EMERGING ISSUES II
The Changing Roles and Identities of
Teachers and Learners in Higher Education

Edited by Bettie Higgs and Marian McCarthy

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BIOGRAPHICAL NOTES

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Marian McCarthy *was seconded full time from her post as lecturer in the Education Department, University College Cork to work in Ionad Bairre, which she co-founded in 2006. Marian has been teaching since 1977, having worked at second level for many years. She is co-ordinator of the Certificate, Diploma and Masters in Teaching and Learning in Higher Education. Marian's doctoral research is in the area of Teaching for Understanding and of approaches that facilitate the development of a Scholarship of Teaching and Learning within the university. She is particularly interested in the synergies between the work of Project Zero at the Harvard Graduate School of Education, with its focus on the student- centred approaches of Multiple Intelligences and Teaching for Understanding, and those of the Carnegie Foundation for the Advancement of Teaching, with its focus on teaching as an integral part of scholarship and research.*

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Ivan Moore *became Director of the Centre for Excellence in Teaching and Learning (promoting learner autonomy) at Sheffield Hallam University, UK in 2007, after five years as an independent educational consultant, and five years as Director of Learning and Teaching at the Universities of Wolverhampton and Portsmouth. He began his career in higher education as a lecturer in Engineering at the University of Ulster before becoming Assistant Director of Educational Development. Ivan has over 50 publications in education and has provided consultancy support to over 75 HE institutions, including the UK Higher Education Academy. His current consultancies include Manchester (Centre for Excellence in Teaching and Learning, CETL), Nottingham Trent (CETL and Fund for the Development of Teaching and Learning, FDTL), Sheffield (FDTL), Loughborough (Engineering Subject Centre and CETL), DCU (reflective portfolios), UCD (student evaluation) and the UK Engineering Council (assessing graduate output standards). Ivan also has extensive experience in change management at a senior institutional level. His particular interests are in developing strategies for learning and teaching, promoting enquiry-based learning, fostering innovation, and student assessment.*

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Jacqueline Potter *is the Academic Development Manager in the Centre for Academic Practice and Student Learning (CAPSL) at Trinity College Dublin. She studied and trained as an ecologist and lectured in this field in the UK for ten years. She became increasingly interested and involved in student learning and was engaged in a variety of institutional change and development roles. She has also initiated and contributed to discipline-specific research and practice projects relating to undergraduate student publication, research-based and work-based learning and curriculum. She is a Fellow of the Higher Education Academy, UK and an Associate Fellow of the Staff and Educational Development Association. She retains an active interest in the interactions between research, teaching and student learning within disciplines.*

THE CHANGING ROLES AND IDENTITIES OF TEACHERS AND LEARNERS IN HIGHER EDUCATION IN IRELAND: AN INTRODUCTION

Bettie Higgs and Marian McCarthy, University College Cork

In 2007, a group of researchers involved in supporting teaching and learning in Irish higher education institutions came together with the intention of producing a book as a resource for their colleagues across the higher education sector. All were members of the Educational Developers in Ireland Network (EDIN). The group decided that, rather than produce a resource for beginning teachers, of which there are already many good examples, group members should write about their current research in teaching and learning in higher education. Co-authoring and collaboration among colleagues from different institutions was encouraged, as part of an attempt to explore and document collective wisdom.

Thus, as with EDIN's first writing project, *Emerging Issues in the Practice of University Learning and Teaching* (O'Neill *et al*, 2005), this collection – *Emerging Issues II* – showcases the continuing development of the EDIN community of practice. The writing process included peer review, external review and formative feedback and was thus developmental for the authors and the EDIN network itself. **O'Farrell, Chapter 2**, discusses how this process strengthened collaboration and promoted linkages; it has also resulted in further collaborative projects.

This book presents a wide selection of issues currently of interest and concern in higher education institutions in Ireland. The chapters are snapshots of the intersection between theory, practice and research in particular settings; they are not meant to be comprehensive. Nevertheless, they present practice approaches, new theoretical considerations and informal conversations, and include signposts to important literature in the area. The authors contextualise current concerns, and discuss how they have responded strategically to national and international trends in higher education. They also highlight how new roles and identities for staff and students in higher education have emerged in response to changes in institutional, social and technological contexts, among others.

We hope that the audience for this book will be as broad as the range of issues canvassed, including all who teach and carry out research in higher education, as well as learning support staff, policy makers and academic managers. The aim is that individual chapters will give insights into research, practice and theory, which readers can discuss, debate and use as the basis for their own learning and teaching work.

Emerging themes

The *Emerging Issues II* project has provided an opportunity for colleagues to work together, develop a discourse and identify common themes and patterns. At an advanced stage in the project, it became clear that there were two pre-eminent themes emerging from the ideas, initiatives, evidence and concerns being documented. The first was that all of the contributors were reporting on and urging change, particularly change in relation to roles and identities across the higher education sector. The second was that the process of collaboration, debate and dissemination encouraged by and embodied in the Emerging Issues II project was promoting pedagogic research, and beginning a movement towards a scholarship of teaching and learning.

Changing roles and identities

The chapters in this book document changes in roles and identities in higher education, at the same time as they advocate the continuation of change. There are changing roles for staff who teach. For example, academic teachers now see themselves as facilitators of learning, rather than as transmitters of knowledge; they may also be beginning to see themselves as researchers of learning. Learners' roles are changing too, shaped both by the changing expectations of their teachers as well as by, for example, changing technologies. In the context of teaching and learning, *role* can be defined as an individual's function, what he or she is appointed or expected to do. Subtly different, *identity* relates more to individuality and personality – who individuals are, and how they see themselves. In teaching and learning, change is occurring so rapidly that roles, goals and outcomes need to be reviewed continually. On the other hand, identity shifts may not take place so quickly and may not align with roles. Can we move roles and identities closer together? This book helps us to begin to explore this question. In addition, centres and institutions must be flexible enough to respond to change, including changing government initiatives and funding opportunities. This makes for exciting times, and means that none of us can stand still. There is, therefore, clearly a need for a publication such as this to document change while it is happening.

Changing Roles and Identities of Educational Developers

It is no surprise that educational developer roles are often undertaken by individuals who have not had a traditional academic pathway. For example, some educational developers are academics who have stepped temporarily but wholeheartedly from their disciplines into the teaching and learning arena, building on their own experiences as teachers to mentor others. Others are employed as full-time educational developers, a role which is sometimes defined as administrative and sometimes as academic. As a result, educational developers are often accustomed to and adept at adaptation. For this reason, they are often ideally suited to leading change both institutionally and nationally.

For some educational developers, however, there may be a gulf between their defined roles and their identities. For example, they may be academics from particular disciplines but appointed into administrative structures, or vice versa (O'Farrell, Chapter 2). Such a position can be uncomfortable, and can even undermine the educational development role. It may be that educational developers – who must often simultaneously be teachers, learners, researchers, facilitators, managers and so on – are working at "the boundaries where fields converge" (Boyer, 1990, p. 19).

In fact, because the term "educational developer" can be applied to such a wide range of roles and identities, it is not necessarily a comfortable name for all those who bear it. In a report prepared for the Irish Universities Quality Board, Hyland (2007) looked at the various names and roles attached to staff who are employed to support learning and teaching in higher education, and concluded that there is a huge range of roles for such staff. Indeed, using only one term to encompass all these roles may be problematic.

Fortunately, the EDIN network is capacious enough to accommodate the wide range of educational development roles in Irish higher education. Indeed, the network itself is changing and has become a community of practice, which benchmarks itself internationally. The EDIN community welcomes a range of practitioners and practices, and this very diversity has enabled it to move beyond a training model with a technical "How do I do it?" approach. Rather, accepting that there may be many ways to "do" educational development means that

the network has been able to adopt a more conceptual focus, which underpins its shift towards the scholarship of teaching and learning (SoTL). This shift from "terminal remediation to ongoing investigation" (Bass, 1988/1999) also shapes EDIN's view of and approach to its activities and projects, which may now be seen in terms of academic and scholarly professional development. As we have noted above, this is true of the *Emerging Issues II* project, which has given EDIN members the opportunity to meet and collaborate on ways of investigating and documenting evolving conceptual change and practice in teaching and learning in higher education. As such, it will enhance members' ability to provide scholarly and practical staff development in their home institutions.

Changing Roles and Identities of Students

Educational developers focus on helping academic staff to understand and improve student learning. It is important to remember, however, that students are agents of change themselves, particularly in their use of technology. For example, they may not always actively engage in the online discussion forums set up by teachers, but they are proactively engaged in conferences that they have constructed themselves. **Jennings and Cashman in Chapter 3** urge us to take note of this and incorporate appropriate technology into our teaching, for a student generation that may be spending up to 18 hours a week online. This means, Jennings and Cashman argue, that most student identities are firmly embedded in the Internet generation, but that many teacher identities are not. They suggest how we might deal with the gap between these different identities.

Students must also respond to the changes associated with more student-centred teaching. As pedagogies such as problem-based learning, seminars and field-based learning become widespread, students are challenged to take a more active role in their own learning. They are expected to understand something about their own learning and to engage with the language of learning outcomes, reflection and learning how to learn. They are also increasingly required to be researchers and even to direct their own learning, which may take them outside their chosen discipline. For example, **Higgs in Chapter 4** describes how first-year students moved from feeling that they learned best by listening to the teacher to recognising the importance of learning from peers. At the same time, these students reported that their favourite activities were those that were the most physically and mentally demanding.

In some cases, students are being asked to take risks, to step into "liminal spaces" (Meyer and Land, 2003), in order to grasp important concepts and move from being novices to being experts (**Moore *et al*, Chapter 5; Higgs and Hall, Chapter 6**). This is a transformative journey for students, but it can easily be taken for granted by experts in the discipline. This is why it is important to fully recognise the various stages of learning. In their discussion of ideas for teaching large classes, for example, **O'Neill and Moore, Chapter 7**, address the issue of engaging students in learning and conclude that students must develop capacities for knowledge creation. The importance is not so much what the student learns, but what they can do with the learning – that is, apply it and be creative with it.

It is important here to make a distinction between the changes that occur year to year with different student cohorts, on the one hand, and the developmental changes that individual students experience on their journey through undergraduate studies and postgraduate research, on the other. **Potter and Hanratty in Chapter 8** consider the role of graduate teaching assistants, who carry out significant teaching in undergraduate courses. These graduates usually assist in the "learning by doing" activities, and thus may have a major

influence on undergraduates' learning. It is increasingly necessary, therefore, to embed the study of teaching and learning into doctoral programmes, so that the doctorate becomes a professional qualification and its graduates are seen as "professing" knowledge.

Changing Roles and Identities of Teachers

Teachers are constantly being urged to change. The chapters in this book are testament to that. During the past decade, for example, the disciplinary researcher who also teaches has begun to put a toe into new teaching and learning waters. This is in response to the call for more student-centred teaching. Academics who have traditionally seen themselves as knowledge authorities are being challenged to hand over power, and "gift the learning to the learner" (Malone, 2002). For some academics, this represents a small change in their role. For others, it is an identity shift and transforms the way they view themselves as academics. Indeed, it can result in the teacher becoming the learner, and the learner becoming the teacher. Understandably, not all staff are comfortable with these shifts.

On the other hand, how do *new* academics view themselves? As part of University College Cork's (UCC) staff induction programme in 2007–08, new academics were asked, "What are you ...?" (rather than "Who are you?" or "What do you do?"). This was part of an attempt to understand academic identity. Participants' answers fell into two clear categories: they saw themselves either as lecturers/teachers/facilitators of learning or as biologists/historians/economists/nurses and so on. In other words, they tended to choose between their teaching and their disciplinary roles.

Regardless of how they view themselves, both experienced and new academic staff are now required to design learning outcomes and assessment, give and respond to feedback, embed an increasing range of skills into the curriculum, maximise the opportunities associated with classroom diversity and consider ethical issues. They are expected to be aware of, and better still to understand, the theoretical underpinnings of all of these aspects of their teaching and student learning. They are being asked to be more intentional in their teaching.

Unless teachers are supported in these activities, it is unreasonable to expect all this from them. One increasingly popular way to support academic teachers is to help them build learning communities – which, of course, may be challenging for those teachers who are accustomed to seeing teaching as a highly "private" experience (what happens in the classroom stays in the classroom). Nevertheless, staff are frequently now called on to communicate their experiences, to report on what works and what does not. By sharing their practice with others, staff not only discover other ways to do things, but also identify those learning and teaching issues that are most interesting to them. For example, **McCarthy, Chapter 9**, documents how staff on an accredited programme are moving from a concentration on their own performance to a focus on their students' performances by asking, "How do I know what my students know and understand"? This is known as teaching for understanding (TfU).

Such approaches emerge from the recognition that teachers must consider what they are doing to help or hinder student learning and understanding. Moore *et al* in Chapter 5 suggest a way of understanding the learning experience by charting the journey from novice to expert, and considering how teachers can help students undertake this journey. On the other hand, **Barrett and Donnelly, Chapter 10**, are concerned about how teachers can inhibit or suppress learning. They believe that the first role of educators is to encourage creativity, and to widen the range of strategies that create a spark in their students.

Educational technology opens up a new spectrum of roles and identities for academic teachers. Some may shun it altogether, whereas others dabble in it, perhaps using VLEs, and yet others become enthusiasts or even experts. Jennings and Cashman, Chapter 3, point out that there is little choice for academics other than to adopt and adapt to educational technology. Wherever teachers are situated on the spectrum, the most important issue is which they put first – student learning or technology.

With appropriate priorities, teachers can incorporate educational technology into a toolbox of flexible pedagogical strategies, assessment techniques and modes of delivery. This means that they need no longer worry about "covering" everything at the expense of active learning strategies, which aim to help students to uncover and discover disciplinary knowledge for themselves.

Clearly, the expectations that academics build this new repertoire and that they also take a professional – even scholarly – approach to teaching and learning, as well as to their disciplinary research, has the potential to prompt an identity crisis of greater or lesser degree. Accustomed to being disciplinary experts, they are necessarily novices in teaching and learning, undergoing experiences similar to those of their students. For example, on accredited courses, they may hand in work late, not read the handouts and baulk at the rigour of the assessment activities. They want to know the mark, they do not always read the feedback, and neither do they act on it. They are distracted by life outside of work.

Unsurprisingly, these experiences can be quite disempowering, and many academics wonder how they are to progress along the path from novice to expert. One way out of the maze is to stand back from practice and "go meta" as Hutchings and Shulman (1999) suggest, by sharing practice, documenting it and conversing with others. **Palmer and Heagney, Chapter 11**, testify to the power of such conversations, which give rise to a language that develops into a discourse, defining discussion and acting as a catalyst to spark collaboration and action. Such conversations also make academics aware of their roles, giving them an opportunity to evaluate them and apply them effectively, integrating them into a more holistic sense of identity.

Changing Roles and Identities of Library, Support and IT Services

Many people who have traditionally supported learning have not called themselves teachers or academics. We find, however, that this is another area of higher education in which roles and identities are changing. Library staff, technologists and disability support officers are now enrolling as students in accredited modules in teaching and learning. This is possible only because they are already engaged in designing and delivering teaching sessions. Their roles allow this natural progression, and for some this has even meant a better alignment of role and identity. For example, **Fallon and Breen in Chapter 12** explore the emerging role of academic librarians in the learning and teaching process through their involvement with teaching staff in the development of student information literacy skills.

In some instances, educational support staff co-teach with academic staff, fostering effective partnerships that assist learners. In other situations, these staff act as experts in professional development programmes for academic staff. For example, **McAvinia et al, Chapter 13**, report on the use of VLEs in the context of teaching information literacy. They recognise their new role and relationships: instead of being helpful librarians at the end of the telephone, they are now "lecturers and examiners imposing deadlines and standards".

Interestingly, the specialist knowledge of experts such as these facilitates new insights into aspects of the student learning experience. For example, there are conflicting views on the importance of blogs and wikis in constructing knowledge. As librarians, Fallon and Breen in Chapter 12 find blogs and wikis of minor importance in research, whereas Jennings and Cashman in Chapter 3 stress their importance in social learning. Hutchings (2006) calls on staff to help students manage and build new knowledge from these co-curricular and cross-cutting literacies.

Nevertheless, we cannot be expert at everything. Even technologists find it hard to keep up with new technological applications. Jennings and Cashman, Chapter 3, urge us to be innovative, but who will help us? The message is that working together to build integrative curricula may be the way to go (see Higgs, Chapter 4).

The Changing Roles and Identities of Institutions
In the 1980s, academics were told not to worry about teaching when applying for positions at The National University of Ireland. In the 1990s, there were no mechanisms for measuring a commitment to excellence in teaching on applications for promotion. But in 2008, significant progress has been made: for example, applications for promotion must address the applicants' contributions and commitment to learning and teaching. What has prompted these changes at the institutional level?

The centrality of teaching in the university's mission in Ireland is adverted to by Malcolm Skilbeck in his 2001 report, *The University Challenged*, when he remarks:
"New and improved ways of teaching students is one of the challenges facing higher education staff" (p. 72). By 2001, the Irish Government had begun to provoke change by funding certain initiatives:

> *from the mid 1990s, targeted funding was made available through the Targeted Initiatives (subsequently renamed Strategic Initiatives) scheme. Innovations in teaching and learning were also supported through the Training of Trainers fund during that period. The increasing emphasis on the link between research and teaching and learning in the HEA's Programme for Research in Third Level Institutions (PRTLI), highlighted in PRTLI3 and PRTLI 4, led to a refocusing of teaching and learning in many institutions. And within the past two years, the availability of significant funding from the Strategic Innovation Fund to support and enhance innovation in teaching and learning has had a major impact on the visibility of teaching and learning in Irish universities (Hyland, 2007, p. 4).*

As a result of these initiatives, a commitment to research-led teaching and to teaching as a form of scholarship has gained momentum in Irish higher education. Without these initiatives, publications such as this one would not be possible.

At the same time, professional bodies are also driving change. For example, disciplinary conferences and journals are beginning to allow some focus on education within the discipline. Researchers have responded to this by presenting their evidence on student learning at conferences, and publishing it in papers.

Strategic plans, parity of esteem for teaching, and inspirational leaders of change are vital if we are to bring about change within our own institutions. When making changes, however, we must be careful to ensure that wisdom and experience balance the excitement of new

initiatives. For example, institutional collaborations are being encouraged by the Higher Education Authority. Do institutions set up structures that help or hinder this collaboration? If the institution managers do not see these interactions and collaborations as important, and recognise the needs of students and the centrality of research in teaching as part of this, they may inadvertently allow agendas to dominate and structures to be set up that hinder progress. The recent emergence of Key Performance Indicators (KPIs), for example, will play a significant part in future change in the third-level sector. Will we have the opportunity to define the KPIs that relate to learning and teaching, or will we simply be expected to respond to them?

Scholarship of Teaching and Learning

Hutchings (2004, p. 1) summarises the core habits and commitments of a Scholarship of Teaching and Learning (SoTL) approach. They are:

> that teaching is intellectual work, that student learning poses challenging problems that require careful investigation, that rich evidence about learning needs to guide thoughtful improvement and that the important work of learning and teaching should not be allowed to "disappear like dry ice" (Shulman, 2004, p. 142) but be made visible, shareable and useful to others.

The production of this book reflects a commitment to these values and a movement towards a scholarship of teaching and learning. For example, the contributors consider teaching and educational development in terms of research and are thus bridging the gap between teaching and research with the aim of improving student learning. As Hutchings and Shulman (2004 p. 150) note:

> A scholarship of teaching is not synonymous with excellent teaching. It requires a kind of 'going meta', in which faculty frame and systematically investigate questions related to student learning – the conditions under which it occurs, what it looks like, how to deepen it and so forth – and do so with an eye not only to improving their own classroom but to advancing practice beyond it.

In the process of writing this book, contributors' work has been made public for critique, following literature research, evidence collecting, analysis and discussion. As a result, we have begun to develop a common language of practice, and have engaged in the antithesis of "pedagogical solitude" (Shulman, 2004, p. 142). Thus the writing of this book has clarified the changing role of EDIN, from network to community of practice. Indeed, for Shulman (2004) SoLT can be accomplished only in the context of a community of scholars.

Conclusion

This book documents how change is occurring in the Irish higher education sector, from the top down and from the bottom up. It prompts us to consider our attitude and response to change: is it proactive or reactive? It therefore looks at some of the drivers of this change. It also makes clear that those involved in learning and teaching in Irish higher education can be the agents of change themselves, although some may first need to overcome potentially disempowering mismatches between their current roles and their senses of identity. What may be needed is a more holistic sense of academic identity, which can integrate traditional research-based roles and newer emphases on teaching and its scholarship.

To achieve this, teachers will need to acquire the skills they advocate for their students: learning how to learn and adapt, learning by doing, having clear goals, and knowing when to

ask for help. Teaching for student learning is complex, and the answers we seek are not in any one book. As teachers, we have been set free to find new ways of promoting students' conceptual development. If we can build a wide repertoire of teaching strategies, and adapt to the circumstances we find ourselves in, we will not only survive but thrive!

We thank all of the authors and readers who are striving with good intentions to support staff and improve student learning. And we offer this book as a step along the way.

References

Bass, R. (1998/9) The Scholarship of Teaching: What's the Problem? *Inventio*, online journal at www.doiiit.gmu.edu/inventio/randybass.htm). [Accessed January 08]

Boyer, E. (1990) *Scholarship Reconsidered: Priorities of the Professoriate*. San Francisco: Jossey-Bass.

Hutchings, P. (2004). The scholarship of teaching and learning in the United States. International Society for the Scholarship of Teaching and Learning Conference, Bloomington, Indiana, October 2004.

Hutchings, P. (2006) *Fostering Integrative Learning through Faculty Development* [online]. Stanford CA: Carnegie Foundation for the Advancement of Teaching. Available from: http://www.carnegiefoundation.org/files/elibrary/integrativelearning/uploads/faculty development_copy.pdf [accessed 13 August 2008].

