ... a true community of scholarship will emerge."

It is clear that Boyer saw that a vital system of higher education required a new vision of its scholarly life. It seems clear, too, that UCC has began an important new scholarly initiative across the last two years. Faculty have been involved in this project, sharing their own efforts and creative ideas and practices to advance this work. Discussions in seminars and in individual interviews have revealed specific values they find in the enterprise. An earlier chapter found in the Introduction to this book, *The Project*, outlined the most consistent faculty finding, that is, that the result of engaging in a reflective process of creating a teaching portfolio results in an increased, focused awareness and understanding of teaching and learning. Other results seem equally important. A brief review is presented here as a background to considering issues of the sustainability of any Scholarship of Teaching projects.

What Faculty Say They Find in a Reflective Portfolio Process

There are several findings of this work that faculty point to when asked what they have learned from this project. Data presented here are from both comments of faculty in seminar sessions and from interviews conducted with 16 of the 23 people who actually presented a teaching or course portfolio for consideration of an award for Excellence in Teaching.

Exploring the evidence of student learning: What do students understand and know how to do?

One question that sustained interest throughout the portfolio seminars had to do with student learning: How do we know what students know and understand and how can we find out? Posing the question in this way forces consideration of exactly what students learn from courses. Faculty found this question compelling. They also realized how little of student learning was ever tapped by the standard course evaluation questionnaire. In the Portfolio Seminar sessions strategies for uncovering student knowledge and understanding were explored. While people report trying out things others had reported on, it is clear that this is still a compelling question. It needs further exploration and opportunities for engaging in systematic investigation.

Linking the needs of learners and the advances in one's disciplines to forge new pedagogical responses: Finding a pedagogical challenge when his students came to class weak in math and chemistry backgrounds and turned-off by difficult concepts, one UCC professor of Biochemistry decided to use a non-math way to present critical concepts in his course and increasingly became creative with computer-based approaches and other audio visual aids. In addition, he describes how changes in his discipline itself have shaped his practice. Recognizing that in the future of his field three dimensional data displays for proteins with the special folding inward problems of their structures will be important for student understanding, this innovative teacher devised a special three dimensional computer program that allows students to manipulate and investigate proteins and their properties. Later this same teacher discovered how his students' needs led to innovations in his teaching techniques and in turn led him to innovative and more effective presentations of his own research in academic forums.

Identifying how a discipline shapes teaching.

In interviews some faculty members commented on how their disciplines differed and how that made their documentation of teaching different. For example, members of the Medical faculty commented on how their courses are usually delivered by a team of faculty and thus no single professor is responsible for the kind of Course Portfolio others might present. Here the question of what impact different disciplines might have on developing a scholarship of teaching emerged. It deserves serious attention in the future.

The increasing role of teaching in the professions: How should students be prepared?

Interviews with several faculty members from different disciplines reveal an interesting trend. It seems that often faculty are in their professional lives being called upon to engage more directly in teaching. This is not to say that this is entirely new, rather that it seems to be an increasing component of the lives of professionals beyond what might be ordinarily expected. For example, in Medicine doctors are asked to teach allied professionals or may even find it a necessity, as did Tony Ryan who developed the New-born Infant Resuscitation Education Program. In this project, he created a teaching program for a range of medical staff, from doctors and nurses to ambulance drivers. Similarly, in programs in Social Work, professionals are asked to be mentors to apprentice professionals, demanding not only supervisory but pedagogical skill. So too do other professions that have mentoring components. In the human resources programs within many companies today, teaching is a regular feature of work-life and a task for career services or human resource divisions. In one university in the United States, there is just getting underway a new program to train doctoral students in chemistry in actual teaching practice as a requirement of the program. The question this trend raises, is how should students be prepared for teaching?

Identifying the need to extend systematically opportunities for faculty to gain knowledge about teaching and learning.