Hutchings, P. and Shulman, L. (1999) "The scholarship of teaching: new elaborations, new developments", *Change*, vol. 31, no. 5, pp. 10–15. Available online from: http://www.carnegiefoundation.org/publications/sub.asp?key=452&subkey=613 [accessed 2 October 2008].

Hutchings, P. and Shulman, L. (2004) "The scholarship of teaching: new elaborations, new developments". Chapter 9 in *Teaching as Community Property: Essays on Higher Education,* San Francisco: Jossey- Bass.

Hyland, A. (2007) Report to the Irish University Quality Board, Dublin.

Malone, L. (2002) Peer critical Learning. *Final report* CASTL. Carnegie Foundation for the Advancement of Teaching. Available online from http://www.carnegiefoundation.org/ [accessed 28 October 2008].

Meyer, J.H.F. and Land, R. (2003) "Threshold concepts and troublesome knowledge: linkages to ways of thinking and practicing within the disciplines", in *Improving Student Learning: Theory and Practice – 10 Years On* [Proceedings of the 10th Improving Student Learning Symposium], ed. C. Rust. Oxford: The Oxford Centre for Staff and Learning Development, Oxford Brookes University. pp. 412–424.

O'Neill, G. Moore, S. and McMullin, B. (eds) (2005) *Emerging Issues in the Practice of University Learning and Teaching*. Dublin: All Ireland Society for Higher Education (AISHE). Available online from: http://www.aishe.org/readings/2005-1/toc.html [accessed 2 October 2008].

Shulman, L. (2004) Teaching as community property: putting an end to pedagogical solitude. Chapter 8 in *Teaching as Community Property: Essays on Higher Education*. San Francisco: Jossey-Bass.

Skilbeck, M. (2001) *The University Challenged: A Review of International Trends and Issues with Particular Reference to Ireland*. Dublin: Higher Education Authority.

Acknowledgements

NAIRTL

WRITING IDENTITY THROUGH THE EDUCATIONAL DEVELOPERS IN IRELAND NETWORK (EDIN)

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Introduction

In Ireland we are only beginning to identify the role educational development should play in learning and teaching, policy-making, educational research and scholarship. With this background in mind, this chapter asks whether countries such as Ireland should look to contexts with a more defined history to fashion an identity, or forge a scholarship based on our distinctive perspectives, skills and approaches. The chapter uses the Educational Developers in Ireland Network (EDIN) – and in particular the EDIN writing retreat (from which this publication stems) – as a case study in the value of the latter approach. As part of its analysis, the chapter considers the notion of cross-institutional collaborative writing and discusses it in relation to the emerging identity of EDIN.

The chapter is divided into three sections. The first introduces the EDIN network and its attempts to establish a more formal identity in a country emerging in educational development. It discusses the complexities of defining an identity and asks just how open countries such as Ireland should be to outside contexts and influences. The second section examines the notion of writing collaboratively as a key characteristic of the EDIN network. It introduces some possible theoretical frameworks that could be used to research cross-institutional writing and describes the writing process undertaken for *Emerging Issues II: The Changing Roles and Identities of Teachers and Learners in Higher Education* linking our writing to our roles as educational developers. Finally, the third section explores whether it is possible to construct an identity, or at least establish a cohesive voice, through either the process or products of our writing.

What is EDIN?

The Educational Developers in Ireland Network (EDIN) was established in 2002 and currently has over 50 members from each of the seven universities in Ireland and many of the institutes of technology. Members include educational and academic developers and other staff charged with learning and teaching development responsibilities.

Originally a small, informal network, EDIN has expanded not only in size but in output – in the growing number of collaborative projects we undertake, in our exchange of information and expertise, and in our applications for and securing of funding. This growth alone has raised questions about our identity, our objectives and our aims as a network. Many extensive formal and informal discussions have taken place including an "away day" held in 2005 to clarify a vision for the network, and a commissioned research and consultancy project undertaken in 2006. The final commissioned report (Wisker and Antiniou, 2006) proposes a framework for the sustained development of EDIN by reflecting on the "history and nature of educational development networks and locat[ing] EDIN within a rapidly changing international context" (p.2).

The establishment of a more formal identity for our network is challenging. The survey carried out as part of the 2006 report revealed that many EDIN members originally joined to

network with other professionals, to share information and to support others in educational development roles. For example:

> *I thought it an excellent opportunity to finally get to know all my peers from around the country working in educational development (quoted in Wisker and Antiniou, 2006, p. 12).*

> *To develop my identity as an educational developer [...] To have honest conversations and enjoy one another's talents, creativity, specialisms and company (quoted in Wisker and Antiniou, 2006, p. 12).*

As we grow in size and output, however, some members have raised questions such as the following about EDIN's future:

- Can we continue to develop at the same rate while maintaining such an informal structure?
- Is it appropriate to be represented at national level by unelected members without a mandate?
- How can we maintain our independence?
- Is there a danger that other groupings or organisations may replace EDIN if we do not firmly establish our presence?
- What funding models are we going to follow?
- Has the time now come to secure a clear management structure, with well-defined roles and transparent lines of communication?
- As the network has no official status, is anyone outside of aware of us? (Wisker and Antiniou, 2006, pp. 12–13)

These questions generate broader concerns about our aims and identity. For example:

- To what extent is our identity as EDIN confined by the boundaries of this group?
- Can we map our individual identities as separate members to our collective identity as a network?
- To what extent can our current structure underpin a substantial identity for EDIN?
- How open are we to outside contexts and influences?
- And how can we move forward as a cohesive group with unified aims and objectives and focused EDIN activities?

The Wisker and Antoniou (2006) report questions whether EDIN represents a community of practice; it asks us to consider what disadvantages we might find in a more developed EDIN; and it asks how far EDIN's growth and development mirrors the international context.

As educational developers in Ireland, our individual identities are still forming, and it is important to remember that EDIN's identity is shaped not least by our roles as educational developers within widely varying institutes and universities. Moreover, Ireland has little history of educational development and lags far behind the US and Australia. Even our neighbours in the UK have established themselves as educational developers and in the process formed an identity (Land, 2004). In Ireland, we are only starting to demarcate the role of the educational or academic developer, and the part people in that role should play in learning and teaching, policy-making, educational research and the scholarship of learning

and teaching. But the extent to which EDIN's role will or indeed should mirror international contexts remains to be seen.

As a nationally based professional community, I would argue that EDIN cannot yet be neatly categorised. For example, EDIN possesses many characteristics of *communities of practice* – shared concerns and passions, a joint enterprise, a commitment to learning together through mutual engagement, a shared repertoire of communal resources (Wenger, 1998; Wenger *et al*, 2002). But look to characteristics of *learning communities* and we also find features in common with EDIN – commitment and professionalism, value of ideas, collaboration built into the fabric of the culture (Johnson in Retallick et al, 1999). And then EDIN can also be usefully compared to *social covenants*, insofar as it is maintained by loyalty, kinship, obligation, duty, responsibility, and reciprocity (Sacks 1997, quoted by Sergiovanni in Retallick et al, 1999). Indeed, even the notion of the *learning organisation*, once used solely in the context of business and industry, is now becoming applicable to the changing identity of higher education institutions in Ireland and abroad. After all, terms such as "quality learning", "organisational learning" and "empowering the learner" are beginning to infiltrate the vocabularies of the institutions we represent, at the same time as the language and principles of business and commerce are becoming increasingly intertwined with the language and principles of the university (Coombe in Retallick et al, 1999).

Therefore, if we cannot yet define *what* EDIN is, perhaps we should not rush to conclude *who* EDIN is. Identity is constantly fluid, and arguably should be viewed as a process rather than a thing – as something that is constantly "becoming" and that does not necessarily ever reach a state of "being". It is something that is undoubtedly influenced by the past and nurtured by the present, but it also anticipates the future. Lawrence Grossberg (1996) proposes the notion of "belonging without identity" – that is, the idea of being free-flowing, not tied to any fixed structure or membership.

Nevertheless, certain pressures – to authorise our work as educational developers, influence or inform policy-making, present our work on a national or international stage, and foster a research community – drive us to formalise who we are and what we do. To do this, perhaps we need to look not only outwards but also inwards to the core of our network, considering what features might be unique, or at least particular, to EDIN. One such feature is EDIN's record of organising cross-institutional collaborative writing retreats, which produce joint publications such as *Emerging Issues II*. These writing products not only reflect the professional issues and concerns that drive us as individual network members, but viewed collectively embody the emergence of a broader picture of educational development in Ireland. But can the process of writing collaboratively be linked to identity definition? The next part of this paper explores the notion of the writing retreat and collaborative writing in relation to EDIN, before asking whether it is possible to form an identity or at least claim an independent but cohesive voice through both the process of our writing and the products of it.

Expressing Identity through Writing

Possible Theoretical Frameworks
When examining a cross-institutional network collaborating through writing, it is challenging to find an appropriate theoretical framework. Here I simply point to some frameworks that could inspire more in-depth research in this area, particularly those that incorporate the notion of dialogue, writing, conversation or narrative.

Perhaps the obvious theoretical departure point is the socio-cultural perspective of group cognition. The collaboration of intellectual peers in educational development is consistent with the activities referenced in socio-cultural theory, and could form a guiding theoretical paradigm. But it should not be the only one. For example, in the educational field, narrative enquiry has been proposed as a way of investigating the processes involved in identity construction (for example, Connelly and Clandinin, 1987; 1995). Narrative theorists argue that "it is in narrative tellings that we construct identities: selves are made coherent and meaningful through the narrative … work that they do" (Benwell and Stokoe, 2006, p. 42). Therefore, the construction of academic identities through participation in a network such as EDIN could be studied through an interpretive analysis of participants' verbatim narratives.

Another theoretical lens that might help reveal the practices, narratives and dynamics of this collaborative network is Bakhtin's work on voices, social languages and dialogicality (Bakhtin, 1986). That the individual and the social environment are inherently related is fundamental to Bakhtin's dialogical thinking. But a consideration of the individual as dialogical self, composed of mutually defining "I-positions" (Hermans & Kempen, 1993) might be a means of broadening the socio-cultural approach to include both individual and group-specific histories that inform collaboration.

The notion of writing collaboratively for academic publication, and the move from private to public that this involves, is also interesting here. One common belief is that "the act of writing transfers private thoughts from the purely subjective into a public domain of shared language and discourse" (Carlile and Jordan, 2007, p. 26). But dialogical theory emphasises the social, cultural, situational and historical nature of cognition and other "subjective" activities (Lave and Wenger, 1991; Saljo, 2002; Bakhtin, 1986; Vygotsky, 1978). If subjectivity is socially and culturally mediated, is writing, as an expression of voice, less subjective than one might assume? Moreover, a person usually speaks to or writes for someone – even if that someone is only the self. Thus, dialogue is never free from its relations to other people, history, culture, community:
The word in language is half someone else's. It becomes "one's own" only when the speaker populates it with his own intention, his own accent, when he appropriates the word, adapting it to his own semantic and expressive intention. Prior to this moment of appropriation, the word does not exist in a neutral and impersonal language (it is not after all, out of a dictionary that the speaker gets his words!), but rather it exists in other people's mouths, in other people's concrete contexts, serving other people's intentions: it is from there that one must take the word and make it one's own (Bakhtin, 1986, pp. 293–294).

Bakhtin's observations prompt three questions:

- If our individual stories are neither autonomous nor socially detached in the first place, can we truly write or express "the self"?
- Does this mean that the notion of collaborative writing as a *shared story* gains strength?
- If we are writing an "emerging identity" in these collaborative retreats (either as a network or as individual educational developers), to what extent can this identity be located in both the content of what we write and in the methodological frameworks or epistemologies we choose or are expected to write in?

Writing within Our Roles

Roles within the EDIN community vary widely. Not only do educational developers within the network come from a variety of institutions (often with varying learning and teaching agendas and emphases), but we have different levels of expertise and, more often than not, different discipline or career backgrounds. Consider, for example, the authors in this volume: of those who work directly in learning and teaching or academic practice and have broadly similar roles, none bears the title "educational developer". Rather, we see a range of other titles (Lecturer in Educational Development, Academic Developer, Academic Coordinator, Dean of Learning and Teaching, Lecturer in Education, Learning Development Officer, Programme Coordinator, Teaching Support Officer and so on). Likewise, some members are employed as academics, as "lecturers" expected to research and publish accordingly; others are employed as administrators, many of whom are academics who have migrated from various disciplines, but now have administrative rather than academic appointments. This diversity gives us exciting opportunities to look beyond the "known" of our immediate contexts in developing our professional identities; at the same time, in this cross-organisational yet collaborative context, it is challenging to create a joint dialogue, a common language that bridges our organisational structures, and a shared identity that nevertheless reflects our diverse backgrounds.

As educational developers (in the broad sense) both coming from and working across diverse disciplines, we are also acutely aware of the different methods and frameworks for academic enquiry used across our institutions, as well as those that belong to our disciplinary backgrounds. But what about our own methods and frameworks? Can we articulate our own field of inquiry, our particular scholarship of teaching at university level, so that it frames enquiries into teaching and learning as a scholarly activity? Peseta (2007) suggests that arts-based enquiry can support academic developers' desire to create "a space in which to examine and re-imagine what can legitimately written about the project of academic development" (Peseta, 2007, p. 15). She also observes, however, that the writing in the field of academic development fails to express how the work itself feels:

> *Many of the research accounts I come across lack the spirit and vitality of the conversations that take place among us – the wonderful laughter and energy of our practice; occasionally its sadness, longing, regret, and desire, the confusion of difficult decision making; and at other times, the joy and celebration of collaborative successes, too (Peseta, 2007, p. 17).*

The pressures of conforming to writing within an imposed framework might well have something to do with this. There is no doubt that it is important to establish a culture of research, scholarship and publication in educational development. We also need to publish to advance our careers as educational developers. But often we must do so according to the norms and conventions of an often unfamiliar research paradigm. To date, educational development has taken on board the "language of the tribe" (Clough, 2002). It is only since educational development internationally has begun to claim a history of practice and scholarship that questions are being raised about the possibilities and limitations of its research economy (Brew, 2003; Eisner, 2004; Harland and Staniforth, 2003; Peseta, 2007).

Even educational developers employed in "administrative" rather than "academic" positions are increasingly expected to combine a strong track record of research publications with practice-based skills. The pressure to publish coupled with lower than desirable publication rates are recurring themes in the literature. According to McGrail *et al* (2006), there are many

reasons why academics do not write for publication including lack of momentum, lack of support structure, time constraints, lack of framework, lack of confidence in ability, limited understanding of the writing process, fear and anxiety. Ideally, academic writing is a process through which learning and scholarship are nourished, and through which positive dialogue within and between the disciplines is initiated and sustained. But the emergence of the "new public management" has moved writing away from this ideal, so that it is now often driven by a "negative ethic" (Murray and Moore, 2006, pp. x–xi).

Academic writing retreats and writing groups are beginning to emerge in the literature as valuable and credible means to increase academic writing output (Lee and Boud, 2003; McGrail *et al*, 2006; Murray and Moore, 2006). As Barbara Grant notes, "writing is so often done in an atmosphere of privation, loneliness, pressure, anxiety" (2007, p. 10). On the other hand, the evidence suggests that short-term, collaborative, intensive writing environments can boost the quality of ideas (Grant and Knowles, 2000). This is because they temporarily remove people from the day-to-day distractions of their professional lives inside the university and personal lives outside it (Grant, 2007; Moore *et al* 2005, Moore, 1995; 2003).

The EDIN Writing Retreat Process: Emerging Issues II

Certainly, the EDIN writing retreats confirm the findings in the literature. For example, feedback from the 2006 EDIN writing retreat (which focused on individuals writing for separate publications) highlighted the value of time to write and freedom from interruption; the balance between solitude and communal time; the relaxed and supportive atmosphere; and the beautiful surroundings that stimulated thought processes. All those surveyed viewed themselves as having achieved at least 90 percent of their writing goals. Some members new to the retreat process expressed surprise at how much they could actually write in such a short period of time. But the success of the writing retreat was not defined solely in terms of productivity: it was also measured by the extent to which the retreat created a forum in which honest dialogue and critical debate could take place. The collegial aspect of the retreat was also well received – the support of others, the pleasant sociability, the informal and yet informative atmosphere in which to engage with ideas, and the stimulation of everyone working at the same time.

The origins of the EDIN writing retreat are well documented in *Emerging Issues in the Practice of University Learning and Teaching* (O'Neill *et al*, 2005). In many ways, the writing retreat for the present publication, *Emerging Issues II*, borrowed heavily from the successes of previous EDIN retreats, but it also departed from them. Essentially, its aims were similar to those of *Emerging Issues* (O'Neill *et al*, 2005), insofar as a group of educational developers gathered to produce a series of writings on issues of learning and teaching, to be published as a single, cohesive output. The cohort of writers for *Emerging Issues II* differed somewhat from the earlier retreat, however, as did both the process of the publication decision-making process, and of the retreat itself. These differences reflected the current context of EDIN and educational development in Ireland. The writing retreat for *Emerging Issues* (O'Neill *et al*, 2005) took place close to the end of the writing process, as the culmination of some months of pre-work and writing preparation; participants' attendance was in part motivated by the desire to complete and/or review their chapters. In comparison, the *Emerging Issues II* retreat was spread out over time: its initial two days took place post-abstract but before the submission of a first draft; its second two days occurred some months later, after a full draft was written and a peer review had taken place.

The planning and writing process for *Emerging Issues II* also differed from *Emerging Issues* (O/Neill *et al*, 2005). Once funding for the project was secured and some months before the retreat took place, EDIN members were invited to submit "ideas" for a new publication. These ideas could be written up on the EDIN website, sent to members via email, or simply "talked through" at a group meeting. Some weeks later, interested parties met for a day to decide on the exact nature of the publication and the process involved. Ideas ranged from a well-developed proposal for a book, to general thoughts and ideas. The members of the group knew each other well and were all passionate and vocal about their interests, so the ensuing dialogue was purposeful, critical and collegial. Interestingly, an almost seamless discussion led to a unanimous decision to create a successor to *Emerging Issues (*O'Neill *et al*, 2005), entitled *Emerging Issues II: The Changing Roles and Identities of Teachers and Learners in Higher Education*. Undoubtedly, we had all grown as educational developers since the previous publication, but in our conversations at that meeting it became apparent that we were still very much emerging both as a network, and as a group of educational developers attempting to work collaboratively across institutions. Our collective ideas for the project showed us that there was a new series of issues emerging for the educational developer in Ireland, new themes that called for exploration, and a growth and change within this context that deserved to be documented or challenged.

It was decided that because we all valued the collaborative nature of EDIN, the call for chapters should strongly suggest (though not prescribe) that chapters be co-written, ideally with someone from another institution or university. Feedback from the 2006 writing retreat prompted this decision, because it showed that many of the participants (both new EDIN members and old) had noted networking and collaboration as a positive outcome. As one participant noted, "even though we meet fairly regularly at meetings we don't have time to discuss our work so the retreat served as a different type of networking experience – research networking – as opposed to professional practice networking that occurs at meetings" (Unpublished feedback in possession of EDIN).

The Peer-Review Process

At the meeting described above, we also decided that the writing of this book should be strongly developmental in approach. Consequently, we agreed that the writing process would include peer review, which would be supportive but also thorough and critical. It would be founded on trust: "mistakes" would be accepted rather than criticised, and the project's cooperative aspect would be highly valued (Anderson and Boud, 1996).

The peer review process was as follows. Interested authors submitted chapter abstracts followed some weeks later by a chapter plan. Then the first of two two-day writing retreats (held in April 2007) focused on peer review. On the first day of this retreat, chapter plans were presented for peer review, which was given in front of the whole group and which included critical evaluation as well as positive commentary. Writers were encouraged to seek focused feedback, but participants were also given a general feedback sheet that prompted them to consider the following questions when reviewing each plan:

- Is the work timely in relation to contemporary dialogue, and does it add new ideas?
- What is the intended contribution to the literature?
- Has the relevant literature been identified?
- Is the intended audience clear and apt?
- Is the topic clearly stated?
- Is the scope of the paper established or is the work trying to cover too much ground?

- Is there a clear logic to the outline as presented?

Because all participants engaged with the plans of their fellow authors, the writing process developed a sense of purpose and context: links were forged, common themes emerged, and people began the process of cross-referencing others. Groups of three to four chapters based on similar themes, structures or challenges formed, and we agreed that the members of each group would peer-review their written drafts using a standard form (see the Appendix) before the second retreat. After this, an independent peer review would be commissioned for each chapter, before the copy-editing process. Both peer review processes envisaged reviewers as critical friends, rather than gatekeepers determining what gets published.

The writing process started on the second morning of the first retreat with a five-minute writing prompt that asked participants what they intended to write that day as a result of the feedback they had received the day before. Participants used the remainder of the day to write at their own pace.

The follow-up writing retreat took place in November 2007. It gave writers an opportunity to write a revised draft, on the basis of peer review feedback.

Our peer-review process goes some way towards supporting participating authors in their writing and making the writing process more affirming and productive – undoubtedly a valuable outcome. But with increasing numbers of participants feeling the pressure to publish in international peer-reviewed journals, the choice made by EDIN members to focus to date on a purely developmental approach may have to be reconsidered for the next project.

Constructing a Voice through What and How we Write

Perhaps EDIN members are some way from writing about their practice "as it feels". Perhaps our writing will emphasise "victory narratives that defend and extend our relevance as a community, rather than making public the intense difficulty of our work" (Peseta, 2007, p. 17). Perhaps our voices are still muffled by the protocols of more established research communities. Even so, we must not forget that we are at a crossroads, with a unique opportunity to begin forging an identity inspired by our particular contexts – our collaborative projects and our collaborative writing ventures.

As academic writers, we are all too aware that developing an individual voice appropriate for broadcast is often far from simple. Co-authoring with someone from a different institution increases the complexity, and the challenges go well beyond the demands of fusing different writing styles. Genuinely collaborative writing involves working together over a period of time to address concerns, tease through ideas, discover new paths, find common ground, form consensuses, and present a piece as a unified whole.

EDIN is a network that does not just talk about collaboration and dissemination in theory but embraces it in practice – this adds a crucial dimension to its emerging identity. EDIN's members may differ widely in their roles within the network, their institutional disciplines and their day-to-day jobs; however, the integrity of the group is founded on members working jointly on issues and passions that can override institutional concerns if necessary. This lends cohesiveness and honesty to the voice we develop when we write collaboratively.

Participating in networks, retreats and publications such as those sponsored by EDIN gives us the time and space to contribute to and benefit from both informal and formal spoken and written conversations in which we share, dissect and disseminate knowledge. Through dialogue of this kind, we discover shared experiences to write about, such as those canvassed in the chapters in *Emerging Issues II*. But *what* we write about provides only a limited basis for the creation of our voice and identity. Therefore, our EDIN dialogue is important because through it we gain the confidence to write and theorise about practice that challenges, excites and motivates us. And eventually, because we are expressing *who* we are – our particular challenges, concerns and investigations – through a process (of critical exchange, peer review and publication) that complements this exploration, it is likely that key identities will emerge effortlessly from the writing process before they dissolve into another stage of becoming – as they should.

Final thoughts

Writing is commonly and somewhat naively seen to be as act that preserves a self in time, but writing can never be a simple or timeless expression of identity. Writing and identity wrap around each other seamlessly; where one ends and the other begins is impossible to define. Identity, as I have argued, is constantly fluid, never static. Moreover, there can be no doubt that the process through which we make our writing public gradually estranges our writing from ourselves. Therefore, we should be satisfied to allow our identity as EDIN to continually grow and change as its members grow and change, and as our concerns (either individually or collectively) grow and change. Moreover, as we disseminate our writings to a wider audience, we must be content for our transient identity to merge with the many different contexts of our readers, and to take shape beyond our individual and collective selves. Perhaps the value and meaning of this identity will emerge only when we give others the freedom to deconstruct it.

References

Anderson, G. and Boud, D. (1996) "Extending the role of peer learning in university courses", *Research and Development in Higher Education*, vol. 19, pp. 15–19.

Bahktin, M (1986) *Speech Genres and Other Late Essays*, eds C. Emerson and M. Holquist. Austin: University of Texas Press.

Benwell, B.M. & Stokoe, E. (2006). *Discourse and identity*. Edinburgh: Edinburgh University Press

Bolton, G. (2001) *Reflective Practice: Writing and Professional Development*. London: Sage.

Brew, A. (2003) "Teaching and research: new relationships and their implications for inquiry-based teaching and learning in higher education", *Higher Education Research and Development*, vol. 22, no. 1, pp. 3–18.

Carlile, O. and Jordan, A. (2007) "Reflective writing: principles and practice", in *Teaching Portfolio Practice in Ireland: A Handbook*, ed. C. O'Farrell. Dublin: Trinity College Dublin and All Ireland Society for Higher Education (AISHE). pp. 24–37. Available online from: http://www.aishe.org/readings/2007-2/chap-03.pdf [accessed 10 July 2008].

Clough, P. (2002) *Narratives and Fictions in Educational Research*. Buckingham and Philadelphia: Open University Press.

Connelly, F.M. and Clandinin, D.J. (1987) "On narrative method, biography and narrative unities in the study of teaching", *Journal of Educational Thought*, vol. 21, no. 3, pp. 130–139.

Connelly, F.M., and Clandinin, D.J. (1995) *Teachers' Professional Knowledge Landscapes*. New York: Teachers College Press.

Coombe, K. (*1999*), "Ethics and the learning community", in Retallick, J. (Eds), Learning Communities in Education*, Issues, Strategies and Contexts*. London: Routledge

Eisner, E. (2004) "What can education learn from the arts about the practice of education?" *International Journal of Education & the Arts*, vol. 5, no. 4, pp. 1–11.

Grant, B.M. (2007) *Facilitating "Women Writing Away": A Handbook and Journal*. Auckland: University of Auckland, New Zealand.

Grant and Knowles (2000) "Flights of imagination: Academic women be(com)ing writers" The International Journal for Academic Development, Volume 5, Number 1, 1 May 2000 , pp. 6-19(14) [accessed 30 August 2008]

Grossberg, L. (1996) "Identity and cultural studies – is that all there is?" in *Questions of Cultural Identity*, eds S. Hall and P. Du Gay. London: Sage. pp. 87–107.

Harland, T. and Staniforth, D. (2003) "Academic development as academic work", *The International Journal for Academic Development*, vol. 8, nos 1–2, pp. 25–35.

Hermans, H. J. M., & Kempen, H. J. G. (1993). *The dialogical self: Meaning as movement*. San Diego, CA: Academic Press.

Johnson, N (1999) "Becoming learning communities," in Retallick, J (eds), *Learning Communities in Education, Issues, Strategies and Contexts,* London: Routledge

Land, R. (2004) *Educational Development: Discourse, Identity and Practice*. Maidenhead and New York: SRHE & Open University Press.

Lave, J. and Wenger, E (1991) *Situated Learning: Legitimate Peripheral Participation*. Cambridge: Cambridge University Press.

Lee, A. and Boud, D. (2003) "Writing groups, change and academic identity: research development as local practice", *Studies in Higher Education*, vol. 28, no. 2, pp. 187–200.

McGrail, M., Rickard, C.M. and Jones, R. (2006) "Publish or perish: a systematic review of interventions to increase academic publication rates", *Higher Education Research & Development*, vol. 25, no. 1, pp 19–35.

Moore, S. (1995) *Intensive Writing program, progress reports*. Melbourne: Victoria University of Technology Collaborative Research Group Scheme.

Moore, S. (2003) *Writers' retreats for academics: exploring and increasing the motivation to write*. Journal of further and higher education, vol. 27, no. 3, pp 333-342

Murray, R. and Moore, S. (2006) *The Handbook of Academic Writing: A Fresh Approach*. Berkshire: Open University Press.

O'Farrell, C. (ed.) (2007) *Teaching Portfolio Practice in Ireland: A Handbook*. Dublin: Trinity College Dublin and All Ireland Society for Higher Education (AISHE). Available online from: http://www.aishe.org/readings/2007-2/ [accessed 12 July 2008].

O'Neill, G., Moore, S. and McMullin, B. (eds) (2005) *Emerging Issues in the Practice of University Learning and Teaching*. Dublin: All Ireland Society for Higher Education (AISHE). Available online from: http://www.aishe.org/readings/2005-1/toc.html [accessed 12 July 2008].

Peseta, T. (2007) "Troubling our desires for research and writing within the academic development project", *International Journal for Academic Development*, vol. 12, no. 1, pp. 15–23.

Retallick, J., Cocklin, B. and Coombe, K. (1999) *Learning Communities in Education: Issues, Strategies and Contexts*. London: Routledge

Sergiovanni, T. (1999), "The Story of Community", in Retallick, J (eds), *Learning Communities in Education, Issues, Strategies and Contexts*. London: Routledge

Saljo, R. (2002) "My brain's running slow today: the preference for 'things ontologies' in research and everyday discourse on human thinking", *Studies in Philosophy and Education*, vol. 21, nos 4–5, pp. 389–405.

Wenger, E. (1998) *Communities of Practice: Learning, Meaning, and Identity*. Cambridge: Cambridge University Press.

Wenger, E., McDermott, R. and Snyder, W.M. (2002) *Cultivating Communities of Practice: A Guide to Managing Knowledge*. Boston MA: Harvard Business School Publishing.

Wisker, G. and Antiniou, M. (2006) "Research and consultancy project to inform sustained development of Educational Developers in Ireland Network (EDIN)". Unpublished report in possession of EDIN.

Vygotsky, L.S. (1978) *Mind in Society: The Development of Higher Psychological Processes*. Cambridge MA: Harvard University Press.

APPENDIX

Peer Review Feedback Sheet

Author to complete and give to peer reviewer:

1. What is the audience for this piece of writing?
2. In one reader-friendly sentence, what is the main hypothesis/thesis you are arguing/testing?
3. What is the answer it will provide?
4. What stage of the writing process are you seeking feedback on?
5. How does your paper add to theory/practice?
6. What remains unresolved?
7. In the box below, tick the issues you are seeking feedback on (tick up to 4).

A	Reviewers' immediate impression after reading piece	
B	Specific strengths of piece	
C	Specific weaknesses of piece	
D	How well is the focus developed?	
E	Is supporting information clear, relevant, orderly?	
F	How well does the writer integrate primary/secondary source materials?	
G	Has the author communicated her/his intent clearly to the audience?	
H	Is the author's voice appropriate in tone? Where is his/her voice most alive, most powerful? Where is it weak?	
I	What is your main suggestion for improvement (within 20 words)?	
J	How might improvement be best achieved (within one paragraph)?	
K	(Author to add as appropriate)	
L	(Author to add as appropriate)	
M	Anything else reviewer might feel.	

(Peer reviewer to cut and paste specific author issues and return replies to author.)

MATURE CYNICS AND FLEDGLING ECLECTICS:
ELABORATING INSTRUCTIONAL DESIGN FOR THE NET GENERATION

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Introduction

This chapter analyses how faculty are currently dealing with the needs of the "net generation" in the realm of higher education (HE) and use of e-learning. It reviews the socially orientated Web 2.0 technologies and their impact on teaching and strategic policy. It also assesses whether a model of generational distinctions is applicable to the methodological practices of teaching and learning.

The current cohort of new academics belong primarily to Generation X (born between 1965 and 1980). These individuals have experienced a surge in technological developments but also significant economic upheavals. Potentially this may leave them with a particularly sceptical outlook upon life in general. They are the "cynics" in the title of this chapter: in Greek Philosophy, the cynics were renowned for flouting social conventions as well as for their confrontational style of engagement.

As time progresses, the contemporary student population, though an ever-fluctuating cohort, will be led by members of the net generation (born between 1981 and 1994, and also known as the "millenials" or "echo boomers") and their younger siblings, the "digital natives" (Prensky, 2001). These are the "eclectics" of the chapter's title, so called because from the myriad of social technologies (such as Facebook, Flicker, Blogger, Hi5, Twitter etc) on the Internet, they are able to choose, aggregate and apply technologies in a variety of forms (mobile and networked) and settings that enable them to stay informed and in contact with their peers. In so doing they demonstrate the ability to multitask and process multiple streams of information at the same time. They use technology differently from older generations. For example, the 2007 ECAR (EDUCAUSE Centre for Applied Research) study of around 27,000 undergraduate students and their use of information technology reveals an increase in personal ownership of laptops to 75 percent, from 52 percent in 2005 (Salaway and Boreson, 2007). It also notes that the majority of students possess at least two pieces of "personal technology", usually a computer and a mobile phone, with media players coming in a close third. Moreover, the net generation's approach to daily life is profoundly shaped by the technology they use. This is now clearly mirrored in the way in which current primary and junior school children are using technology in their daily lives. 1 in 5 children have partaken in some form of online or distance learning, and the presence of technology in the classroom has become second nature – with the use of video, podcasts and online assignments so commonplace (Greenwood, 2007). This awareness and familiarity with technology has implications for the manner in which HE will choose to engage with future implementation of technology and infrastructure. This generation's access to technology has a direct impact on the amount of time individuals spend working online (including study, work and recreation); the average is 18 hours per week per students and 59% of this generation indicate a clear preference for, at the very least, moderate access to technological implementations.

So the question arises: how can the cynics engage the eclectics in the process of learning? Can academics adopt and adapt to the new demands of new learners, in a timely and pedagogically suitable way? This chapter reports on research undertaken to answer this

question, in the form of a survey of the current uses of technology in higher education and the impact of technology on staff in their daily lives and academic endeavours. The research also involved a pilot participatory action research methodology.

Technology and pedagogy

There have been many different approaches to e-learning, and various models and methods are regularly developed to harness the potential of technology for education. Examples include Palloff and Pratt's Online Communities (1999) , Salmon's 5-Stage Framework (2000), Collis and Moonen's Flexible Learning Approach (2001), Laurillard's Conversational Framework (2002), the IMS Learning Design (2003), and Britain and Liber's Framework (2004). All of these make reference to the increasing presence of e-learning tools (from simple html pages through wikis, blogs, SMS and so on) and how they may begin to be integrated into our teaching practice.

The Next Steps

One of the more recent developments in the field of online learning is the Personal Learning Environment (PLE). A PLE is a system that helps learners control how and what they learn, supported and facilitated by technology. For example, it may take the form of an editable virtual learning environment (VLE) in which an individual learner is able to choose a particular pathway or series of tools that aid them in achieving the designated learning outcomes based on their prior experience and knowledge. Or it may be entirely flexible, based only on the learning outcomes and identified assessment criteria. In this way individual students engage in a module of learning and they themselves choose what tools are required to demonstrate learning and how to present material for assessment. They aggregate a set of 'personalised' tools that collectively demonstrate and calatlogue their process of learning. In this way PLEs enable learners and academics to integrate tools and resources in a form of knowledge construction. They also allow the potential for learners and academics to co-create that knowledge and collaborate in its subsequent dissemination. Interestingly, this activity is consistent with constructivist learning theory, which sees learners as the makers of knowledge and meaning. The potential of PLEs for facilitating new approaches to learning (by interaction with others) (Doise and Mugny, 1984) is supported by Web 2.0 technologies and their emphasis on social activities.

The term "Web 2.0" refers to the tools and technologies that have characterised the web since the early 21st century, in particular those associated with sharing, innovation and collaboration – for example, wikis, blogs and social networking sites. These tools have a "gravitational core" (O'Reilly, 2005) rather then any set of defined parameters. With the emergence of the Web 2.0, the way we gather information from the Internet has fundamentally changed, as has the type of information we gather. It is now primarily derived from and generated by users themselves, via social software such as blogs and the now ubiquitous social networking sites such as Facebook and MySpace. It has also changed in appearance; part of the success of Web 2.0 is its inbuilt concept of sharing and providing opensource solutions. Opensource is a development method that harnesses multiple streams and processes (i.e. many independent developers may be working at once on a variety of needs) to enable cheaper, quicker, more advantageous and more transparent means of creating and answering software needs. This leads to multiple aggregations, creations and re-imaginings of Internet tools and resources.

Web 2.0 information often takes the form of "micro-content", an example of which is the folksonomy, a way of categorising data on the web using tags generated by individual users.

For example, I take a picture of the Trinity Library Long Room and provide a series of keywords (the "tags") related to the Book of Kells. An architect who has similar images posts keywords related to their discipline – for example, "Deane and Woodward" (the architects of 1860). Yet another user provides keywords relating to the *Star Wars* Jedi library whose design was based upon the Long Room. How is this of any use? The creation of personal metadata such as this is primarily a social phenomenon, which is its core strength. Each tagset inevitably feeds into one another and quickly creates a mass of interrelated links and resources. By harvesting these via a social bookmarking tool such as Bibsonomy (http://www.bibsonomy.org/help/about/) and displaying them as either "tagclouds" (see Figure 1) or lists, users can quickly identify either likeminded individuals or co-researchers. So rather than get lost in a tangent such as the Star Wars universe, I can quickly discover what other links scholars of illuminated manuscripts (such as the Book of Kells) have identified.

Figure 1:
An Example of a TagCloud Based on the Key Term "Web 2.0" (Cremonini, 2006)

Etienne Wenger's work is central to our understanding of and application of online interactions. His concept of "communities of practice" (Wenger, 1998) has a great deal of resonance in the current interactions of e-learning and Web 2.0. The idea of communities of practice is based around three elements – the domain, the community and the practice – and the interactions between individuals, their joint purposes and their actual endeavours. Although Wenger sees the community of practice as a means by which to promote collaboration online, the online community of practice is often misunderstood as a mere website, network or shared concern. These may indeed form the constituent parts of an online community but they require activities to realise their potential – for example, problem-solving, requesting information, reusing assets, discussing developments, mapping knowledge and identifying gaps.

These kinds of activities can be easily undertaken using Web 2.0 tools – for example, users could collect information via Google News then create a comparative analysis via the blogosphere (the collective term for blogs) using Memeorandum

(http://www.memeorandum.com/). They could mark up the information in del.icio.us (http://del.icio.us, another example of social bookmarking software) and then use *Tagcloud* (http://www.tagcloud.com/) to identify gaps in the information. In addition, users can map their online activities by using a tool such as *Trailfire* (http://trailfire.com/pages/about/idea.php), which enables users to navigate their searches by providing additional user information from the online community, members of which may have undertaken similar enquiries.

In summary it may be seen that there is a clear reason one might embrace these Web 2.0 technologies within HE. They offer a way in which the learner engages in the process of knowledge construction in a clear and transparent manner; information acquisition can be mapped and reviewed, collaborative endeavours may be analysed and individual developments can be aggregated and assessed. Combined, this series of iterative developments (by group or individual) may be used further in a reflective process charting both personal growth and competency over the period of designated learning and beyond. However before embracing these technologies one needs to address potential issues that may arise with regard to the un-fettered use of such technology. Learners will require clear direction and scaffolding from their academic facilitators as to how they might best achieve the designated learning outcomes. They will need the ability to discern the provenance and value of information they may acquire within the process. In time both the learner and teacher will be in a position to navigate the myriad of tools available and decide collectively which and when it may be fit for pedagogic purposes.

Embedding support structures for e-learning

In the mid-2000s, two policy initiatives foresaw the significance of the relationship between e-learning and the skills needed for lifelong learning. First, the Higher Education Funding Council for England (HEFCE)'s strategy document on e-learning (Beaty et al, 2005) explores recent history to provide a focus for future development that "enables institutions to meet the needs of learners and their own aspirations for development". Second, the European Commission's recommendation on key competencies for lifelong learning (European Comission 2006) hones in on the importance of digital competence as part of its priority focus on Information Society Technologies (IST) (that is, those technologies that underpin the creation and sharing of knowledge). Digital competence includes not only a sound understanding of primary applications but also how these may impact on individuals in their personal, social and working lives. The recommendation goes further, including the capacity for collaborative networking, information sharing and searching and retrieving critical data; it also adds the capacity for reflective and responsible attitudes to information engagement. There is another key competency that is also noted: "the ability to pursue and persist in learning, to organise ones own learning ... both individually and in groups" –that is, learning to learn.

At the same time as there is increasing pressure to incorporate e-learning as both a part of and platform for lifelong learning skills, many institutional strategic plans are still grappling with the difficulties of establishing a technological infrastructure for e-learning, including the diminishing discoverability and retrieval of data and materials (i.e. how to manage the ever increasing amounts of data generated electronically – registration, assignments, reports, research etc), and the need for increased maintenance across disparate systems (Gaible, 2004), and the long-term financial commitments involved. The fact that an investment in e-learning and technology is now part of the fundamental running costs of

any institution, rather than a nominal project over a finite period, has had huge implications on local support structures.

The Irish Information Society Commission (ISC, 2005) identifies several areas crucial to a successful engagement with the range of information communication technologies (ICT). Chief among these is the need to be innovative in the way we employ ICT. Innovativeness will provide the necessary bridge to make universal access to and usage of ICT a reality, underpinning a complete social uptake and integration of technology into everyday family, working, community and learning life. In higher education, such innovations are taking place in relation to managed learning environments, which are being carefully deconstructed and refocused on user-orientated systems (such as PLEs and Web 2.0 tools, discussed above), which allow greater creativity and adaptation on the part of the end user.

Higher education's end users are its learners (or even clients), and they may well dictate the future offerings of higher education because they are able to make informed choices about where they study and how they choose to do so, whether online, synchronously or asynchronously, or in a face to face method with suplementary technologies (e.g. video, discussion or presentation tools). Oblinger and Oblinger (2005) refer to a particular pedagogical concept that has appeared in conjunction with this change, that of "learning to be" (Bisoux, 2007). This concept is based on an apprenticeship model in which, for example, learners are taught how to *be* midwives, rather than simply learning the necessary discipline-specific criteria. In this way it is possible for the individual to move beyond the classroom and theory and begin to apply the newly acquired knowledge in an experiential manner, all be it in a simulated or case based environment. With a combination of online and traditional teaching supports, it is possible to see how such a flexible approach would wrap essential content delivery with reflective practices and practical implementations. Applying a pedagogic model such as this, will enable the teacher / facilitator to provide the necessary scaffold whereby the learner gains access to the appropriate content via a blend of traditional teaching and online interventions (e.g. focused information seminars or 'troublesome knowledge' encounters followed by access to online case studies and simulations). The learner is able, throughout the process, to collect reflections, commentaries, queries and additional information in their chosen format (e.g. a blog, group wiki, tagset etc) all of which can be readily accessed when the need arises or when confronted with new situations (such as a new patient scenario, case study or even an online assessment). In this way each learner creates a personal learning portfolio.

As we begin to embed e-learning into our curriculum either sureppitiously or by design we need to ensure that it is integrated in an appropriate manner. Biggs' (1999a) concept of constructive alignment offers a means by which we might ground our practice so that learners are not only central to our approach but implicitly involved in the dynamic of a process-driven curriculum. This reinforces the way in which we might consider the use of ICT within the day-to-day practice of curriculum design. This is not to say that we become over reliant on infrastructural implementations, such as institutional managed learning environments (MLEs) or portals, to guide our development, but that we acknowledge the role that the individual learner brings to the process, with their experience and knowledge of current technological paradigms. Utilising this information, we may open the way in which we address our curriculum design and begin to apply (technological) solutions in a manner that befits the needs of the programme, the academic and the learner.

The role of academics will change as e-learning is increasingly incorporated into and transforms traditional learning environments. Anderson *et al* (2001) provide a clear set of criteria for defining and assessing teaching engagement and presence within an online environment. They see academics as having to negotiate three clear roles when engaging in an online discourse or modular development: design and administration, facilitating discourse, and direct instruction. Add to this the variable needs of learners and their preferred styles (for example, global or millennial learners (Mestre, 2007)) and the size and intricacy of the task at hand becomes apparent. Unfortunately, as yet there seem to be few rewards for the lone academic undertaking such a task (Collis and Wende, 2002). Skilled personnel will be required to assist academics in making the technological and pedagogical shifts associated with the incorporation of e-learning and the move to a more student-oriented and personalised programme.