One significant and related discovery of this work was how little prepared some faculty say they are for third level teaching (Huber, 1998), and how eager some are to increase their knowledge and understanding of teaching and learning. Frequently, in interviews and in the seminars, faculty described how they came into teaching at third level, were handed a syllabus and told to teach. Most relied on how they had been taught-largely through lecture format. Many had searched on their own for assistance, taking courses in a surprising range of places and valuing what they learned about their daily work. One woman shared a discovery she found: "I've learned a kind of

language . . . I didn't know what all of these things meant before-such as active learning, student-centered learning, or objectives, goals, aims. Now that I [do]... I am wanting to re-write all of my courses." These comments cry out for some systematic response and a program about teaching and learning for third level faculty.

Making the evidence of teaching excellence and its scholarship public and open to investigation.

In the final portfolio seminar of the year, faculty came back to the question: What is a scholarship of teaching? A vigorous dialogue emerged. While some brought forward reports of categorical objections to the very idea of a scholarship of teaching, others as vigorously defended the idea. (See Chapter 11 for details). One UCC person commented: "It is a great question. I think that we are all saying that teaching is very important for the whole university, for us, and for our students. Anything important has to be documented. In doing research, I start by writing. And I think it is the same for teaching. We must start with that idea that teaching is very important. Scholarship is very important. I find that I have thought more about this course from this experience with reflective writing than ever before. Excellence in teaching is a process. You have to change things around, experiment. I discovered that you must think about your courses." Another added: " I feel very strongly that a lot of the process is an investigation and a journey of self-discovery, a journey of discovering your own involvement-your own learning. New knowledge comes from this process. Syntheses happen. And that, and that knowledge uncovered, fall within the definition of scholarship." Another person summarized: " I think a scholarship of teaching also must involve students. It is not done alone-only in relation to the self. It is simply not self-referential. It creates a discourse about students and their learning-that is part of the scholarship of teaching. It creates a discourse and invites people to join in this community of discourse"(Lyons, 2002).

Implications

The implications of this work on advancing a scholarship of teaching are several. It seems that faculty responses, though small in number when compared to the whole of UCC, do point to a segment of the larger institution who found value in this work. But they do suggest important questions as well: How can this work be sustained? At what level? With what resources? By whom? Specifically, it seems useful to ask:

At what level should a discourse on teaching be introduced in the academy? How? How should it be sustained? Through what forums?

Should the idea of engaging in a reflective inquiry and documenting one's teaching and presenting it to colleagues be built into permanent structures of the university, to the structures of promotion and rewards? How? Which promotions?

How can faculty be sustained in their efforts to deepen their knowledge and understanding of teaching and learning? How? By degree or certificate programs? Offered in the evenings for practicing faculty?

How can on-going dialogues about teaching and learning, about what students know and understand and how faculty can find-out, be deepened?

What research ought to be undertaken about third level teaching? About what constitutes good teaching within the institution? About teaching across disciplines? About a scholarship of teaching? By whom?

This is the agenda for the future. If a scholarship of teaching is to be advanced, these issues must be addressed. Readers of this paper are invited to respond, to offer their insights, observations, and concerns about the possibilities of advancing a scholarship of teaching, strengthening and extending this dialogue into their own institutions.

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APPENDIX

GUIDELINES FOR CREATING A PORTFOLIO

INTERROGATING, DOCUMENTING, AND REPRESENTING THE SCHOLARSHIP OF TEACHING: PORTFOLIO OPTIONS

Guidelines for Creating a Portfolio for the President's Awards for Excellence in Teaching at University College Cork

*Prepared by Nona Lyons, Visiting Research Scholar, UCC
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Introduction

These guidelines present a framework for creating a teaching portfolio. Although designed especially for those applying for the President's Awards for Excellence in Teaching at University College Cork (UCC), they are useful to a broad range of portfolio makers as they offer important perspectives on the portfolio development process.

Part I: The Scholarship of Teaching - A Conceptual Framework

Casting the portfolio process as an activity of interrogating, documenting and representing the scholarship of teaching, Part I of these guidelines offers an historical context for this approach to portfolio making. It describes how a portfolio process can be both a mode of inquiry into teaching and a way to document it and represent it. Types of portfolios are described and their different purposes and contents outlined.