Indeed, if the changes outlined above are to be effective, they need to be undertaken as a re-imagining and fresh implementation of learning outcomes, rather than the slow, costly and piecemeal approach that has characterised the use of enhanced learning (Collis and Wende, 2002).

Research study

The aim of the research exercise was to gather evidence of the presence of technology (Web 2.0 in particular) and how it is integrated into current academic practice and to see whether there was any notable generational divisions.

Data Gathering 1

An online survey was developed to:
1. identify the current and intended future use of technologies by higher education staff in their teaching practices
2. explore any generational distinctions in the implementation of technologies.

Survey Monkey (http://www.surveymonkey.com/) was chosen to deliver the questionnaire. This free online software allows for rapid dissemination and response collation. An online resource that outlines popular current technologies was developed as a reference guide for use in tandem with the survey (see http://www.ucd.ie/teaching/projects/Technologies.html).

The survey was sent out to several local and international cohorts, including the Educational Developers Irish Network (EDIN), the Association of Learning Technologists (ALT), and the Elearning Europa Community.

Results

Twenty-nine questionnaires (n29) were fully completed. Figure 2 highlights the varied countries, roles and decades of birth of those who responded. Respondents were of different generations (1940s–1980s), with the majority (38 percent) born in the 1950s. Just over half (52 percent) of the surveys were completed by higher education staff from Ireland and the UK, whereas others were completed by international higher education staff from, for example, Australia, the US and Singapore. Roles were varied among the respondents with the majority (72%) having an academic post, although many also stated that they had other roles and duties within their institutions.

Figure 2: Online Survey Responses: Country, Role, Decade of Birth

ROLE	TOTALS
Academic	21
Researcher	9
Administrator	4
IT/Media Services	5
Support Personnel	5
Librarian	4
Student	3
	n = 29

■ 1940s ■ 1950s ■ 1960s ■ 1970s ■ 1980s
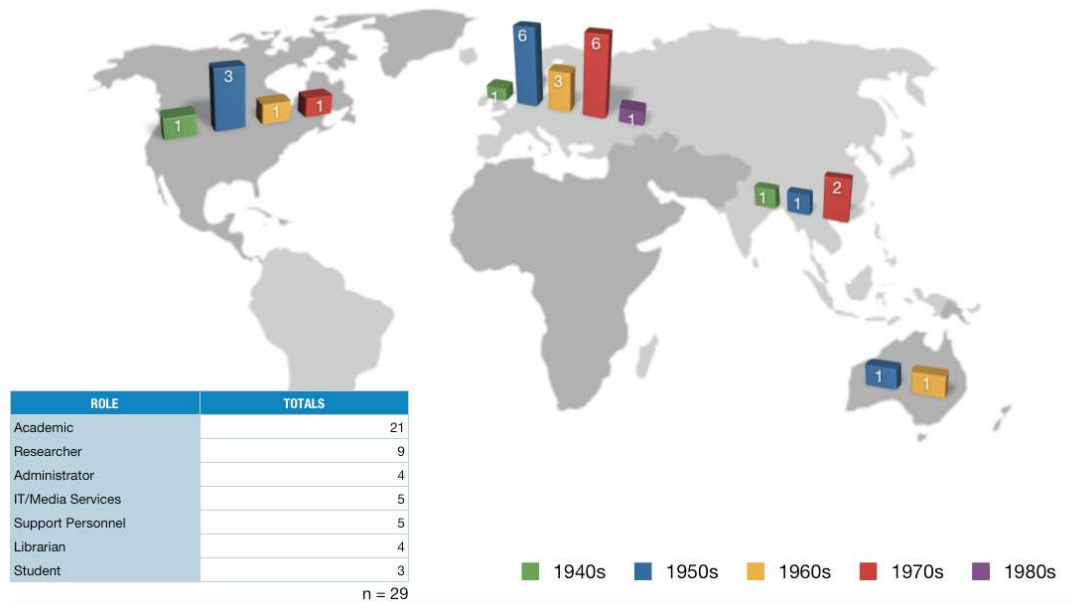
Current and future use of technologies
To identify technologies in current use, the survey asked respondents to list their five most frequently used technologies. Responses were varied and ranged across hardware and software, which we have categorised as assisting either teaching or research and communication activities. Table 1 outlines some of the technologies listed. A third of identified technologies may be considered Web 2.0 in origin, in reference to a latter point (re: future usage) it is interesting to note that where some individuals are currently using these tools on a day-to-day basis, others are only just begining towards integrating them in their daily practice.

Table 1: Technologies in Daily Use

Teaching	Research/Communication
VLEs	Google applications*
E-Assessment Tools	Email
Virtual classrooms	Internet
Multimedia Software	Ejournals
Smartboard	MS Office
Podcasts*	USB Key
Blogs*	PDA
Data projector	Skype*
Delicious*	Mobile Phone
Wikis*	Facebook*
Camtasia	Windows Messenger

*Those marked with an asterisk may be considered Web 2.0 Technologies

Respondents gave various reasons for using these technologies, including the desire to enhance student learning experiences and the view that technology was an essential

component that facilitated the completion of work in an easy, convenient manner. There was no distinctive difference between generations in the use of these technologies.

Respondents were asked what technologies they would like to use in the future and what they perceived as the benefits of doing so. Many of the responses were very similar to those technologies mentioned by other individuals in response to the previous question on current technologies.

Similarly, the perceived benefits of applying these technologies generally focused on "enriching student learning" by creating "self-directed", "collaborative", "asynchronous", "student-centred" and "interesting" learning activities in current teaching practices. Other reasons included that technology could improve efficiency in course delivery by aiding different student learning styles and helping those with different needs. Finally, respondents said that future technologies would support them in their own research and aid their own teaching practices.

Training and awareness
The majority of participants (72 percent) indicated that they did not undergo any training to use current technologies but stated that they were self-taught, or learned through trial and error. For technologies such as VLEs and specialised software (for example, MS Office, SPSS), however, 48 percent of participants indicated that they did receive formal training, which was generally provided by their institutions.

Awareness of new technologies was primarily generated by the Internet (26 percent) and current literature (23 percent). Discussions with colleagues (17 percent) also raised respondents' awareness of technologies. See Figure 3 below.

Figure 3: Sources of Awareness of New Technologies
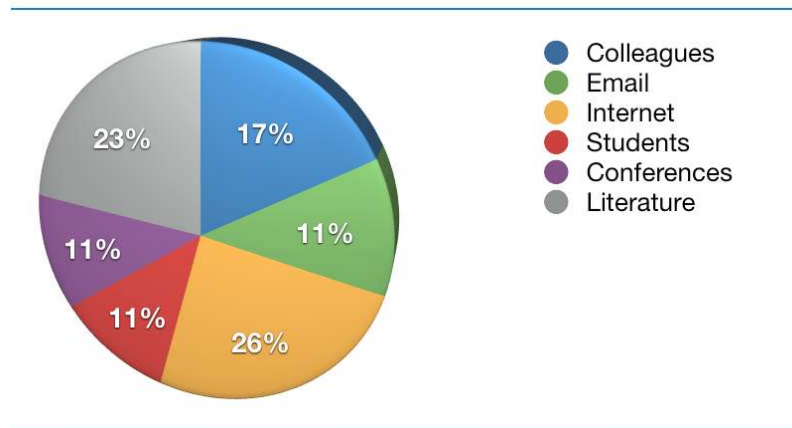
Data Gathering 2

Invitation to play
To provide some triangulation of the data gathered, an emic qualitative methodology was employed using Participatory Action Research (PAR). The emic approach is particularly useful when confronted with a situation where researchers are embedded in the research area and

there is a need to step back, review and assess different potential angles of enquiry. A method of doing this is the concept of the grand Tour enquiry (Spradley et al., 2004). This enables the researchers to pose the broadest possible questions / queries to the research cohort and allows them to extrapolate why and how they categorise their thoughts (and answers).

A pilot study was undertaken to assess the methods, means and tools that individuals use in the area of online course design and implementation. Participants were invited to play a game designed to elicit a response to the dilemmas and issues faced when developing an online course or event. As a result of the game play, they were able to map the process they would undertake to complete the design and implementation of online materials to support their chosen course. In addition, individuals were prompted to engage fully and share their experiences both positive and challenging.

The pilot game was undertaken by two participants, one from academic faculty, the other based in an IT support role. Their game map centred around providing a means of support for an online discussion forum and dissemination of information and material to the wider cohort (involved in the programme module). A key factor in the perceived success of the forum would be its accessibility by a dual cohort of professionals and students. Three potential solutions were proposed by the IT person and examined fully across a wide range of needs and possible supports. A mutually acceptable solution was reached, but potential issues were noted, along with their possible impacts for the roll out of the service.

The final score
The game process allowed the participants to explore in depth a series of solutions and issues that arose from their differing points of view. The academic member of staff had a clear design in mind, but was unable to decipher the multiple options available to her. The IT individual suggested potential solutions and worked with the academic to rule out certain elements that would not be effective or viable. The need for an open access forum led the participants to consider a VLE that was independent of the institution, and also the possibility of customising the solution. As a by-product, the participants learned about each other's work and its benefits. For example, the IT staff member learned that the academic community wants to involve people in continuing professional development and integrate their needs into curricula; the academic learned that IT services provide a wealth of information about current and future developments both locally and internationally.

Discussion
A recent EDUCAUSE Center for Applied Research (ECAR) report (Sreebny, 2007) noted a distinct lack of actual implementation of social software, such as wikis, at an institutional level (this is mirrored in the findings from the survey where only a third of technologies sited where Web 2.0.) There may be several reasons for this – for example, a lack of rapid deployment and also "strategy fatigue" (although this may be a double-edged argument, with institutions on the one hand not wishing to deploy "new" technologies at the same time as the technologies are perceived as being in a constant state of flux and development). Also when learners arrive in an institution they may be already accessing and familiar with other (and external) social applications, so there is little need for a local version.

Several key points arise from the two data gathering exercises. Of note is the way in which the respondents to the survey acquire new knowledge about technology, in particular the

lack of open access and dissemination via their own institutional services and their preferences for referring to colleagues and the literature. From the PAR activity, we noted that it was only through direct dialogue with an academic member of staff that the IT individual provided an array of potential options and information about future initiatives.

There was no evidence of a generational distinction in the current and future identified use of technology. This may be explained partly by the way the survey was disseminated – that is, online. This may have inadvertently deterred some people from participating. We intend to follow up with further PAR initiatives and focus groups.

Two interesting issues were noted in the responses to the question about future use of technologies. First, the rationale for use of future technologies was focused on benefits to learners rather than to academics; second, the technologies identified were more often than not already noted by other participants in their current use. Does the latter suggest a hierarchy of technically minded academic users, or does it suggest that each person uses many of the current technology options in differing situations? And does the need to address the learners requirements suggest an awareness of the socially orientated make-up of many Web 2.0 tools?

Is it the case that the use of Web 2.0 tools rather than the more "common" technologies (for example, MSOffice, Blackboard and so on) suggests that some academics are flouting the perceived norm (that is, institutional policy), and are these academics confronting the technical and pedagogical implementation of mainstream teaching i.e. the behemoth of institutional VLE integration (where large systems are in situ, but used to a small degree of their full potential)? Or are they seeking new challenges in the way they teach by engaging in innovative technologies alongside institutional supports and services?

Conclusions

Some questions arise about the cultural impact of Web 2.0. Is it enabling the unhindered introduction of technology in everyday practices (communication, knowledge construction sharing etc.), and are these practices being employed in higher education by the academic cohort? With the prevalence of new technologies and the rapidity of change in them, is it wise to engage? Alexander (2006) argues that the "lowered barrier" of entry to use of these tools will have a marked cultural impact on the way we undertake our education. Not only will it be easier for all to access and learn how to use the tools, but perhaps the ability to set up a tagset on a particular topic of enquiry, for example, may override the need required to meet and discuss face to face.

From the results of our survey, we note that individuals are engaged in experimentation with or without local support. How can we best integrate and maintain the innovative teaching practices of these individuals, as well as a broader range of their colleagues? The PAR study suggests that educational technologists have a crucial role to play in bringing the new, the traditional and the institutional infrastructures together. Are these the individuals with whom to collaborate and indeed elaborate the instructional design of teaching for future practice?

Biggs (1999b) refers to learning as a way of interacting with the world; as we learn, our exposure to and understanding of phenomena change, enabling us to see the world differently. It is within this process that "The acquisition of information in itself does not bring about such a change, but the way in which we structure that information and think

with it does" (Biggs,1999b, p. 60). It does not therefore matter that the (physical) tools with which we learn may change, but the one important thing remains the same – our ability to aggregate, digest, converse and promulgate new ideas from the world of information that we encounter everyday.

References

Alexander, B. (2006) "Web 2.0: A new wave of innovation for teaching and learning?" *EDUCAUSE Review*, vol. 41, no. 2, pp. 32–44 [online]. Available from: http://connect.educause.edu/Library/EDUCAUSE+Review/Web20ANewWaveofInnovation/40615 [accessed 2 July 2008].

Anderson, T., Rourke, L., and Garrison, D.R. (2001) "Assessing teacher presence in a computer conferencing context", *Journal of Asynchronous Learning Networks*, vol. 5, no. 2, pp. 1–17.

Beaty, L, Allan, C and Read, M. (2005) HEFCE strategy for e-learning (accessed 20.07.08 http://www.hefce.ac.uk/pubs/hefce/2005/05_12/)

Biggs, J. (1999a) *Teaching for Quality Learning at University*. Buckingham: SRHE & Open University Press.

Biggs, J. (1999b) "What the student does: teaching for enhanced learning", *Higher Education Research and Development*, vol. 18, no. 1, pp. 57–75.

Bisoux, T. (2007) "The evolution of elearning", *BizEd, January/February* pp 22-29. Available from: http://www.aacsb.edu/publications/Archives/janfeb07-toc.asp [accessed 20.08.08].

Britain, S. and Liber, O. (2004) *A Framework for Pedagogical Evaluation of Virtual Learning Environments*, rev. edn. Manchester: JISC Technologies Application (JTAP) Programme. Available from: http://www.jisc.ac.uk/whatwedo/programmes/elearning_pedagogy/elp_outcomes.aspx [accessed 20.08.08].

Collis, B. and Moonen, J. (2001) Flexible Learning in a Digital World: Experiences and Expectations. London: Kogan Page.

Collis, B. and van der Wende, M. (eds) (2002) Models of Technology and Change in Higher Education: An International Comparative Survey on the Current and Future Use of ICT in Higher Education [online]. Enschede: Centre for Higher Education Policy Studies, University of Twente. Available from: http://www.utwente.nl/cheps/documenten/ictrapport.pdf [accessed 2 July 2008].

Cremonini, L. (2006), Image:Web 2.0 Map.svg [online]. Wikipedia. Available from: http://en.wikipedia.org/wiki/Image:Web_2.0_Map.svg [28 June 2008].

Doise, W. and Mugny, G. (1984). The Social Development of the Intellect. Oxford: Pergamon Press.

European Comission (2006) "Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - i2010 - Annual Information Society Report 2007 {SEC(2007) 395} {Volumes 1, 2, 3}". Available from: http://ec.europa.eu/information_society/eeurope/i2010/index_en.htm [accessed 20.07.08].

Gaible, E. (2004). "The educational object economy: alternatives in authoring an aggregation of educational software", Interactive Learning Environments, vol. 12, nos 1–2, pp. 7–25.

Greenwood Henke, K (2007) "Learning in 21st Century: A National Report of Online Learning" Available from: http://www.tomorrow.org/speakup/learning21Report.html [accessed 20.07.08].

Hanna, D.E. (2003). "Building a leadership vision: eleven strategic challenges for higher education", EDUCAUSE Review, vol. 38, no. 4, pp. 25–34 [online]. Available from: http://net.educause.edu/ir/library/pdf/ERM0341.pdf [accessed 2 July 2008].

IMS (2003) *IMS Learning Design Best Practice and Implementation Guide* [online]. Lake Mary FL: IMS Global Learning Consortium. Available from:

http://www.imsglobal.org/learningdesign/ldv1p0/imsld_bestv1p0.html [accessed 2 July 2008].

ISC (Information Society Commission) (2005). *Learning to Innovate: Reperceiving the Information Society* [online]. Dublin: Department of the Taoiseach. Available from: http://www.isc.ie/downloads/34843_InfoSoc.pdf [accessed 2 July 2008].

Laurillard, D. (2002) *Rethinking University Teaching: A Framework for the Effective Use of Educational Technology*, 2nd edn. London: Routledge-Falmer.

Mestre, L. (2007) "Accommodating diverse learning styles in an online environment", *Information Literacy and Instruction*, vol. 46, no. 2, pp. 27–32.

O'Reilly, T. (2005) *What Is Web 2.0: Design Patterns and Business Models for the Next Generation of Software* [online]. Sebastopol CA: O'Reilly Media. http://www.oreillynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html [accessed 2 July 2008].

Oblinger, D. and Oblinger, J. (eds) (2005) *Educating the Net Generation* [online]. Boulder CO: EDUCAUSE. Available from http://www.educause.edu/books/educatingthenetgen/5989 [accessed 2 July 2008].

Palloff, R.M. and Pratt, K. (1999) *Building Learning Communities in Cyberspace: Effective Strategies for the Online Classroom*. San Francisco: Jossey-Bass.

Prensky, M. (2001) "Digital natives, digital immigrants", *On the Horizon*, vol. 9, no. 5, pp. 1–2.

Salaway, G. and Borreson, J. (2007) *The ECAR Study of Undergraduate Students and Information Technology* [online]. Boulder CO: EDUCAUSE. Available from: http://www.educause.edu/ers0706/13903 [accessed 28 June 2008].

Salmon, G. (2000) *e-Moderating: The Key to Teaching and Learning Online*. London: Kogan.

Sreebny, O. (2007) *Digital Rendezvous*. Boulder CO: EDUCAUSE. Available from: http://connect.educause.edu/Library/ECAR/DigitalRendezvousSocialSo/40158 [accessed 2 July 2008].

PROMOTING INTEGRATIVE LEARNING IN FIRST-YEAR SCIENCE

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Introduction

At University College Cork (UCC), prospective students apply to enter one of several broad science streams: Computer Science; Biological and Chemical Sciences; Environmental and Earth System Sciences; Genetics; Chemical Sciences; Mathematical Sciences; or Physics and Astrophysics. In Environmental and Earth Systems Sciences, the first-year programme is presented as a set of eight discrete science modules delivered by six different departments. Although we hope that first-year science students will gain a solid and broad foundation across the sciences, coordinators report that students have difficulty transferring their knowledge and skills from one module to another. Indeed, assessment practices in the modules lead students to believe that the courses are standalone and separate. In addition, students are encouraged to spend some time at another university.

In this potentially fragmented experience of modularisation and mobility, it is up to the students to make the connections between modules if they can, and to make sense of the information and concepts with which they are bombarded. Of course, some do better at this than others. This chapter considers what can be done to help all students gain a more integrated experience of first-year science, by framing its concerns in relation to the emergence of integrative learning as a theoretical issue and a classroom practice. The chapter explores the challenges and benefits of integrative learning through a case study of first-year science at UCC.

What is Integrative Learning?

In 1998, the Association of American Colleges and Universities (AAC&U) issued a *Statement on Liberal Learning*, urging higher education institutions to help students connect up the various aspects of their learning. Boyer's (1990) influential analysis of the nature of scholarship is given much credit for this initiative. Boyer categorised the different facets of scholarship into the scholarship of discovery, application, integration and teaching. His interpretation of the scholarship of integration urges us to consider and research the connections within and between disciplines. Some of the early literature stemming from Boyer's work discusses the challenges of connecting learning across the disciplines and introduces the term "integrative learning" (Graff, 1991; American Association of Colleges, 1991).

Undoubtedly, integrative learning took place before Boyer's work, but much good practice went unreported. Teachers in the disciplines did not have a common teaching and learning language. Subsequently, the AAC&U (2002, p. 21) called on universities to change their practices to help students develop their capacities to be "integrative thinkers who can see connections in seemingly disparate information, and draw on a wide range of knowledge to make decisions", emphasising that the goal of educators is to help prepare "students who can adapt the skills learned in one situation to problems encountered in another". This call caused some teachers to examine what they were doing already, and to make small modifications to improve integrative learning. Studies began to emerge, in unpublished reports, portfolios and websites, as well as published reports (Association of American Colleges and Universities, 2002; Colby *et al*, 2003).

In 2003, with liberal arts colleges in mind, the Carnegie Foundation for the Advancement of Teaching (CFAT), together with the AAC&U, undertook a national project, *Integrative Learning: Opportunities to Connect* (Association of American Colleges and Universities, 2004–07). It focused attention on practice, as well as on institutional commitment to integrative learning. Capturing this campus activity, Huber and Hutchings (2004) published *Integrative Learning: Mapping the Terrain*, a useful and motivational review of the situation at that time. Appended to this was a "Statement on Integrative Learning", which highlights a broad concern about the "fragmented landscape" of the undergraduate experience. It notes that integrative learning, which could address this concern:

> *comes in many varieties: connecting skills and knowledge from multiple sources and experiences; applying theory to practice in various settings; utilising diverse and even contradictory points of view; and, understanding issues and positions contextually (Huber and Hutchings, 2004, p. 13).*

In this vision, integrative learning includes integrating on-campus learning with experiences in the "real world", aligning different approaches and different models, and integrating learning over time.

The work of the CFAT, AAC&U and others has opened up and continues to develop a language for discussion of integrative learning. Questions about what integrative learning might look like and how we can encourage it continue to be asked. A starting point for addressing these questions is consideration of the characteristics of students who are integrative learners.

Characteristics of Integrative Learners

Building the capacity for integrative learning requires a commitment and intentionality on behalf of learners (Huber and Hutchings, 2004). This capacity includes, for example, the ability to ask meaningful questions about complex issues and problems in order to create an integrative framework and a more holistic understanding (Klein, 2005). Intentional learners:

- have a sense of purpose that keeps them on track with their learning
- are self-aware and understand something of their own learning processes
- are self-directed learners with explicit learning goals
- will fit fragmentary information into a "learning framework"
- can ask probing questions to help achieve their learning goals
- can monitor and reflect on their own efforts
- can make choices that promote learning
- know when to ask for help.

All students can benefit from strengthening these sorts of characteristics.

How Teachers Can Encourage Intentional, Integrative Learning

Huber and Hutchings (2004) suggest that we can scaffold intentional learning with intentional teaching. The characteristics of intentional teaching for integrative learning can be distilled from the case studies reported from the Integrative Learning Project (Association of American Colleges and Universities, 2004–07). Teachers who have these characteristics:

- are integrative thinkers themselves
- understand something of how students learn
- make integrative learning an explicit goal, objective or learning outcome

- are comfortable with a range of teaching strategies from which they can draw
- design opportunities for students to connect up their learning
- make purposes explicit to students
- encourage work-based learning
- use assessment methods that encourage integrative thinking and learning
- are willing to take risks with their teaching and, where appropriate, stand back and "gift the learning to the learner" (Malone, 2002)
- construct and systematically investigate questions related to student learning and disseminate practice, thereby practising scholarship.

Members of the Carnegie Academy for the Scholarship of Teaching and Learning (CASTL) team at the CFAT have synthesised the findings of the Integrative Learning Project in public reports (Gale 2006; Huber, 2006; Hutchings, 2006; Miller, 2006). The findings are divided into four strands that capture the depth and breadth of integrative learning, and indicate how students' integrative learning can be increased:

- curriculum design
- pedagogy
- assessment
- faculty development.

Curriculum design

Huber (2006, p. 2) believes that design at the programme level is important but warns that "getting everyone to think beyond the level of the course is a challenge". She urges teachers and curriculum designers to "build links into the regular curriculum, and create opportunities for *all* students to integrate their learning at multiple points *throughout* their college careers". She advocates starting early, because building capacities to integrate learning takes time.

Pedagogy

Given a supportive curriculum, certain pedagogies and teaching strategies are known to provide rich opportunities for integrative learning. These include problem-based learning, seminars, learning communities and e-portfolios. Intentional teaching can be based on the use of one or more of these pedagogies to design a course, or a whole programme for integrative learning (Gale, 2006; Hutchings, 2006).

Assessment

Thoughtful assessment opportunities can promote and demonstrate integrative learning within courses and within programmes. Miller (2006) points out that practice necessarily varies from campus to campus, so that good-quality teaching and assessment are aligned. He believes that a complex outcome, such as integrative learning, can be defined operationally by what students do when engaged in the outcome.

Faculty development

These good practices do not just happen. Teachers in higher education need assistance and guidance, as do students, to engage in integrative learning. For students to engage in integrative learning, their teachers must model it. This is not something that comes naturally to all. Indeed, Hutchings (2006, p. 1) says:

there are few mechanisms for knowing how well students connect ideas across courses (be it within the discipline or across fields, between curriculum and co-curriculum, or between academic work and engagement with social and community issues), making it difficult to get integrative learning clearly on the agenda or seen as something that needs further attention.

In response to these issues, Hutchings (2006) advocates staff development that engages teachers as integrative learners. If staff themselves experience collaborative learning and problem-based learning groups, they will begin to develop a toolkit for integrative teaching, thus promoting students' integrative learning. Additionally, Miller (2006) advocates making high-quality examples of students' integrative work public, so that staff can be kept in touch with what is expected, and build their understanding of how it can be developed. Hutchings draws a persuasive picture of "developed" staff helping students to map out connections between cross-cutting literacies.

Although Boyer stated that the scholarship of integration is explicitly about connection-making, the scholars at CASTL have concluded that all four of Boyer's scholarships advocate and encourage integrative learning. They agree with Leskes (2004) that universities, once informed, will see integrative learning as one of the hallmarks of a good undergraduate education.

Case study: First-year Science at UCC

Irish universities are not liberal arts colleges, but the message from the Integrative Learning Project is nevertheless pertinent to them. Recent moves towards modularisation in our universities mean that fragmentation is becoming a common feature of programmes, even of those specialising in one particular discipline. In these circumstances, helping students to connect their learning is a worthwhile endeavour.

Recently, I have been involved in the redesign of a geology residential field course. Geology is the central science from which all other sciences emanate – at least, this is what I tell my students on their first day at UCC. Together, we map out what the study of geology involves, and where geology meets, overlaps and connects with other science disciplines. In the past, students were left to make further connections themselves. The newly redesigned field course incorporates assessment and learning activities that help first-year students develop capacities to connect and integrate their learning – capacities that should stay with them and develop during the rest of their studies and beyond. The rest of this paper presents this field course as a case study in fostering integrative learning in first-year science.

The case study describes:

- the role of the field course in geoscience learning in general, with commentary on its potential for facilitating integrative learning, and with particular reference to the first year field course.
- the importance of small-group work in facilitating integrative learning in this field course
- how various field and campus activities encouraged students to make disciplinary and interdisciplinary connections in this course
- the importance of reflection on learning – and learning to reflect – in the development of integrative learning in this field course
- how this field course's assessment was designed to support integrative learning.

I carried out some action research to study aspect of teaching and learning on this course, employing a wide variety of data-collection methods to capture the complexity of student learning in the field setting. I looked at integrative learning from several angles, and produced both qualitative and quantitative data, allowing a degree of triangulation. From this, rich insights and complex interactions emerged. A detailed description of activities and how they contributed to students' integrative learning is given in Higgs (2007); some examples are highlighted below.

The Role of the Field Course in Geoscience Learning

For the geoscientist, the field course is an important component of what Schulman (2005) calls the "signature pedagogy". It is where students can go out into the natural environment and potentially practice the work of professional geoscientists. Each year, however, colleagues debate whether residential field courses for first-year students should continue. Student feedback suggests field courses are popular, but when asked to apply the learning they have gained from field courses – in the form of synthesis, for example the construction of a two-dimensional cross section – students often cannot demonstrate understanding. This calls into question the usefulness of the field experience. In the US, for example, Colby *et al* (2003) report cases where potentially rich experiences have appeared to result in shallow learning. Hawley (1996) suggests possible reasons for this, noting that in geoscience fieldwork, the dominant style is the 'Cook's tour' which is characterised by a didactic teaching approach with passive student interaction. In other words, the field course can be like a lecture-in-the-field, with students writing down whatever the lecturer says, rather than recording their own observations and interpretations. Students who can write quickly and neatly are rewarded when the notebooks are collected for assessment. There may be little opportunity for students on the course to practice being scientists. Thomas (1998) warns that educators must be clear about the purpose of field courses, and concludes that there are still important questions to be answered, such as those concerning student learning processes in field-based learning. He suggests that if we can answer these questions, we can make the most of "being there".

After all, the field setting, or natural laboratory, has the potential to show us that everything is connected, and can offer authentic opportunities for students to see and feel that this is the case, helping them to develop the capacities needed for integrative thinking and learning. Why is this important? Klein (2005, p10) explains that in the current changing and unexpected contexts, "the answers they [students] seek and the problems they will need to solve as workers, parents and citizens are 'not in the book'". As science professionals, geoscience students must be prepared for an unpredictable career path, possibly in mining, environmental science, geophysics, forensic science, engineering geology, science teaching and local government, among others. As citizens, all graduates will need lifelong learning skills, and an understanding of the interconnections within and between the sciences.

The Field Course

The field course described below is a three-day residential course that forms part of the first-year module, (An Introduction to the Geological History of Ireland), at UCC. Student numbers are usually around eighty.

In the redesign of the first-year field course, my intention was that my students and I would integrate our geology learning with learning in those disciplines that overlap at the margins, such as chemistry, physics, biology and maths. We would look at a geological problem through the eyes of a physicist, for example. We would be interested in new understandings

and the value added by exploring these overlaps. At the same time, connections within the discipline would be strengthened. I included explicit reference to integrative learning in the course objectives and learning outcomes,

Small-group work

Small group work has been shown to be a pedagogy that has good potential for fostering integrative learning (Huber and Hutchings, 2004). Therefore, in 2005, we introduced a new emphasis on small-group work. Beginning on campus, students worked in small groups on projects related to the field area: this enabled them to develop both prior knowledge of the area, as well as questions they wanted to answer. Each small group included a new "angle" or area of science in their project. The groups presented interim progress reports to their peers, which opened up dialogue among the student groups.

Recognising and using valid feedback is an important characteristic of integrative learners, and the small-group work embedded opportunities for giving and receiving it. For example, discussion of the process of researching took place, and review of each others' work helped students to move their learning forward. Student feedback was shared and discussed in the wider group, giving all students the opportunity to hear each others' views. This feedback was timely, allowing students to act on it and improve their work as it developed during the course.

The emphasis on small-group work was echoed in the field, with a shift from lectures-in-the-field to a series of seminars-in-the-field. It is important to bear in mind that geologists are always enthusiastic in the field, and love to "tell the story". In other words, field work can become very teacher-centred. In contrast, the seminar is "a pedagogy wherein everyone has a voice and each person's ideas are valued, a venue for exploring varied perspectives, an opportunity to experiment, a way to flesh out skeletal ideas through the challenge of friendly critics" (Gale, 2005).

The group collaborative work on campus began to build learning communities that made the subsequent residential field trip more effective. The students had begun to get to know each other and develop ways of working together and supporting each other. During the field trip, students carried out activities in their small groups along the north coast of County Antrim, with leaders to guide their work.

Disciplinary and Interdisciplinary Connection-making

In their small-group projects, students were encouraged to make disciplinary and interdisciplinary connections, as well as connections between new and existing knowledge. For example, a project on landslips moved from geological considerations to the role of vegetation in promoting or controlling landslips, and from the effect on local communities to the engineering solutions adopted on the north coast of Ireland. In another project, students researching groundwater went beyond the geological description of aquifers and considered the potential hazard of pollution, which necessarily connected them to local agriculture and industry in Northern Ireland. The work clearly showed that first-year students are able to carry out collaborative research projects, and indeed that having a purpose for the work (visiting the area of study) and a responsibility (bringing the information to the rest of the large group) motivated them to engage.

Activities during the field trip also provided opportunities for authentic work-based learning, which became important in facilitating integrative learning for the students. For example, a

field workbook was used to encourage students to record their own observations. Questions in the workbook were used to elicit group discussion and initial interpretation where appropriate. Each evening, synthesis activities were carried out back at base. These mirrored the work of professional field geologists, where all information is recorded in a geological column, and/or a geological cross-section. These activities helped students piece together the clues they had found during the day. In the subsequent focus group, all agreed that the evening sessions "were needed to pull things together".

In addition, opportunities for connection-making with other science disciplines were increased and made more explicit during the field trip. I used the metaphor of "wormholes" (pathways to parallel universes) to describe field activities that required students to connect with "parallel" course modules in the first-year science programme. One wormhole activity simply involved taking a soil pH test when a new bedrock type was encountered. The values obtained were later compared, and showed marked differences in soil pH. This allowed students to connect to prior work they had done in biology and chemistry, and potentially to go on to discuss weathering, the carbon cycle and global warming, thus linking ancient rocks to present-day environmental issues.

Later examples of wormhole activities provided more discussion and connection-making opportunities. One example involved a shallow geophysical survey related to a land development proposal, in which students had to connect geology and geomorphology to concepts they had encountered in physics. This led to discussion of applied geology, the needs of the local community and potential employment opportunities – always of interest to students!

At first, there was some resistance to this idea of thinking outside the discipline; indeed, only a small number of students felt "safe" working in this way. In the examples noted above, however, we made the purpose of the activity clear to students, which was a key factor in student engagement. And, as the field course progressed, students (and leaders) became more comfortable with the idea that all things are connected. Students realised that they did have prior knowledge that could be brought to bear in discussions. Subsequent wormhole activities linked:

- campus laboratory classes with field work in a revision exercise at Cushendun
- the history of science with contemporary understandings of field evidence at Portrush (a key site for scientific controversy in the 18th century)
- rock properties, landslips and local community at Garron Point
- geological time and contemporary juxtaposition of strata at Murlough Bay.

These worm-hole activities showed that *everything* is connected by some pathway, making student learning unpredictable. I likened them to the neuronal networks and connections of the brain, giving each of us our own mind (Greenfield, 2004). This can assist in preparing students for the uncertainty they will meet as science professionals and citizens.

Reflection on Learning and Learning to Reflect
Integrative learners must "learn how to learn", so opportunities for this were woven into the disciplinary programme. For example, sections of the field workbook contained reflective questions, and operated like a reflective journal, providing a safe place for students to integrate metacognition and disciplinary understandings. (The term "reflective journal" was

not used explicitly at this stage, however, because it would have met with resistance from leaders, and sounded like "a chore" or "not scientific" to students.)

An important opportunity for reflection on learning occurred on the last evening of the field trip, after a challenging daytime activity with messy evidence supporting two separate hypotheses. On this occasion, student groups were asked to defend their interpretation of the evidence they had collected. Most of the small groups had come to a consensus about their evidence, but many modified their interpretations in the light of evidence and argument from other groups. Questions in the workbook asked students to reflect on this process: "What did you learn from others in your group?" and "What did you learn from other groups?" Some students revealed more than others about their learning. They became aware that their peers were making meaning of what they were seeing. Indeed, among other things, the students learned that being a scientist involves accepting that there is not always an easily identifiable, right answer. Students reported that this integration of challenging fieldwork and subsequent discussion was their favourite activity.

How well were students integrating their learning? The answer to this question was revealed partly by students' responses when they were asked, "What questions remain?" We identified six levels of question complexity in their responses, which concurred with Green's (2004) model of student questioning, and which could be mapped to six levels of attitude to learning. For example some students simply asked 'What is the right answer?' while others essentially composed research questions that demonstrated their understanding of the problem.   An interesting point to make is that all of the students could have formulated the more complex questions. They all had appropriate prior knowledge. It requires an attitude to push learning further, and to demonstrate commitment to resolving conflicts in knowledge.

We also asked students to record their "ah-hah" moments during the course: "What became clear?" "How did it happen?" Students described these moments in their own words in their workbooks. This was tremendously revealing, and gave leaders keen insights into where students find difficulty connecting their learning. Difficulty occurs particularly on campus in lectures and practical classes. For example, students found it difficult to visualise portions of the Earth in three space dimensions and integrate changes in the time dimension. The description of "ah-hah" moments gained in complexity towards the end of the course, indicating that students were beginning to articulate their learning better.

Before the field experience, we used a questionnaire to ask students about how they learn best. Their responses indicated their belief that they learned best from teacher-centred activities, from being lectured to, listening, being instructed, memorising and obtaining "good notes". Only 11 students noted that social learning, such as asking questions and discussing with friends, is important, even though they were all deeply involved in such activities.

The results of a second questionnaire completed by students on the last evening of the field course clearly showed that team-working and other social learning skills had moved up the scale. This was confirmed by written reflections in the students' final reports, which showed that they were beginning to understand the importance of collaboration and social learning. Typical comments in the reports included:

- The group met up on five occasions to discuss and organise the project ... these sessions allowed members to work as a team and suggest useful sources of reference for other members to pursue.
- During the trip we extracted bits of information that related further to our project, amalgamating with what we had already researched.

In addition to the new importance attached to social learning in the second questionnaire, two explicitly integrative skills – drawing on existing knowledge and questioning – were also given a relatively high importance, even though only two students (out of a total of 80) had included "questioning" in their responses on the initial questionnaire. The second questionnaire also indicated the students felt they were lacking in the skills of prioritising, decision-making, making judgements and challenging assumptions, all important skills for integrative learning.

The student engagement showed us that traditionally we have not sufficiently challenged students. This came across in a subsequent focus group meeting, when the most physically and mentally demanding activities stood out as the most enjoyable. Many of the "ah-hah" moments involved "messy" data, that only came together with a struggle. But this made for robust connections. This idea connects with my interest in students' breakthrough thinking (Perkins, 2000). Does a breakthrough occur when a wormhole activity succeeds? Is this an "ah-hah" moment?

Assessment

When I designed the course's summative and formative assessment, I asked myself: "How will I know whether students' integrative learning has increased?" I ruled out a campus-based terminal examination as an inauthentic form of summative assessment for a field-based course. Instead, I designed a group assignment, which awarded students:

1. 10 percent for satisfactory participation
2. 20 percent for the final group report
3. 60 percent for the field workbook students used to record field evidence, discussion and reflections on learning
4. 10 percent for "attitudes to learning".

This fourth component is a new concept in fieldwork assessment. Field course leaders have long recognised that students whose participation is particularly beneficial to the group of learners do not always get the best marks, and in extreme cases can even fail because a notebook is incomplete. This component attempted to reward and promote integrative learning by assessing students' attitudes to learning in the field. To do this, I modified a table by Gronland (1999), related to Bloom's affective domain, which included assessment criteria that progressed from "attentive; asks for clarification; volunteers; demonstrates commitment to improving" through several categories up to "concerned with bringing the different pieces of learning together; resolving conflicts in knowledge; sees the need for planning; proposes; revises; solves; internalises". Although this was a rather blunt instrument for measuring complex qualities, it began to redress the emphasis in student assessment.

These forms of summative assessment were new to first-year students, and the students therefore needed careful guidance and monitoring. An important part of this guidance was provided by formative assessment, which took the form of continuing observation of and

dialogue with students and formed part of every activity. It included several types of feedback, including what Hounsell (1997) calls "feed-forward" – that is, feedback intended to help the flow of learning.

Insights into Integrative Learning

After observing all of the activities, questions, potential worm-holes and so on, I have come to some conclusions about integrative learning:

- There are connections that students make themselves.
- There are connections that leaders or peers provoke.
- There are connections that leaders or peers point out.

The evidence shows that students do not belong to one of these categories alone, but move between them depending on the complexity of the connection, and their attitude, motivation or inclination. Some students, however, will be in the first category more often than others.

These observations map well onto Ritchhart's (2002) internal–external model of dispositions, which describes:

- dispositional action, where patterns of behaviour are self-initiated, intentional and consciously controlled
- assisted action where patterns of behaviour rely on a combination of internal and external triggers
- coerced action, where patterns of behaviour occur only in the presence of external supports and motivation.

Ritchhart allows movement back and forth between the three. His findings concur with those described above in that it is not always that students lack the ability to make connections, but rather that they lack the inclination. Ritchhart calls this the ability–action gap. Thus we must ask how we can encourage students to close the ability–action gap. Ritchhart (2002, p. 51) calls for students to have "the opportunity for practice and reinforcement within meaningful contexts". This is exactly what the field activities and evening discussions aim to do. With this understanding, we can perhaps do this better.

To help close the gap the student must be aware of the opportunities, and know what action is appropriate. For appropriate actions in the field to be reinforced, and consistency of approach internalised, leaders also need to be aware of their own behaviours. Leaders who try to promote a disposition may not succeed if they do not themselves have that disposition.

What Did the Teachers Learn?

Turning the spotlight from students to ourselves as educators, what habits of mind and attributes do we need if we are to help students build capacity to be integrative learners? It seems that if we do not make connections beyond our own areas of interest, we are unlikely to encourage students to do it.

On this field course, we, as group leaders, had to stand back and let the students take over some of the activities. Not all leaders were comfortable with this. On the other hand, the residential arrangement meant that leaders did have multiple conversations about what was

working and what insights we were getting. Ideas were generated about how things might work better. Back on campus, where these conversations are rare, the first-year programme is our "group project". We must work as an effective group. What we learn, and how we respond, affects student learning. Talking to colleagues about student learning could create "a culture of connection-making". Indeed, the student focus group asked that staff talk to each other and link up the learning. They listed specific topics where they recognised connection-making would be valuable. We should follow the lead of the students who wrote in their own group project that "we meet together to exchange tips and see how it is all pulling together".

More recently, some of the key findings published in the 2006 reports of the Integrative Learning Project were mapped against elements of this first-year course (Higgs, 2007). This process identified integrative opportunities that can be consolidated and strengthened in the future. It also highlighted "gaps" in the geoscience programme. This has led to future recommendations for improved student learning. These recommendations include:

- Integrative learning should be an explicit programme learning outcome.
- Links between courses within the programme should be strengthened, and we should provide multiple opportunities for students to connect their learning over the four years.
- Staff need support in the design of curriculum, assessment and teaching strategies that have been shown to promote integrative learning.

Conclusions

The field course described here was designed to maximise opportunities for integrative learning, and to help students develop their capacities to become integrative thinkers and learners. The design of the course was experimental, and a broad range of opportunities (some unintentional) resulted. At the start of the field component, students had a narrow perception of how they learned, with a high dependence on teacher-centred activities. By the end of the field course, students demonstrated a clearer picture of their learning skills; in particular, they recognised a range of skills that contributed to integrative learning. To help all students to recognise the broad range of ways in which they are learning is a worthy over-arching outcome for a geoscience programme.

The improvements made to this field course were designed to enhance student learning and engagement. The emphasis on small-group work had an immediate impact on student engagement when it was introduced. We also found that students engaged in the learning when they saw a purpose. Indeed, the students' favourite activities were the most challenging ones. Moreover, the redesigned residential course gave students time to make connections, and to reflect on their learning. In addition, it is clear that increased opportunities for integrative learning can motivate students to persist in a programme, or even increase their learning efforts. Between 2004 and 2006, the number of students choosing to progress to study Geology increased by 500 percent. Of course, other factors could have played a part in this increase, but when staff were asked informally for their opinions about the increased demand for the BSc in Geology, they all believed the field course was a major factor. On the basis of the evidence collected, we concluded that first-year geoscience residential field courses can be highly effective in the promotion of science students' integrative learning.

It would have been difficult to negotiate this level of transformation in a staff meeting on campus. We now have a disciplinary community of staff who are actively involved in the

first-year field course, can discuss pedagogy (without necessarily knowing the word), and have greater insight into the students who choose to study geology in their second year.

References

American Association of Colleges (1991) *The Challenge of Connecting Learning*. Washington DC: Association of American Colleges.

Association of American Colleges and Universities (1998) *Statement on Liberal Learning* [online]. Washington DC: AAC&U. Available from: http://www.aacu.org/About/statements/liberal_learning.cfm [accessed 13 August 2008].