Part II: Constructing a Reflective Portfolio: Reflection and its Evidence

This part of the guidelines reviews the wider assumptions of a portfolio process and then focuses on the significance of reflection. Reflection is the linchpin activity of portfolio making. It is the place where systematic, serious consideration is given to what is learned by the portfolio maker from engaging in an inquiry into one's practice or some aspect of it. Specifically it is where the portfolio maker asks: what is learned about teaching or learning from this process? Critical to this process is the idea of evidence. For one example: How do we know what our students know and can do, what they have learned? What is the evidence? In the conclusion of a reflection, a portfolio maker suggests what the outcome of reflection may be for future ways of teaching, for changing practices, or for carrying out further investigations.

Part III: Scaffolding the Process of Inquiry for Portfolio Development

Part III of these guidelines offers a scaffold to a portfolio maker through a set of questions. These serve as suggestions for how to proceed. Most useful is the notion of planning backwards, that is, determining when the portfolio needs to be completed and how and when each entry and its evidence will be put together. For example, if there is a need to collect data from students, when would they

have to be gathered? Analyzed? Realistic appraisals and a good set of deadlines are crucial. Portfolio making is a serious and time-consuming task. Some suggest that it takes about a year of serious activity to gather sufficient evidence. Planning backwards can be a most useful tool. In addition, sharing the work of portfolio making with a critical friend has proven to be important. Finally, in concluding Part III, categories for constructing and assessing portfolio evidence are discussed.

Part I: The Scholarship of Teaching

What is the evidence of a scholarship of teaching?

How can it be inquired into and documented?

How should it be assessed?

“My argument is that until we find ways of publicly displaying, examining, archiving, and referencing teaching as a form of scholarship and investigation, our pedagogical knowledge and know-how will never serve us as scholars in the ways our research does. The archival functions of research, scaffold our frailties of memory, and we need something comparable for the scholarship of teaching.”

Lee Shulman, 1998a.

Introduction

In 1990, when Ernest Boyer of the Carnegie Foundation for the Advancement of Teaching published his book, *Scholarship Reconsidered*, he made a bold suggestion. Arguing that colleges and universities needed “new forms of scholarship,” that go beyond the traditional model - what he called the *scholarship of discovery*, Boyer identified three additional forms:

- ◆ the scholarship of integration, that would make connections across disciplines;
- ◆ the scholarship of application, that would address consequential problems of individuals and institutions, bridging theory and practice, and,
- ◆ the scholarship of teaching, that would not only contribute to knowledge but transform and extend it.

Boyer’s work launched a series of investigations into college teaching.

Teaching: A Scholarly Act?

Sponsored by the Carnegie Foundation and the American Association for Higher Education (AAHE), the new research took up a set of pressing questions: What is the scholarship of teaching? How can it be documented? represented? If such an idea is to be considered seriously, it must, Donald Schon argued, “produce knowledge that is testably valid, according to criteria of appropriate rigor, and... claims to knowledge must lend themselves to intellectual debate within academic...communities of inquiry” (Schon, 1995, p. 27). For Schon, this new scholarship implied a kind of action research, planned and conducted by practitioners. A fundamental feature of a new scholarship of teaching, then, was the notion of active inquiry into it by faculty themselves. But how?

Guided by several researchers, especially Lee Shulman of Stanford University, later to follow Boyer as the president of the Carnegie Foundation for the Advancement of Teaching, the new project yielded several models. The first was the *Teaching Portfolio (1991)*, the second, the *Course Portfolio*

(1998). Both are described here in brief so that some of the compelling possibilities students and faculty find in them to document the scholarship of teaching may be identified.

Portfolios have a long and valued tradition with many professionals - with artists, writers, photographers, and architects, for example. These professionals use portfolios to keep copies or drafts of their work - their writings, models of projects, sketches of their art - charting how over time it has changed. Some portfolios include only what is considered one's best work. Others include a range of work. But portfolio uses in teaching are only a recent phenomenon.

Why teaching portfolios for inquiring into and documenting teaching? Portfolios are not simply receptacles. In addition to providing a means of documenting teaching, they can serve as a method of inquiry. Portfolios came into teaching in one form through teacher education because educators recognized this possibility. If competent teaching is a complex, uncertain and often messy activity, it could not easily be documented or assessed. Traditional ways of credentialing teachers - by grades, courses completed, and an acceptable grade on a National Teachers Exams - seemed inadequate to capture teaching's dynamics or dimensions. The portfolio emerged as a more possible medium. Life in classrooms, teachers at work could be caught through a portfolio with its entries and evidence of work over time. It could document how a teacher and his or her students were progressing, recording lessons taught, assessments made. It could carry a syllabus, a course plan, and ample samples of student work, revealing levels of student understanding—some even including student portfolio entries.

However, each portfolio entry carries a crucial element: that is, a *reflection*. Through reflection, a teacher revisits and inquires into his/her own teaching and learning, assessing what succeeded or failed and *why*. In this process, teachers uncover the meanings and interpretations they make of their own practices. Through a portfolio they can make this knowledge public and open to scrutiny. Thus, the portfolio can be both the means of inquiring into teaching and a way of recording the results of that process.

For an activity to be designated as scholarship, AAHE sees that three characteristics are needed:

- ◆ it should be public;
- ◆ susceptible to critical review and evaluation; and,
- ◆ accessible for exchange and use by other members of one's community.

Portfolio Models

Two portfolio models offer the possibility of meeting these goals:

The *Teaching Portfolio* (Edgerton et al, 1991) can be defined as a set of accomplishments of teaching, usually including samples of student work and accompanied by reflective writing. While there may or may not be a set of specified entries for a teaching portfolio, it usually is thought of as comprised of a range of the evidence of teaching. For example, there might be a statement of one's teaching philosophy, a syllabus, a video of a class, etc. sample assessments used to determine what students know and understand, etc.

The Course Portfolio (Hutchings, 1998) focuses more specifically on a single course. Creating a course portfolio is or can be inherently an investigation, as Shulman suggests, for it depicts a

“journey motivated by purpose and beset by uncertainty. A course, therefore, in its design, enactment, and analysis, is as much an act of inquiry and invention as any other activity more traditionally called ‘research’ or the scholarship of teaching” (Shulman, 1998a, p. 5).

Three main features characterize the course portfolio: *design, enactment, and effects or results*. Pat Hutchings elaborates, arguing that the course begins with significant goals and intentions, usually embodied in its design and expressed in the syllabus and other documents. The goals are carried out as the course unfolds; and, as a result outcomes emerge, students do or do not grasp ideas, methods, values, etc. (Hutchings, 1998, p. 16). A course portfolio is/can be organized around the three elements.

While the course portfolio is focused on an investigation into a specific course, the teaching portfolio may focus on several courses but also on discrete aspects of them. The course portfolio specifically highlights outcomes, that is, student learning. As such, a large emphasis is on student accomplishments as a direct result of the course. However, both portfolio types should incorporate sufficient evidence of student learning, such as samples of student work, their projects, etc. These convey a sense of what students know and understand from their learning. The two portfolio types, then, may be said to share certain purposes and processes:

- ◆ To engage in the systematic inquiry into and documenting of teaching.
- ◆ To highlight the evidence of student understanding and learning.
- ◆ To articulate and make public the knowledge of teaching and learning.
- ◆ To foster dialogue with colleagues as “critical friends” about reflective teaching and its scholarship.

Part II

Constructing a Reflective Portfolio

Basic Assumptions

In the creation of a reflective portfolio to document the scholarship of teaching, several assumptions shape the task:

The Scholarship of Teaching Implies Inquiring into Teaching and Publicly Documenting and Displaying Results. The “Scholarship of Teaching” that Ernest Boyer envisioned as one of three needed new forms of scholarship involves not only the teacher engaged in the transmission of knowledge, but in its transformation and extension. One means is through systematic inquiry into teaching practice (Boyer, 1990).