Association of American Colleges and Universities (2002) *Greater Expectations: A New Vision for Learning as a Nation Goes to College*. Washington DC: AAC&U. Available online from: http://greaterexpectations.org/ [accessed 13 August 2008].

Association of American Colleges and Universities (2004–07) *Integrative Learning: Opportunities to Connect* [online]. Washington DC: AAC&U. Available from: http://www.aacu.org/integrative_learning/index.cfm [accessed 13 August 2008].

Boyer, E. (1990) *Scholarship Reconsidered: Priorities of the Professoriate*. San Francisco: Jossey-Bass.

Colby, A., Ehrlich, T., Beaumont, E. and Stephens, J. (2003) *Educating Citizens: Preparing America's undergraduates for Lives of Moral and Civic Responsibility*. San Francisco: Josssey-Bass.

Gale, R. (2005) "The magic of learning from each other", in *Carnegie Perspectives* [online]. Stanford CA: Carnegie Foundation for the Advancement of Teaching. Available from: http://www.carnegiefoundation.org/perspectives/sub.asp?key=245&subkey=574 [accessed 14 August 2008].

Gale, R. (2006) *Fostering Integrative Learning through Pedagogy* [online]. Stanford CA: Carnegie Foundation for the Advancement of Teaching. Available from: http://www.carnegiefoundation.org/files/elibrary/integrativelearning/uploads/pedagogy_copy.pdf [accessed 14 August 2008].

Graff, G. (1991) "Colleges are depriving students of a connected view of scholarship", *The Chronicle of Higher Education*, 13 February. A48.

Green, L. (2004) Towards a model of student questioning. *Final report* June 2004, CASTL

Greenfield, S. (2000) *The Private Life of the Brain*. New York Penguin.

Greenfield, S. (2004) "The child", in *Reconsidering Science Learning*, eds E. Scanlon, P. Murphy, J. Thomas and E. Whitelegg. London: Routledge Falmer.

Gronland, N.E. (1999) *How to Write and Use Instructional Objectives*. (6th ed.). Bellevue, WA: Merril Press.

Hawley, D. (1996) "Changing approaches to teaching Earth-science fieldwork", in *Geoscience Education and Training: In Schools, Universities, for Industry and Public Awareness*, eds D.A.V. Stow and G.H.J. McCall. Rotterdam: A.A. Balkema. pp. 243–253.

Hawley, D. (1998) "'Being there': a short review of field-based teaching and learning", in *Examples of Good Practice in Earth Science Learning and Teaching: Fieldwork* [UK Geosciences Fieldwork Symposium: Proceedings]. Plymouth: Higher Education Academy Subject Centre for Geography, Earth and Environmental Sciences (GEES). pp. 9–16. Available online from: http://www.gees.ac.uk/essd/field.htm#HawleyD [accessed 14 August 2008].

Higgs, B. (2007) "Promoting integrative learning in a first year Earth Science field course", MA thesis, University College Cork.

Hounsell, D. (1997) "Essay writing and the quality of feedback", in *Student Learning: Research in Education and Cognitive Psychology*, eds J.T.E. Richardson, M.W. Eysenck and D. Warren-Piper. Milton Keynes: SRHE/Open University Press.

Huber, M.T. (2006) *Fostering Integrative Learning through the Curriculum* [online]. Stanford CA: Carnegie Foundation for the Advancement of Teaching. Available from:

http://www.carnegiefoundation.org/files/elibrary/integrativelearning/uploads/curricul um_copy.pdf [accessed 13 August 2008].

Huber, M.T. and Hutchings, P. (2004) *Integrative Learning: Mapping the Terrain*. Stanford CA: Association of American Colleges & Universities and the Carnegie Foundation for the Advancement of Teaching. Available online from: http://www.carnegiefoundation.org/dynamic/publications/mapping-terrain.pdf [accessed 13 August 2008].

Huber, M.T. and Hutchings, P. (2005) *The Advancement of Learning: Building the Teaching Commons*. San Francisco: Jossey-Bass.

Hutchings, P. (2000) "Approaching the scholarship of teaching and learning", in *Opening Lines: Approaches to the Scholarship of Teaching and Learning*, ed. P. Hutchings. Stanford CA: Carnegie Foundation for the Advancement of Teaching. pp. 1–10.

Hutchings, P. (2006) *Fostering Integrative Learning through Faculty Development* [online]. Stanford CA: Carnegie Foundation for the Advancement of Teaching. Available from: http://www.carnegiefoundation.org/files/elibrary/integrativelearning/uploads/faculty development_copy.pdf [accessed 13 August 2008].

Klein, J.T. (2005) "Integrative learning and interdisciplinary studies", *Peer Review*, vol. 7, no. 4, pp. 8–10.

Leskes, A. (2004) "Foreword", in *Integrative Learning: Mapping the Terrain*, by M.T. Huber and P. Hutchings. Stanford CA: Association of American Colleges & Universities and the Carnegie Foundation for the Advancement of Teaching. pp. iv–v. Available online from: http://www.carnegiefoundation.org/dynamic/publications/mapping-terrain.pdf [accessed 13 August 2008].

Malone, L. (2002) Peer critical Learning. *Final report* CASTL. Carnegie Foundation for the Advancement of Teaching website. Available online from http://www.carnegiefoundation.org/ [accessed 28 October 2008].

Miller, R. (2006) *Fostering Integrative Learning through Assessment* [online]. Stanford CA: Carnegie Foundation for the Advancement of Teaching. Available from: http://www.carnegiefoundation.org/files/elibrary/integrativelearning/uploads/assess ment_copy1.pdf [accessed 13 August 2008].

Mino, J. (2006) Link-Aloud. *Final report* CASTL. Carnegie Foundation for the Advancement of Teaching

Perkins, D. (2000) *The Eureka Effect: The Art and Logic of Breakthrough Thinking*. New York. Norton.

Ritchhart, R. (2002) *Intellectual Character*. San Francisco: Jossey-Bass.

Shulman, L.S. (2005) "Signature pedagogies in the professions", *Daedalus*, vol. 134, no. 3, pp. 52–59.

Stone Wiske, M. (ed.) (1998) *Teaching for Understanding: Linking Research with Practice*. San Francisco: Jossey-Bass.

THE JOURNEY TO HIGH LEVEL PERFORMANCE: USING KNOWLEDGE ON THE NOVICE-EXPERT TRAJECTORY TO ENHANCE HIGHER EDUCATION TEACHING

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Introduction

In 1968, Benjamin Bloom presented a formidable challenge to educators by arguing that most students can excel if they learn under appropriate conditions. He gave teachers guidance on how such "mastery learning" could be generated: by combining cognitive entry behaviours, affective conditions and enhancing the quality of teaching, 90 percent of students could achieve what only 10 percent of students typically achieved without these interventions and orientations (Amirault and Branson, 2006). Embedded in Bloom's recommendations were ideas about how experts could interact meaningfully and positively with novices in any field. Since then, the "novice–expert" trajectory has implicitly shaped the ideas of educational theorists across a wide range of disciplines. And yet, the daily practice of teachers in higher education is rarely informed by knowledge and insights associated with the study of this trajectory.

Formalised interactions between novices and experts are an institutionalised part of the daily work of higher education institutions. Notwithstanding the exceptions and misgivings that teachers and learners may experience about the use of both terms, the differences between expert and novice approaches to ideas, knowledge, learning and skill development offer useful insights for those involved in higher education. This difference forms the central focus of this chapter.

This chapter reviews some of the key literature on the differences between novice and expert behaviour in learning and professional development settings. It argues that it is in these different patterns and orientations that we can find some intriguing as well as practical ideas for the development of better learning environments in higher educational settings. It proposes that the characteristics of and differences between novices and experts provide us with among the most important clues available to help support the "journey to competence". And it suggests that understanding the novice–expert gap gives us vital knowledge that can guide the design of learning environments that ensure that the largest numbers of students achieve the greatest levels of mastery over their disciplines (while also recognising the length of time that it really takes to develop high-level competence in any field). The chapter concludes by recommending a range of strategies that could help to bridge the gap between novice and expert, a gap in which many transformative experiences can occur, and yet a gap that often feels insurmountable from the points of view of the new learners and the experienced teachers who encounter it.

How expertise is acquired

The literature in the fields of expertise and expert performance suggests that there are several key features associated with the process of expertise acquisition. These features include the:

- "10-year rule"
- need for deliberate practice and immersion
- movement through different phases of competence

- development of automaticity.

Each of these features is outlined briefly below.

The "10-year Rule"

Although aptitude and natural ability clearly play a role in the development of high levels of expertise, research suggests that individual talent may be less important than other factors. These factors include time, dedication, support and interpersonal orientation (for example, Ackerman and Beier, 2006; Krampe and Baltes, 2003). No matter how brilliant or talented an individual might be, it seems that there is no way to short circuit the journey from novice to expert. Equally, even when people do not possess particularly high levels of initial aptitude, the literature suggests that if they "stick with the programme", the likelihood of becoming expert is quite high. Many commentators agree that the average amount of time necessary for someone to experience the gradual transformation from novice to expert is about 10 years. Although some have found that certain experts can accelerate their learning, the 10-year rule is a recurrent and persistent finding across a range of domains (for example, Simon and Chase, 1973; Ericsson *et al*, 1993; and Sosniak, 2006).

Deliberate Practice and Immersion

It is not simply the passage of time that facilitates the development of expertise. The "decade to expertise" needs to be characterised by high levels of motivation, persistence, opportunity and aptitude, and must include dedicated periods of assiduous practice, self-assessment and evaluation by others, complete immersion and formative feedback to support the process. Ericsson (1996, 2006) has emphasised that as well as time and practice, the acquisition of expertise requires a special level of engagement, which he refers to as "deliberate practice" and which is characterised by "full mental engagement, the focus on overcoming current performance boundaries" (Ericsson, 2006, p. 238).

Movement through Different Stages of Competence

The literature on expertise also suggests that there are different, roughly identifiable phases on the journey to expertise and high-level proficiency. Phases that have been identified in the theory tend to approximate those described by Dreyfus and Dreyfus (1986) as novice, advanced beginner, competent, proficient, and expert or "master" performer (see Table 1). Many curriculum development models recognise that there are different levels of engagement in learning and try to reflect those levels in the planning and scheduling of different topics, skills and challenges. Even when explicating the different levels of engagement and competence that might be invoked at different stages of a programme, however, dialogue about curriculum development does not always pay specific attention to the important differences between novice and expert (such as those outlined in Table 1). Furthermore, despite what is known about these differences, there remains inadequate guidance within different fields about how both teachers and students need to adjust their teaching and learning practices and processes as the gaps between teachers and learners start to close.

**Table 1: Levels of Proficiency
(based on Dreyfus and Dreyfus, 1986)**

Novice	- Rigidly adheres to taught rules or plans - Has little situational perception - Has very limited discretionary judgement - Has no experience base on which to integrate an assessment of challenges or problems
Advanced beginner	- Needs guidelines for action based on some aspects of the situation - Has limited situational perception - Uses some prior experience to build a base ready for competence
Competent	- Copes with crowdedness - Sees action at least partially in terms of long-term goals - Is capable of conscious deliberate planning - Has standardised and routine procedures
Proficient	- Sees problems holistically - Is efficient at identifying most important aspects and issues
Expert	- Does not rely on rules or guidelines - Has intuitive, deep, embedded understanding of situations, and understanding that can quickly be acted on

The Development of Automaticity

The well-documented development of automatic routines among experts (for example, Posner and Snyder, 1979; Procter and Vu, 2006) may be a key reason for the difficulty experts have in articulating their knowledge to novice audiences (Matthews *et al*, 2000). The development of automaticity seems to be a phenomenon that prevails across all domains. The gradual transformation of knowledge from explicit and conscious to tacit and unconscious means that experts do not always know just how much expertise they possess. They may underestimate the amount of basic information that novices require to begin developing proficiency in the field. In addition, even where experts do realise the importance of basic, introductory information, they often encounter significant difficulties in articulating this information in ways that can be understood and used by novices.

Differences between novice and expert orientations

The four features of expertise acquisition outlined above have implications for the differences between expert and novices, which in turn affect the ways in which experts and novices interact in educational settings. Indeed, experts may be highly proficient in their own fields, but their very proficiency may in fact limit their effectiveness in educational settings.

For example, experts underestimate the length of time in which a novice will complete a task. Also, as their expertise grows, their ability to understand the challenges faced by novices diminishes (for example, Hinds, 1999). It seems clear, then, that as experts gain expertise, their ability to explain things to novices becomes somehow impaired. Experts often find it difficult to explain or expand on certain aspects of their knowledge and skills,

because these knowledge and skills sets are no longer explicit, having become embedded in their practice. Of course, novices may suffer from the same difficulty, but the impact and implications are less significant, because they are not called upon as frequently to explain and lead understanding about the things that they know.

Chi (2006) identifies other deficiencies of experts, including:

- domain limitations – experts are increasingly unable to instruct outside their specific area of expertise
- overconfidence – experts have been found to overestimate their own capabilities in a range of settings
- tendencies to "gloss over" – evidence suggests that experts fail to attend to details on the surface of a case, problem or issue
- over-reliance on contextual clues – the accuracy of experts' responses to problems are significantly augmented by, or even dependent on, key contextual information or background data, so that the absence of this data may significantly undermine expert performance
- inflexibility – experts may be quite rigid in the application of their skills, and become easily thrown if the rules of engagement change or move outside the specific domain over which they have mastery.

Essentially, whereas experts think in intuitive, unconscious and automatic ways (Eraut, 1994), novices use analytical, conscious and deliberate thinking processes (Moore, O'Maidin and McElligott, 2002). Whereas experts are faster and more fluent, novices are slower and more stilted in the ways they interact with topics, and in the ways they think, talk and carry out tasks in the target domain (Matthews *et al*, 2000). Experts perceive data and organise it into large meaningful patterns (Glaser, 1998), whereas novices perceive data in disjointed and fragmented ways, often having difficulty in seeing how data might fit together or be linked. But on the other hand, experts struggle to explain the basic rules of their expertise (Matthews *et al*, 2000), whereas novices can access the steps in recently acquired skills much more easily and clearly.

The positive pedagogical potential of novice-expert interactions

Despite the differences between them, it is worth remembering that novices can do many of the things that experts can. In the right conditions, they can quickly demonstrate the foundations of competence on which experts have built more complex routines, links and ideas. Furthermore, experts can be understood very easily and naturally "as long as the principles of natural conversation apply" (Hogan, Rabinowitz and Craven, 2003).

Therefore, the principles of natural conversation need to be cultivated more assiduously in higher education environments. Natural conversation requires an arena in which all voices have an opportunity to be listened and responded to. It requires an orientation in which experts need to understand the foundations of misunderstanding and the opportunities for insight among the novice groups with whom they interact. The fundamentals of effective dialogue probably require teaching and learning in small groups. Despite the ways in which technology enhances and facilitates communication, it still has not found (nor we argue, will it ever find) a way to overcome the fundamental need for the establishment of genuine human relationships that only small group learning can provide.

Expert teaching is a mix between known, planned routines and flexible responsiveness to the specifics of any one classroom situation. Torff (2003) has shown that as teachers become more experienced and accomplished, and as long as the teaching context allows and encourages this, teachers can move from a focus on content and curriculum, to a focus on their learners' acquisition of higher-order thinking skills.

Recommendations and implications for the practice of teaching in Higher Education

Even this brief review of some of the key literature on the characteristics of expertise suggests a range of issues that should be of concern to educators in relation both to policy and practice.

Many of the findings suggest that experts become faster and less obvious (sometimes even appearing lazier and more complacent) in their approach to problems within their domain of expertise. Their expertise gives rise to cognitive and practical shortcuts that generally serve them well. But experts also have zones of comfort that may become a sort of methodological fixedness, an inflexibility that may restrict their ability to generate alternative solutions, to consider details or to recognise new patterns and ideas that may not fit into their learned ways of doing things. What does this mean for experts teaching novices?

To begin with, novices can teach experts about aspects of a problem: by asking "naive" questions, they can help experts to see problems and to combine ideas in new ways. This means that experts should listen to novices' question not only in order to answer them, but also as a means of critiquing their own expert approaches and orientations towards problems. A related issue here is that novices may be more thorough in their analysis of problems and concepts, and in this thoroughness may find interesting possibilities and ideas that can escape experts.

The observed tendency in experts to underestimate time requirements for novices to complete certain key tasks carries quite serious implications for educational settings at all levels. After all, curricula are generally designed and scheduled by experts, which means that an under-allocation of time required for practice may be persistently built into the design, development and delivery of educational programmes across a range of domains. Indeed it could be argued that the time allocated to many curricular activities is calculated on the basis of past practice alone. Therefore, evidence-based curriculum design should analyse and include the time needed for novices to develop progressive levels of expertise.

Experts may be inflexible when it comes to allowing novices to begin from different starting points and take different routes to the same learning outcome. As diversity increases in higher education environments, this challenge becomes intrinsically more problematic anyway, but may pose particular difficulties for highly competent experts whose problem-solving activities have become quite automatic, formulaic and rigid, despite their effectiveness and complexity. This suggests that teachers should be prepared to give their students permission to confront a problem from different perspectives while recognising that teacher routines and patterns may be among the most efficient ways of reaching solutions without necessarily being the most appropriate for their students at a particular point in time. Sometimes, more circuitous routes aid students' capacity to understand even if eventually they abandon some steps and approximate more closely the patterns that experts typically use.

Expertise is revered in academic settings, and signifiers of expertise are often the basis on which promotion and reward decisions are made. No wonder then that there may be a tendency for experts to protect their power. It is not unusual for students to report a feeling of being bamboozled as teachers work to maintain a mystery about their genius. The opposite type of orientation is needed to create healthy, functional learning environments – experts who are secure in their knowledge domains but humble enough to recognise the brilliance of others (that is, they can acknowledge both the giants on whose shoulders they stand as well as the budding genius of their students). Brilliance among students can be developed. Bamboozling students and not recognising or allowing for gaps in knowledge at best gives rise to mediocre learning environments and at worse to the kind of fear and shame that is associated with impoverished, Machiavellian learning experiences.

Having outlined some of the problematic issues that arise from the differences between novices and experts in educational environments, we turn now to a discussion of practical ideas for enhancing those environments by making the most of the novice–expert relationship.

Peer-supported Learning

The co-option of experienced students as peer supports for novice students is a proven strategy for bridging the gap between novices and experts in academic environments, because experienced students tend to be relatively close to novice students, yet they have also learned some of the important rules, routines and skills of academia. On a behavioural level, peers can mediate conversations that might otherwise be incomprehensible or difficult to penetrate for the new university student; they can provide candid information to teachers that can help to improve teaching performance.

Novice-led Conversations

Traditional academic learning environments are teacher led. Both teachers and students can turn this around in the interests of bridging the novice–expert divide. To begin with, it is important to coach teachers to take less of a lead at key points, to slow down and to prompt student-led conversations. In addition, it is similarly important to coach students to ask questions, to probe lecturer perspectives and to demonstrate the ways in which they are navigating (or not navigating) the material they are expected to learn. This can empower students to make the most of the conversations they have with experts in a particular field. Students can ask teachers to explain in several different ways: "Can you help me to understand this better by comparing it to something else?" "Can you go a bit slower because I find this part quite difficult" "Can you say that again?" "Can you try to rephrase what you have just said?" "Can I try to explain what I think you have said in my own words?"

Problem-based Learning ("Authentic Tasks")

Problem-based learning (PBL) is founded on the principle that real-world problems are multidisciplinary, ambiguous, poorly structured and challenging. Introducing PBL environments is an effective way of ensuring that novices engage in challenging but motivating learning settings, with the facilitation, advice and support of experts. The dynamics of learning are structured by the teacher but very quickly become led by the novice students themselves. PBL proponents argue that the PBL movement is one of the most important and potentially transformative approaches to teaching in higher educational contexts and that it is capable of creating more authentic tasks for learners. PBL is a demonstrated route to changing the routines and patterns of interactions between novices and experts.

Teacher Training in the Science of Learning

It is timely now to call for a more fully developed approach to the study of novices' learning patterns and to help experts to design learning environments with these observed patterns and routines in mind. It is time to train and develop our expert academics in the "science of learning", so that their teaching approaches and methods can occur with a clear understanding of novitiate frameworks, key stepping stones and "threshold concepts". Although much work has already been done to disseminate and develop an approach that encompasses a greater understanding of learning, it is important to co-opt teachers themselves in this investigation. This is one of the key ways that a link between teaching and research can be achieved, a goal that is often central to the strategic objectives of universities across the globe.

Integration of Novice–Expert Relationships to Established Diversity Frameworks

An understanding of the importance of engaging with learner diversity has become increasingly central to effective teaching and learning. For example, Carroll (1963) showed that learners are diverse in the time they need for learning (aptitude), the time they are willing to spend on learning (motivation and perseverance), and the time they have for learning (opportunity). All these factors interact to explain the differences in performance among learners. These are only some of the variations that require educators to build different bridges in the same learning contexts. Similarly, multiple intelligences (Gardner, 1993), learning styles (Kolb, 1984), cognitive styles (Hayes and Allinson, 1998), personality differences and other sources of diversity all play themselves out in the classroom and other learning settings, and have been recognised as important considerations. We argue that novice–expert differences should become a stronger and more considered part of the dialogue that focuses on diversity in higher educational settings.

Deconstruction of Implicit Knowledge

Ford and Addams Weber (1992) have suggested that a science of knowledge elicitation is necessary for novices to gain the benefits of experts' competence in a way that can be readily absorbed and used by them. Other researchers suggest that "protocol analysis" (for example, Ericsson, 2006), which offers an arguably clearer and more accessible alternative to other approaches (such as directed questioning and introspection), can show more easily what is happening inside the heads of experts, and make these protocols more accessible to novices.