The World of Practice is a Complex, Uncertain Domain Requiring a New Kind of Investigation. Teaching is a complex enterprise, unpredictable, and “notoriously uncontrolled, where problems are usually ill formed, and actors in the practice situation are undeniably interested.” This differs from a conception of practice as “technical rationality” with its characteristic application of science/theory to problems of disinterested practitioners (Schon, 1995, p. 29). In this view, practice involves the application of knowledge, not its generation. But investigations into the puzzles of practice call for the practitioner to engage in his or her own active inquiry. These investigations can lead to new meanings, understandings, and new knowledge of teaching.

A Portfolio Can Provide both an Intentional Means of Inquiring into Teaching and a Way of

Representing the Evidence and Results of that Process. Portfolio making is fundamentally an intentional process of reflective inquiry. It is a form of action research that engages the practitioner in inquiring into some aspect of teaching or learning, in reflecting on that process, and in documenting the knowledge revealed so that it can be made public, open to scrutiny, and to conversations with colleagues and the larger teaching and research community.

Reflection is the Essential Feature. John Dewey thought of reflection as “the kind of thinking that consists in turning a subject over in the mind and giving it serious and consecutive consideration.” He saw it as involving a state of “doubt, hesitation, perplexity, mental difficulty in which thinking originates, and an act of searching, hunting, inquiring to find material that will resolve the doubt, and dispose of the perplexity” (Dewey, 1933/1998, p. 12). Reflection is defined too as “an intentional act engaging a person alone, but especially in collaboration with others—students, other researchers, teacher colleagues—in interrogating a situation of teaching or learning to construct an understanding of some aspect of it. Such an act looks both backwards and to the future. It is in the service of understanding that will shape action. It likely involves narrative for it is the story of meaning; and, it can raise ethical issues for the people involved” (Lyons in press, 2002). A portfolio maker engages in reflection in at least two points: with each entry and in a final, over-all reflection on the portfolio process as a whole, identifying the meaning the process has meant.

Portfolio making is a Collaborative Activity Involving Conversation with Critical Friends. Portfolio making flourishes through conversations that engage colleagues in the puzzles of practice. Portfolio makers report that without critical friends, the process is likely not to succeed (See Shulman and Cuban in Lyons, 1998).

Models of Teaching Portfolios

Teaching portfolios offer a range of possible ways to document teaching practice: A teaching portfolio, a course portfolio, or a variant created by a group of teachers: A project or team portfolio. All of these models are intentional products designed to present compelling evidence of the intellectual fabric of teaching and learning. None are scrapbook collections or expanded resumes or the output of a teacher’s files. Each has a serious and specific purpose. The teaching portfolio focuses on presenting a range of teaching activities. The course portfolio more narrowly but deliberately examines one course. All portfolio types include and highlight significant evidence of student learning and critical reflection on the process.

Documenting Teaching Incorporates Three Elements: The Design, Enactment, and Results of Teaching: The American Association of Higher Education (AAHE) identifies that design of a course of study, its enactment in actual teaching, and its results in terms of student understanding are critical elements for the documentation of the scholarship of teaching for course portfolios. But these three elements provide an organizing set of ideas for teaching or other portfolio types as well. Each entry may be considered to address one of these elements.

Creating Portfolio Entries: A portfolio entry is a significant piece of evidence resulting from an inquiry into teaching or learning. It includes an artifact, that is, some piece of evidence related to the entry, such as, a syllabus, samples of student work, etc. Lee Shulman calls portfolio-making a “theoretical activity” for what is deemed portfolio worthy is a statement of the teacher’s theory of teaching/learning. Five basic elements accompany each entry. These include:

1. A Label or Name for the Entry: Gives a name to the entry and its evidence.

2. The Context: Provides pertinent information, a statement of purpose, description of the class, its students, relevant history of the course, etc.
3. The Rationale: The rationale explains why the entry is included and what the portfolio maker is exploring in this particular entry—what kind of investigation it represents.
4. The Reflection: What is Learned About Teaching and Learning: The reflection, the heart of the entry, reveals the construction of meaning the portfolio maker found in engaging in the inquiry. This reflection, usually a robust account of several pages, includes some reference to how this entry changed the portfolio maker's thinking, practice or how it might, or whether aspects of the original puzzle remain.
5. Implications for Practice/Scholarship: The conclusion may be thought of as a new hypothesis about teaching or learning that emerges from the investigation and will shape future teaching and student learning.

Possible Portfolio Entries: Portfolio entries depend on the purpose, whether a teaching, course, etc. The portfolio should open with a statement of purpose along with such basics as a table of contents. It can be organized around design, enactment, and results.

Entries for the *Intentional Design of Teaching* include: a statement of teaching design, a syllabus, course assignments, projects for students, etc.

Enactment of Teaching entries include: a video of a class, observations by teaching assistants or colleagues, teaching observations collected by the instructor, etc.

Results of Teaching entries focus on: samples of student work, not just survey responses but emphasize student understandings and applications of course concepts, content, etc.

Part III

Scaffolding the Process of Inquiry for Portfolio Development

“We close the classroom door and experience pedagogical solitude, whereas in our life as scholars, we are members of active communities: communities of conversation, communities of evaluation, communities in which we gather with others in our invisible colleges to exchange our findings, our methods, and our excuses. I now believe that the reason teaching is not more valued in the academy is because the way we treat teaching removes it from the community of scholars”

Shulman, 1993.

Organizing Ideas and Questions for Portfolio Development

Experiences of faculty portfolio makers reveal that engaging in portfolio development can be facilitated by certain procedures that serve to scaffold or support the process as a professional development activity. Here some procedures are identified and accompanied by a set of organizing questions to make these explicit.

Purposes: What are the broad purposes of the portfolio?

1. What kind of portfolio will be constructed? Why? (Course, Teaching, Other?)
2. What will be documented? a course? several? Is there a question to be investigated? about teaching? students/their learning? What do you care to know? Does this investigation connect with other research? your own? others?

Collaborative Inquiry: Who will join in this inquiry?

3. Is there a colleague or group of colleagues with whom you can meet to share your work and entries? to serve as critical friends? Plan regular meetings.

Portfolio Entries and Evidence: What should they contain? highlight?

4. What might a potential table of contents include?
5. Will there be a range of evidence? What will the portfolio contain, for example, of:
- ◆ Design of teaching: the plan of a course, a syllabus, and critical assignments?
 - ◆ Enactment of teaching: student assignments, teaching tasks; and,
 - ◆ Results of teaching: what evidence of student learning and understandings?
 - ◆ Reflection on each entry and, then, the portfolio as a whole:

Implications: What has been learned? What actions might follow?

- ◆ What has been learned? Has your teaching practice changed? will change?
- ◆ Implications for future teaching, publication, etc. How will the knowledge gained be used?

Planning Backwards: Some Recommendations:

- ◆ Create a timetable/schedule for portfolio development. Use a backwards planning method. When do you need to submit the portfolio? What should you think about completing by September?
- ◆ Is there a way to collect data/evidence this fall, if there is some issue under investigation?

Conclusion

Categories for the Construction and Assessment of Portfolio Evidence

The following categories are ones that should be considered as a framework for both the construction of a portfolio and its assessment. They can serve as a guide to portfolio development. A teaching portfolio of any kind, then, will need to address the following:

- ◆ Introduction and Orientation to the Portfolio: Context (institutional, social/cultural): School/course setting, students, learning environment, perspective towards knowing and knowledge, etc.
- ◆ Professional autobiography/history.
- ◆ Statement of Teaching Beliefs/Philosophy: An articulate vision of teaching and learning. Evidence of the integration of current scholarship/research of a field that might go into teaching designs.
- ◆ Intentional Designs of Teaching: Purposes, conceptual frameworks, activities all designed to engage learners, history of past experiences, cycles of teaching a course influencing current practice.
- ◆ The Enactment of Teaching: Activities to engage students in their own learning and understanding.
- ◆ Results: Student Work and Learning: What do students know and are able to do? How do we know what students know? Find out? Evidence of student success/feedback.
- ◆ Reflection: Interrogation for Re-framing Teaching: How will your practice change as a result of this investigation?

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Web Resources

- American Association for Higher Education (AAHE): <http://www.aahe.org>
- Carnegie Foundation: <http://www.carnegie foundation.org>.

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