Opportunities for Immersion

We know that novices can very quickly pick up and practise expert routines and that engagement is an extremely important factor in fostering expert-type orientations. The more immersed and engaged students are, the more likely it is that they will acquire the competencies of experts more quickly and effectively. Csikszentmihalyi (1999) shows that engaged activity for optimal performance requires challenge and skill; total immersion; the absence of both time-consciousness and self-consciousness; clear goals and feedback; and a feeling of being in control, at least to some extent, of the learning outcomes to which students have subscribed. All of these criteria should be considered when designing and activating positive learning environments in higher educational settings.

A Focus on Motivation and Willingness to Engage in Dedicated Practice

Given the 10-year rule discussed above, it seems reasonable that formal education would strive to achieve as much immersion as possible within a programme of study and development. The most robust way of ensuring immersion both within and outside formal

contact hours is to catalyse student motivation, curiosity, interest and stimulated engagement from the very start of the programme. This can be achieved through a good knowledge of students' points of reference, their realms of interest and the features of their own experiences that are likely to motivate their willing immersion within a field of expertise. Good teachers naturally invoke their students' curiosity and interest.

Respect for the Knowledge Base of Experts

None of this suggests that we do not need experts. Universities would indeed be impoverished without their active presence. It is not possible to build knowledge societies, scientific orientations or critical thinking routines without the persistent input of those practitioners who are already fully immersed and highly competent in their fields of expertise. But we must also nurture the capacity for those experts to take a critical look at how their expertise can impede as well as support effective learning. Indeed, in the novice–expert literature, it has been established that one of the most common characteristics of highly talented individuals is the experience of having "studied with a master teacher – a teacher who has considerable standing in the field and who has helped to prepare others who are known for their accomplishments" (Sosniak, 2006, p. 298). This kind of intense mentorship should be facilitated in higher educational settings.

Intensive Exposure of Novices to Experts in Egalitarian, Open, Honest Contexts

Bloom once noted that in the quest to find out the "characteristics of talent", "we were looking for exceptional kids, and what we found were exceptional conditions" (Carlson, 1985). This should be one of the most encouraging and yet one of the most challenging findings possible for educators, pedagogues and teachers across all fields. The message is that it is possible to create outstanding learning environments in which students of many backgrounds and inherent abilities can thrive, participate, and excel. These environments need resources, climates, cultures, commitment, time and effort. But these environments can and do exist. They rely on the existence of experts but also on the way in which learning environments connect these people to students and foster a multi-directional learning process with novices teaching experts at least as often as experts impart their wisdom to those less experienced and accomplished as themselves.

Opportunities for "Masterclass" Activities after Graduation

Given the "10-year rule" associated with the acquisition of high-level expertise, it would make sense for higher education institutions to offer support for and continuity of learning beyond the initial period of education. Similarly, it would seem that the total immersion of a four-year programme or the mixed immersion of part-time programmes could be enhanced by the regular availability of expert input for even longer periods of time.

Conclusions

This chapter has examined the differences between novices and experts and the implications for higher education environments. We have not suggested that there is a simple or even desirable way to accelerate the journey from one level of competence to the next. Indeed, false acceleration or inappropriate "hot-housing" of skills could have detrimental effects or create fragile levels of expertise that do not reflect the robust competence frameworks of the real expert. Rather, we are suggesting that educators can benefit from an assiduous examination of the key stages of the journey, as part of a firmer commitment to the science of learning across all disciplines. Part of this science involves incorporating a strong, evidence base into educational design and development activities, in this case evidence about the differences between novices and experts. This would enable teachers and

educational developers to better combine the perspectives and experiences of both experts and novices with the aim of creating more effective learning environments. If we can ensure that the expert voice is not lost on the novice learner, while the novice voice finds a way of being heard, we may move closer to Bloom's vision of all students excelling and mastering any subject.

References

Ackerman, P. L. and Beier, M. E. (2006) "Methods for studying the structure of expertise: psychometric approaches", ", in *The Cambridge Handbook of Expertise and Expert Performance*, eds K.A. Ericsson, N. Charness, P.J. Feltovich and R.R. Hoffman. Cambridge: Cambridge University Press. pp. 147–166.

Arimault, R.J. and Branson, R.K. (2006) "Educators and expertise: a brief history of theories and models", in *The Cambridge Handbook of Expertise and Expert Performance*, eds K.A. Ericsson, N. Charness, P.J. Feltovich and R.R. Hoffman. Cambridge: Cambridge University Press. pp. 69–86.

Barrett, T. (2005). Understanding problem-based Learning *in Handbook of Enquiry and Problem-based Learning*, Barrett, T., Mac Labhrainn, I and Fallon, H (eds) AISHE and CELT, NUI Galway. pp. 13–25.

Bloom, B. (1968) "Learning for mastery", *UCLA Evaluation Comment*, vol. 1, no. 2, pp. 1–8.

Carlson, J.G. (1985) "Recent assessments of the Myers-Briggs Type Indicator", *Journal of Personality Assessment*, vol. 49, pp. 356–365.

Carroll, J.B. (1963) "A model of school learning", *Teacher College Record*, vol. 64, pp. 723–733.

Chi, M.T. (2006) "Two approaches to the study of experts' characteristics", in *The Cambridge Handbook of Expertise and Expert Performance*, eds K.A. Ericsson, N. Charness, P.J. Feltovich and R.R. Hoffman. Cambridge: Cambridge University Press. pp. 21–30.

Csikszentmihalyi, M. (1999) "Implications of a systems perspective for the study of creativity", in *Handbook of Creativity*, ed. R. Sternberg. New York: Cambridge University Press. pp. 313–338.

Dreyfus, H.L. and Dreyfus, S.E. (1986) *Mind over Machine: The Power of Intuition and Expertise in the Era of the Computer*. New York: The Free Press.

Eraut, M. (1994) *Developing Professional Knowledge and Competence*. London: RoutledgeFalmer.

Ericsson, K.A. (1996) "The acquisition of expert performance: an introduction to some of the issues", in *The Road to Excellence: The Acquisition of Expert Performance in the Arts and Sciences, Sports, and Games*, ed. K.A. Ericsson. Mahwah NJ: Erlbaum. pp. 1–50.

Ericsson, K.A. (2006) "Protocol analysis and expert thought: concurrent verbalizations of thinking during experts' performance on representative task", in *The Cambridge Handbook of Expertise and Expert Performance*, eds K.A. Ericsson, N. Charness, P.J. Feltovich and R.R. Hoffman. Cambridge: Cambridge University Press. pp. 223–242.

Ericsson, K.A., Krampe, R.T. and Tesch-Römer, C. (1993) "The role of deliberate practice in the acquisition of expert performance", *Psychological Review*, vol. 100, no. 3, pp. 363–406.

Ford, K.M. and Adams-Webber, J.R. (1992), "Knowledge acquisition and constructivist epistemology", in *The Psychology of Expertise: Cognitive Research and Empirical AI*, ed. R.R. Hoffman. New York: Springer-Verlag. pp. 121–136.

Gardner, H. (1993) *Multiple Intelligences: The Theory in Practice*. New York: Basic Books.

Glaser, R. (1998) "Expert knowledge and processes of thinking", in *Learning and Knowledge*, eds R. McCormack and C. Paechter. London: The Open University Press. pp. 103–111.

Hayes, J. and Allinson, C.W. (1998) "Cognitive style and the theory and practice of individual and collective learning in organisations", *Human Relations*, vol. 51, no.7, pp. 847–871.

Hinds, P.J. (1999) "The curse of expertise: the effects of expertise and debiasing methods on predictions of novice performance", *Journal of Experimental Psychology: Applied*, vol. 5, no. 2, pp. 205–221.

Hogan, T., Rabinowitz, M. and Craven, J.A. (2003) "Representation in teaching: inferences from research of expert and novice teachers", *Educational Psychologist*, vol. 38, no. 4, pp. 235–247.

Krampe, R.T. and Baltes, P.B. (2003) "Intelligence as adaptive resource development and resource allocation: a new look through the lenses of SOC and expertise", in *The Psychology of Abilities, Competencies, and Expertise*, eds R.J. Sternberg and E.L. Grigorenko. New York: Cambridge University Press. pp. 31–69.

Kolb, D. (1984). *Experiential Learning: Experience as the Source of Learning and Development*. Englewood Cliffs, N.J.: Prentice Hall.

Matthews, G., Davies, G.R., Westerman, S.J. and Stammers, R.B. (2000) *Human Performance: Cognitive, Stress and Individual Differences*. East Sussex: Psychology Press.

Moore, S., O'Maidin, D. and McElligott, A. (2002) "Cognitive styles among computer systems students: preliminary findings", *Journal of Computing in Higher Education*, vol. 14, no. 2, pp. 46-67.

Posner, M. and Snyder, C. (1975) "Attention and cognitive control", in *Information Processing and Cognition: The Loyola Symposium*, ed. R.L. Solso. Hillside NJ: Erlbaum. pp. 55–85.

Proctor, R.W and Vu, K-P.L. (2006) "Laboratory studies of training, skill acquisition, and retention of performance", in *The Cambridge Handbook of Expertise and Expert Performance*, eds K.A. Ericsson, N. Charness, P.J. Feltovich and R.R. Hoffman. Cambridge: Cambridge University Press. pp. 265–286.

Simon, A.A. and Chase, W.G. (1973) "Skill in chess", *American Scientist*, vol. 61, pp. 394–403.

Sosniak, L. A. (2006) "Retrospective interviews in the study of expertise and expert performance", in *The Cambridge Handbook of Expertise and Expert Performance*, eds K.A. Ericsson, N. Charness, P.J. Feltovich and R.R. Hoffman. Cambridge: Cambridge University Press. pp. 287–301.

Torff, B. (2003) "Developmental changes in teachers' use of higher order thinking and content knowledge", *Journal of Educational Psychology*, vol. 95, no. 3, pp. 563–559.

INTEGRATING CONCEPTS OF INTEGRATIVE LEARNING

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Introduction

In contemporary higher education, there is significant potential for students to have a fragmentary learning experience. Integrative learning, which Huber and Hutchings (2004, p. 13) describe as "connecting skills and knowledge from multiple sources and experiences", may be one way to address this issue. Indeed, it may help students get the most out of their undergraduate experience and prepare for what lies ahead.

At University College Cork (UCC), an investigation of student engagement in a geoscience field course designed to foster integrative learning concluded that all students in the course benefited from intentional teaching for integrative learning (Higgs, 2006; 2007; and see also chapter 4 in this volume). But the study also revealed that not *all* students will go *all the way* to make meaningful connections, even when multiple opportunities are provided. These students may fall into Ritchhart's (2002) ability–action gap. To foster integrative learning more effectively, teachers may require a deeper understanding not only of the complex opportunities students need to connect, but also of how to help them overcome the gap between their abilities and their motivation to act.

Huber and Hutchings (2004; 2005) warn, however, that unless teachers become integrative thinkers, modelling integrative learning, we are unlikely to encourage our students to be integrative learners. The work of campuses involved in the Integrative Learning Project (Association of American Colleges and Universities, 2004–07) and analysis by senior scholars at the Carnegie Foundation for the Advancement of Teaching (Gale, 2006; Huber, 2006; Hutchings, 2006; Miller, 2006), confirm this. They suggest that integrating pedagogies and integrating modes of assessment may provide new ways to encourage integrative learning. In addition, we find that the concept of integrative learning overlaps with several neighbouring concepts, and that by investigating these overlaps, and integrating concepts, we may see innovative possibilities for fostering integrative learning.

This chapter considers how attempts to promote integrative learning can be informed by an exploration of these overlapping concepts. The chapter expands on the metaphor of "wormholes", (introduced in Chapter 4 this volume) which the authors have found particularly illuminating as a model of integrative learning and as a practical device for helping students to make connections between apparently disparate areas of knowledge. From this starting point, the chapter aims to align metaphors and conceptual models – such as "wormholes", troublesome knowledge, threshold concepts and border crossings – and find new knowledge at the intersections. In so doing, it hopes to extend our understandings of integrative learning and inform intentional teaching for integrative learning.

Exploring "Wormholes"

In science fiction, "wormholes" refer to pathways to parallel universes. In the redesign of a first-year geoscience field course at UCC, wormholes were used as a metaphor for activities to help students connect parallel packages of learning (Higgs, 2006; 2007; see also chapter 4 this volume).

Although mainly associated with science fiction, wormholes have attracted a considerable scholarly literature (for example, Morris and Thorne, 1988). The literature dates back to 1935, when Albert Einstein and Nathan Rosen realised that general relativity allows the existence of "bridges", originally called Einstein-Rosen bridges but later renamed wormholes by the physicist John Wheeler. These bridges act as shortcuts between distant regions of space-time (Figure 1). By journeying through a wormhole, a person could travel between two regions faster than light traversing a path in normal curved space-time. Apart from connecting separate universes, wormholes can vary in shape, can be difficult to get through without being destroyed and can have a constriction, bottleneck or throat that necessitates a struggle to get through. A known property of wormholes is that they are highly unstable and would probably collapse instantly if anyone attempted to pass through them. Calculations suggest that an advanced civilisation might be able to navigate wormholes by using something physicists call "exotic matter" to prevent them from closing. In more recent hypotheses, wormholes can create their own exotic matter, making them big enough and able to stay open long enough for people to get through. Once in place, it would be difficult to remove a wormhole. New work suggests that wormholes can have numerous strands or connecting fibres, and may be more complex than the diagrams in Figure 1 suggest.

Figure 1: Representations of Hypothetical Wormholes (BBC website)

WORMHOLE IN SPACE

Wormholes would act as shortcuts connecting distant regions of space-time. By going through a wormhole, it might be possible to travel between the two regions faster than a beam of light through normal space-time.
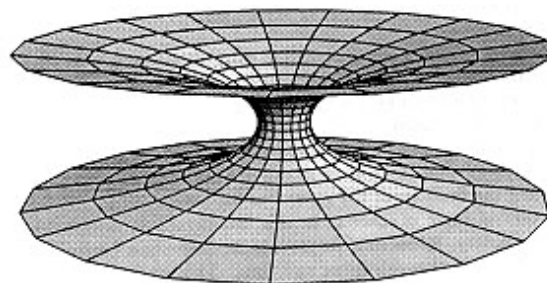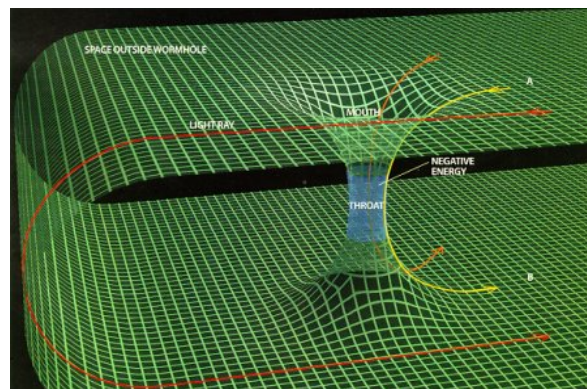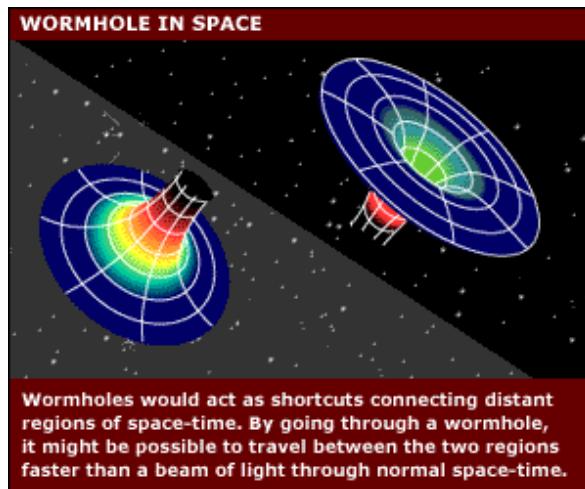
In metaphorical terms, normal curved space-time represents what students can do unaided; when guided by intentional teaching for integrative learning, students can connect areas of their learning just as wormholes connect different regions of space-time. The "wormhole", in this case, is a specially designed integrative learning activity. The wormhole metaphor overlaps in interesting ways with ideas such as troublesome knowledge and threshold concepts, and it can also be extended. For example, we use the notion of "exotic matter" below as a submetaphor for the assistance that students need from tutors and peers to help them through wormholes.

Integrative Learning: Neighbouring and overlapping concepts

Previous studies have indicated that there are *levels* of integrative learning, and that the degree to which students make connections is influenced by their attitudes to learning (see Chapter 4 this volume). The evidence also shows that students do not always turn their ability into action, and so do not integrate their learning effectively – that is, they do not navigate wormholes successfully. In an attempt to understand why this occurs, here we use the concept of integrative learning as a lens to investigate the neighbouring concepts of troublesome knowledge, threshold concepts and border crossings, all of which are currently being debated in the literature. What will this exploration tell us about integrative learning itself? In particular, can we gain insights into the blockages that stop students linking theory to practice, linking laboratory and field-based experience, linking academic and work-based learning, and linking naïve to deeper understandings?

Troublesome Knowledge and Threshold Concepts

Perkins (1999) suggests that there are some concepts that are difficult for students to grasp because those ideas are counter-intuitive, alien or complex. He refers to these concepts as "troublesome knowledge". He also proposes the concept of breakthrough thinking (Perkins, 2000), where learners struggle to make sense of messy data before a "light goes on". Building on this work, and using examples mainly from economics, maths and science, Meyer and Land (2003; 2005; 2006a; 2006b) find that certain concepts are held to be central to the mastery of a subject. They call these threshold concepts. The idea that there are threshold concepts in each discipline emerges from a national research project in the UK, 'Enhancing Teaching–Learning Environments in Undergraduate Courses' and is summarised by Cousins (2006).

Several of the characteristics of threshold concepts resonate with integrative learning:

- Grasping a threshold concept is transformative, causing a significant shift in the learner's perception of the subject and allowing further learning to proceed. For example, when learning about climate change, if an understanding of the natural variability of climate through time is grasped, this is transformative.
- A threshold concept is integrative. It exposes the hidden interrelatedness of phenomena, for example when a learner grasps the concept that surface landforms are related to the geological structures beneath our feet.
- A threshold concept is often irreversible. The concept causes such a repositioning of subjectivity on the part of the learner that, once understood, the learner is unlikely to forget it, for example when the learner internalises evidence that the Earth's outer layers are made up of a series of plates that are in constant motion.
- Within a discipline, a threshold concept is likely to have borders with thresholds in new conceptual areas, for example when a learner uses the laws of physics to remotely investigate the geological subsurface. Exploration at these borders encourages integrative learning.

Meyer and Land (2005; 2006a) refer to threshold concepts as "conceptual gateways" or "portals", leading to previously inaccessible ways of thinking about something. In this visualisation, threshold concepts can be likened to wormholes, through which learners must pass to deepen their understanding. Threshold concepts are likely to involve forms of troublesome knowledge (Perkins, 2006), just as wormholes require learners to struggle to get through the constriction or throat.

If wormhole activities are designed to focus on the connection across one of these conceptual gateways, a threshold concept can be grasped. This represents significant integrative learning. In the study carried out by Meyer and Land (2005;2006a), the act of grasping a threshold concept allowed students to attain a higher level of understanding *within the discipline*. The current analysis concludes that it is likely that *interdisciplinary* threshold concepts also exist, and once identified and negotiated, could help ensure that interdisciplinary studies are integrative and transformative. This assertion is also supported by the characteristic of threshold concepts being bounded by thresholds in other subject areas.

These ideas have implications for curriculum design and for pedagogy. According to Cousins (2006, p.4)

> in contrast to transmitting vast amounts of knowledge which students must absorb and reproduce, a focus on threshold concepts enables teachers to make refined decisions about what is fundamental to a grasp of the subject they are teaching. It is a "less is more" approach to curriculum design.

Building on Cousin's statement, we can say that a focus on threshold concepts would enable teachers to make refined decisions about what is fundamental to a grasp of the interconnectedness of disciplines and domains. If we aligned this approach with a learning outcomes approach, we would associate each learning outcome with a threshold concept – that is, what the student would master as a result of taking the course or programme. Our

objective would be to help learners build a robust framework of understanding. Students could then integrate "content" into their framework of understanding by self-directed study.

Meyer and Land (2006b) indicate that it may not be easy to pass through conceptual gateways. This is consistent with the idea of struggling to navigate a wormhole. They also suggest that learning may involve the occupation of liminal space during the process of mastery of a threshold concept. This is an unstable space, where learners oscillate between old and emergent understandings. When knowledge is troublesome, this learning experience can be uncomfortable and associated with feelings of anxiety. As with Vygotsky's (1978) Zone of Proximal Development (ZPD), what teachers do to assist learners in this space is crucial.

A learner who enters the liminal space is taking a step towards mastery of a concept "unlike the learner who remains in the pre-liminal state in which understandings are at best vague" (Cousins, 2006, p.4). This links with Ritchhart's (2002) concept of the ability–action gap. Cousins (2006) and Higgs (2006) agree with Ritchhart that difficult learning is both cognitive and affective, and so students' attitudes to learning are of key importance.

King (2006) reports on an attempt to uncover threshold concepts in the geosciences. When she asked participants at a conference in June 2006 about areas of difficulty encountered by their students, they highlighted geological time and visualisation in more than two dimensions. In May 2007, a two-day symposium-in-the-field on the teaching of field geology expanded on this work (Higgs, 2007). The 18 participants had, between them, 400 years of experience teaching geology. At one point, they were asked two subtly different questions about field-based learning:

1. What do students find difficult to learn?
2. What causes difficulty for students' learning?

The responses clustered into themes and are outlined in Box 1. They give an indication of where wormhole activities could be concentrated. Unless these difficulties are negotiated, students may not be able to secure robust understandings.

Box 1: Responses to Questions Asked of Geological Field Course Leaders

"What do students find difficult to learn?"

1. **Geological time**, particularly imagining the scene "at the time", when surroundings were different, and processes might have been occurring at a different rate from the present day.

- **Example**: The now famous tetrapod trackway on Valentia Island, Co. Kerry, never fails to excite interest and engage students. But because the location is directly adjacent to the sea, students believe the creature walked out of this sea onto dry land and left its tracks on a beach. Examination of the evidence shows that the animal lived in a freshwater environment, far from the sea, and left its tracks on a river flood plain. Students will, however, often revert to their original understanding after a short time-lapse. The image of the present-day setting is very powerful.

2. **Visualising in three dimensions**: Geologists often work with 2D information, but must interpret the "patterns" to construct the 3D reality. Many students find this difficult. If students are told that it is easy for some people and difficult for others, they put themselves into the second category, and accept this as an innate deficiency.

- **Discussion**: Gardner developed the theory of multiple intelligences, with spatial intelligence defined as the ability to represent the spatial world internally, both perceiving the visual as 3D and transforming it into 3D (Gardner, 2004; Viens and Kallenbach, 2004). Intentional teaching may find strategies to assist the development of spatial intelligence.

"What causes difficulty for students' learning?"

3. **Things that teachers do that make learning difficult**: As leaders on field trips, we point out things that cannot be seen with the naked eye. We are using information that is "common knowledge" to the experienced geologist, but is still at the level of theory for students.

- **Example**: A field tutor may say, "This rock contains no biotite and therefore formed under anhydrous conditions". This statement makes understanding difficult on two counts. First, the tutor is sure there is no biotite in the rock because he has seen a thin section of the rock under the microscope, on a previous occasion. A student looking at the rock and listening to the tutor may think that he or she alone is the only person unsure about the presence of biotite. Second, the rock contains black minerals that may be amphibole or pyroxene. These are difficult to tell apart in the field in a hand specimen. Amphibole is a hydrous mineral. Again the leader had prior knowledge, and knows that amphibole is rare in the rock. This practice is common on field courses, and leads the student to become dependent on the teacher, to lack confidence and to consider themselves "not very good in the field". So teachers can create troublesome knowledge.

- **Discussion**: It was suggested that we must build student confidence by encouraging a culture of questioning. A confident student might ask, "Is it possible to tell from this hand specimen whether biotite is present, or would we need to study a thin section of the rock?" This could be followed up with "What about amphibole? Isn't this a hydrous mineral? How can we tell amphibole and pyroxene apart in this hand specimen?" Students need to know that questioning is key to their learning.

4. **The student feels there should be a right answer**: Leaders may give lectures in the field, in which interpretations are presented as facts. This positions the leader as the only authority figure, and also means there is little opportunity for students to learn from each other. Moreover, students learn to accept and write down whatever the leader says. They do not build confidence in "doing field work", and do not grasp the concept of provisional interpretation and uncertainty. If these concepts are not articulated, students may find knowledge troublesome and become despondent.

Drawing on the responses in Box 1, we propose that two examples of potential threshold concepts for first-year science students are:

- There may not be a right answer.
- Scientists learn from discussion with peers.

In chapter 4 of this volume, Higgs describes a wormhole activity in which students were simply asked, "What did you learn from others?" In their answers, students addressed both of these threshold concepts. The answers indicated that, for some students, there was a- small identity shift, because they realised *how* they were learning. Others engaged with these threshold concepts without realising it! Their attitudes were influenced simply by observing their peers.

Cousins (2006) finds that these identity shifts can sometimes entail more troublesome, unsafe cognitive and affective journeys than the example given above. This is because grasping a threshold concept may involve leaving an old belief system behind, and can require a difficult repositioning for students. This suggests that students must take risks to make troublesome connections. As teachers, we must encourage this risk-taking, and explicitly reward it. Cousins (2006, p.5) observes that "often students construct their own conditions of safety through the practice of mimicry. In our research, we came across teachers who lamented this tendency among students to substitute mimicry for mastery". Mimicry can take the form, for example, of echoing expert language – and can in fact help students to internalise concepts, so long as it is accompanied by a struggle to understand. There must be an inclination to resolve conflicts in knowledge, pull disparate pieces of information together, and close the ability–action gap for deeper understanding. The characteristics of intentional learning, summarised by Higgs in chapter 4 in this volume, must be encouraged, otherwise learning can be "the product of ritualised performances rather than integrated understandings" (Cousins, 2006, p.5).

The question remains: how can we design a curriculum that encourages and welcomes students to enter a wormhole, a liminal space or a ZPD? That is, how can we encourage students to turn ability into action? The concept of intentional teaching for integrative learning offers a solution to these problems. We must identify the transformative points in student understanding – that is, we must be aware of areas of troublesome knowledge, where intentional teaching is required. We must design curricula that allow students to spend some time in the liminal space, "hanging out" part way through the wormhole, while they are seeking answers to their questions. As Cousins (2006) says, this space should allow recursiveness and excursiveness – that is, it should allow students to loop back on the conceptual material, rather than trying to push them through in a simplistic, linear way. This is consistent with findings in neuroscience that multiple connections build robust learning (Greenfield, 2004) and aligns with the multiple strands and complexity in our wormhole metaphor.

It is important to highlight a final complication here, which is that common knowledge is different for each student, and may be much different from the teacher's common knowledge (see Box 1, for example). Moreover, the threshold between common knowledge and theory moves for each individual as experience is gained. So, theoretically (and this can be observed in practice to a certain extent), thresholds are in different places for each student, and teachers should ensure that wormholes are capacious enough for many students, or that there is a range of wormholes to suit different students.

Cousins (2006) makes an important point when she challenges the assumption that it is always the threshold concept itself that is troublesome. Rather, she believes the difficulty of mastery is not separate from learners and their social and emotional contexts. This brings us to a consideration of border crossings.

Border Crossings

The concept of border crossings is different from the idea of threshold concepts, but it also adds depth to our understanding of the process of integrative learning. Jegede and Aikenhead (2004) developed the concept of border crossings to deal with the reality that students live and work in more than one domain (or culture). In their study of home culture versus university science culture, for example, they found that "for many learners conventional science seems disconnected from practical ends" (p. 167) and not all learners have the capacity to resolve conflicts between the subcultures of families, peer groups, the broader community and university science.

Their work deepens the language of integrative learning, and articulates the potential for smooth, manageable or rough border crossings between the domains that affect student learning. In this view, "troublesome knowledge" would be seen as a social or cultural phenomenon, in addition to being cognitive and affective. For example, if a student lives in several "cultures" (perhaps there are no scientific conversations in the home, or the student is discouraged from studying science), the student may experience difficult border crossings. Navigating these crossings successfully for these learners would be integrative and transformative, and can depend on the assistance they receive in making transitions. Huber and Hutchings (2004) advocate intentional teaching to assist students in developing capacities to integrate their academic and work-based or community-based learning. When integrative learning is effective, university science culture and other cultures need not be in conflict.

Jegede and Aikenhead (2004) describe a spectrum depicting degrees of interaction between domains. At one extreme, there is parallel learning where conflicting domains (on campus and off campus, for example) do not interact and are held separately. Cobern (1996) called this "cognitive apartheid". At the other extreme, students are able to resolve any conflicts and feel comfortable with border crossings. These students are likely to be integrative learners. Students move between the two extremes, depending on the circumstances. They may need to struggle, and may need assistance, to move away from cognitive apartheid and towards integrative learning. This aligns with the findings reported in Chapter 4 of this volume that there are levels of integrative learning, with students moving back and forth between them.

Can the study of border crossings offer new insights into the ability–action gap? Jegede and Aikenhead (2004) find that, when the culture of science education generally harmonises with learners' "life-world" culture, science will tend to support the learner's view of the world. This process is characterised by smooth border crossings, and successful connection making. But when the culture of science education is at odds with the learner's life-world, science instruction will tend to disrupt the world view by trying to force the learner "to abandon or marginalise his or her life-world concepts and reconstruct in their place new (scientific) ways of conceptualising" (Jegede and Aikenhead, 2004, p.155). This can make learners feel uncomfortable, and alienate them from their life-world culture – or alienate them from science. These students may be deterred from entering the liminal space, or wormhole.

Jegede and Aikenhead (2004, p.156) do throw some light on the ability action gap. They report that learners can develop "clever ways to pass their science courses without learning the content in a meaningful way" but develop coping mechanisms such as silence, evasiveness and manipulation. There may be no meaningful learning, but communicative competence (Jegede and Aikenhead, 2004). The concern is that the students may not be poor learners, but they learn how to learn sufficiently well to succeed. If there is no reward for struggling to "get through the wormhole", students may not expend the required time and effort.

What can teachers do to help? Understanding the nature of border crossings can offer new insights into activities designed to promote integrative learning. Intentional teaching can build bridges between the world view of science and the world view of learners, and help to resolve the conflicts. For example, at LaGuardia Community College, first-year students create e-portfolios to help them to link coursework to the rest of their lives, this being considered vital for personal growth and academic success (Arcario et al, 2005). We can design assessments to reward what we value. In the study in geosciences reported in Chapter 4 this volume, first year students were given a group research project designed to help them to integrate on-campus research with field based research. In addition "wormhole" opportunities encouraged these students to link natural phenomena with the real world. With border crossings in mind, more science could be taught from the angle of community concerns, focusing, for example, on geo-hazards, resource development and exploitation, groundwater protection, coastal erosion, environmental management, and ethics. This is exactly what Huber and Hutchings (2004) call for. Teaching strategies can be chosen to help students to identify any conflicts, explore them from several angles, and move towards integrative learning.

Jegede and Aikenhead (2004) suggest that teachers make potential border crossings explicit for learners. For inexperienced learners, they advocate the "tour-guide teacher", who gives a high degree of guidance, and has an extensive repertoire of teaching strategies. When less guidance is needed, they advocate the teacher as "travel agent", providing incentives, topics and issues that create the need to know science. Not all teachers will be comfortable with this view of teaching science, but these ideas can help us hone existing teaching strategies, or develop additional strategies, to build capacities for integrative learning.

Conclusions and discussions

In this chapter, we have explored the metaphor of the "wormhole", facilitating integrative learning by providing pathways between discrete packages of learning. Successful navigation may need 'exotic matter' (assistance from a peer or guidance from a teacher) to keep the wormhole open and allow safe passage for the learner. We have brought this metaphor together with the neighbouring concepts of troublesome knowledge, threshold concepts, and border crossings. By integrating these concepts, we have come to a new understanding of the nature and complexity of integrative learning. Insights into the blockages that can prevent connection-making have been gained.

The ideas and concepts – threshold concepts, troublesome knowledge, and border crossings – all overlap with integrative learning, but are not entirely the same. Nevertheless, they have significant implications for intentional teaching for integrative learning, and suggest a new focus for the design of opportunities to connect.

Viewed as such, they bring richness and clarity to the understanding of integrative learning itself, and situate integrative learning at the heart of what Perkins (2006) calls "practical constructivism". They help answer the questions: What is integrative learning? What does it look like? And how can we assess it?"

This exploration of neighbouring and overlapping concepts has also highlighted another important characteristic of integrative learning. That is, integrative learning can vary in the "type" or nature of connection and the time required to make the connection. Learners might not attempt the connection, they might try and not make it through, or they might struggle long enough to pass through successfully. If a connection is important enough, learners must be allowed time to visit and revisit in multiple ways; they must feel safe that confusion is tolerated, and that even mimicry as a route to understanding is allowed. An awareness of this tolerance may encourage more students to take the plunge and turn their abilities into action.

At the beginning of this chapter, we asked, "Why are we interested in understanding and aligning models and frameworks?" As teachers, we are students of design and strategy for better learning. We need to understand how students learn, and how our actions enable or inhibit learning. This can help us to encourage closure of the ability–action gap. To do this, we need to concentrate the "opportunities to connect" in the most effective places, building an intentional framework of understanding around which the student can proceed with independent study.

References

Association of American Colleges and Universities (2004–07) *Integrative Learning: Opportunities to Connect* [online]. Washington DC: AAC&U. Available from: http://www.aacu.org/integrative_learning/index.cfm [accessed 13 August 2008].

Arcario, P., Eynon, B. and Clark, J.E. (2005) "Making connections: integrating learning, integrating lives", *Peer Review*, vol. 7, no. 4, pp. 15–17.

Black, P. and Wiliam, D. (1998) Inside the black box: Raising standards through classroom assessment. Phi Delta Kappan, vol. 80, no. 2, pp. 139-148. http://www.pdkintl.org/kappan/kbla9810.htm [accessed 25 August 2008]

British Broadcasting Corporation website Available from: http://www.bbc.co.uk/science/space/deepspace/wormholes [accessed 3rd November 2008].

Cobern, W.W. (1996) "Worldview theory and conceptual change in science education", *Science Education*, vol. 80, pp. 579–610.

Cousins, G. (2006) "An introduction to threshold concepts", *Planet*, no.17, pp. 4–5. Available online from: http://www.gees.ac.uk/planet/p17/gc.pdf [accessed 21 August 2008].

Gale, R. (2006) *Fostering Integrative Learning through Pedagogy* [online]. Stanford CA: Carnegie Foundation for the Advancement of Teaching. Available from: http://www.carnegiefoundation.org/files/elibrary/integrativelearning/uploads/pedagogy_copy.pdf [accessed 14 August 2008].

Gardner, H. (2004) "Foreword", in J. Viens and S. Kallenbach, *Multiple Intelligences and Adult Literacy: A Sourcebook for Practitioners*. New York: Teachers College Press. pp.

Huber, M.T. (2006) *Fostering Integrative Learning through the Curriculum* [online]. Stanford CA: Carnegie Foundation for the Advancement of Teaching. Available from: http://www.carnegiefoundation.org/files/elibrary/integrativelearning/uploads/curriculum_copy.pdf [accessed 13 August 2008].

Huber, M.T. and Hutchings, P. (2004) *Integrative Learning: Mapping the Terrain*. Stanford CA: Association of American Colleges & Universities and the Carnegie Foundation for the Advancement of Teaching. Available online from: http://www.carnegiefoundation.org/dynamic/publications/mapping-terrain.pdf [accessed 13 August 2008].

Huber, M.T. and Hutchings, P. (2005) *The Advancement of Learning: Building the Teaching Commons*. San Francisco: Jossey-Bass.

Hutchings, P. (2006) *Fostering Integrative Learning through Faculty Development* [online]. Stanford CA: Carnegie Foundation for the Advancement of Teaching. Available from: http://www.carnegiefoundation.org/files/elibrary/integrativelearning/uploads/facultydevelopment_copy.pdf [accessed 13 August 2008].

Jegede, O.J. and Aikenhead, G.S. (2004) "Transcending cultural borders: implications for science teaching", in *Reconsidering Science Learning*, eds E. Scanlon, P. Murphy, J. Thomas and E. Whitelegg. New York: Routledge Falmer. pp. 153-175.

King, H. (2006) Threshold Concepts and Troublesome Knowledge. Planet. No. 17 December 2006 p. 2-3

Meyer, J.H.F. and Land, R. (2003) "Threshold concepts and troublesome knowledge: linkages to ways of thinking and practicing within the disciplines", in *Improving Student Learning: Theory and Practice – 10 Years On* [Proceedings of the 10th Improving Student Learning Symposium], ed. C. Rust. Oxford: The Oxford Centre for Staff and Learning Development, Oxford Brookes University. pp. 412–424.

Meyer, J.H.F. and Land, R. (2005) "Threshold concepts and troublesome knowledge (2): epistemological considerations and a conceptual framework for teaching and learning", *Higher Education*, vol. 49, no. 3, pp. 373–388.

Meyer, J.H.F. and Land, R. (2006a) "Threshold concepts and troublesome knowledge: an introduction", in *Overcoming Barriers to Student Learning: Threshold Concepts and Troublesome Knowledge*, eds J.H.F. Meyer and R. Land. London: Routledge. pp. 3–18.

Meyer, J.H.F. and Land, R. (2006b) "Threshold concepts and troublesome knowledge: issues of liminality", in *Overcoming Barriers to Student Learning: Threshold Concepts and Troublesome Knowledge*, eds J.H.F. Meyer and R. Land. London: Routledge. pp. 19–32.

Miller, R. (2006) *Fostering Integrative Learning through Assessment* [online]. Stanford CA: Carnegie Foundation for the Advancement of Teaching. Available from: http://www.carnegiefoundation.org/files/elibrary/integrativelearning/uploads/assessment_copy1.pdf [accessed 13 August 2008].

Morris, M.S. and Thorne, K.S. (1988) "Wormholes in spacetime and their use for interstellar travel: a tool for teaching general relativity", *The American Journal of Physics*, vol. 56, no. 5, pp. 395–412.

Perkins, D. (1999) "The many faces of constructivism", *Educational Leadership*, vol. 57, no. 3, pp. 6–11.

Perkins, D. (2000) *The Eureka Effect: The Art and Logic of Breakthrough Thinking*. New York Norton.

Perkins, D. (2006) "Constructivism and troublesome knowledge", in *Overcoming Barriers to Student Learning: Threshold Concepts and Troublesome Knowledge*, eds J.H.F. Meyer and R. Land. London: Routledge. pp. 33–47.

Ritchhart, R. (2002) *Intellectual Character*. San Francisco: Jossey-Bass.

Sambell, K., Gibson, M. and Montgomery, C. (2007) *Rethinking Feedback: An Assessment for Learning Perspective* [AfL Red Guide Paper 34]. Newcastle UK: Centre for Excellence in Teaching and Learning, Northumbria University.

Viens, J. and Kallenbach, S. (eds) (2004) *Multiple Intelligences and Adult Literacy: A Sourcebook for Practitioners*. New York: Teachers College Press.

Vygotsky, L. S. (1978) *Mind in Society: The Development of Higher Psychological Processes*, eds and trans. N.I. Cole, V. John-Steiner, S. Scribner and E. Souberman. Cambridge MA: Harvard University Press.

STRATEGIES FOR IMPLEMENTING GROUP WORK IN LARGE CLASSES: LESSONS FROM ENQUIRY-BASED LEARNING

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Introduction

The theories of learning that appear to be gaining the most attention in the recent educational literature emphasise the importance of the social and dialogic aspects of higher education (for example, Woo and Reeves, 2007; Boekaerts and Minnaert, 2006; Carlile and Jordan, 2005; Lave and Wenger, 1999; Roth, 1999). At the same time, the development of and support for innovative teaching strategies and programmes are key aspects of higher education policy. Group work is just such an innovative strategy, which can foster the social and dialogic aspects of learning. Unfortunately, academic staff's efforts to promote group work are often hindered by the resources needed to support it (Rangachari, 1996). In many institutions, it can be difficult to implement group work comprehensively in large classes, particularly in large first-year and second-year undergraduate programmes. This reduced opportunity for social and peer-supported learning can be a key factor in inhibiting both student retention and social learning.

Enquiry-based Learning (EBL) has also been gaining prominence in undergraduate programmes internationally (Pastirik, 2006; Roberts *et al*, 2005; Kahn and O'Rourke, 2005). EBL can give learners the opportunity to develop professional and personal skills ranging from teamwork and leadership skills to problem-solving and information skills, as well as personal attributes such as the ability to take responsibility for their own learning and actions (Barrett *et al*, 2005; Savin-Baden, 2004). EBL creates an environment in which the learners, often working in groups, are supported in determining their own lines of enquiry. They identify what is known; what needs to be learned; what information is required; how it is to be acquired, processed and applied; and how it is to be shared with others (Barrett *et al*, 2005). This approach is not new to many disciplines, where it may previously have been described as problem-based learning (PBL) (Savin-Baden, 2004), design exercises, investigations, case studies or project-based learning. The essential, common ingredient is that an initial "trigger" (the problem, design specification, area for investigation or case) stimulates the group to pursue a particular line of enquiry, through which learning is achieved. The groups are supported by a range of resources including online, paper-based and human resources.

In this chapter, we aim to consolidate and disseminate some ideas on how to organise group work in large classes in higher education. In particular, we draw on both the literature and some case studies from EBL practices in Ireland and the UK to argue that EBL can activate social and dialogic learning in group-work situations in innovative ways. It is not our intention to cover all aspects of EBL, such as assessment, which can be explored in other publications (Barrett *et al*, 2005). We believe that the lessons from these EBL cases are transferable to other group-work situations in higher education.

Theories of group work in teaching and learning

Historically, the emphasis given to learning from others has varied significantly across different learning theories. The early cognitive theorists maintain that learning occurs in the "mind", although Piaget (1896–1980) did note that children learn from other children (Rogoff, 1999). Another more recent and very influential theory is constructivism, which

highlights the importance of building on previous knowledge and making sense of information:

> *Whereas the Cognitivist tries to take charge and direct the students' thinking, the Constructivist accepts the autonomy of the student, and instead acts as a facilitator or mediator. The Constructivist helps the learner to discover meaning and understanding, rather than simply to accumulate information (Carlile and Jordan, 2005, p. 19).*

The constructivist view of teaching is consistent with the increasingly common view of the teacher as facilitator in higher education learning; facilitation is, of course, an important skill for teachers and students involved in group work. Social constructivism may be even more pertinent to an understanding of how learning occurs in groups. It "directs our attention not to the individual who tries to build an understanding independent of others, but instead to individuals who become functioning members of communities before they become selves" (Roth, 1999, p. 10). Recent literature in the area of e-learning, in particular, draws on the social constructivist view of learning (Woo and Reeves, 2007) and considers how to apply this in practice (Jacques and Salmon, 2007).

Biggs (1999) highlights the importance of active learning and student interaction in promoting deep learning in higher education. He advocates the use of peer discussions, peer-assessment and group work. Light and Cox (2001) note that group work has four key purposes – intellectual, social, personal and practical. Oakley *et al* (2004, p. 9) observe that students taught in groups "achieve higher grades, learn at a deeper level, retain information longer". This is in addition to the development of interpersonal skills such as communication and teamwork. Oakley *et al* (2004) also distinguish between "group work" and "teamwork", the latter of which they describe as "cooperative learning". They outline some useful strategies that enhance teamwork in groups, including the development of team policies, evaluation of effective team functioning and peer ratings (of workload, preparation, participation and so on).

Group work in Enquiry-based Learning

What is Enquiry-based Learning?
Enquiry-based learning (EBL) is a term used:

> *to describe approaches to learning driven by enquiry. The tutor (lecturer) establishes the task and supports or facilitates the process, but the students pursue their own lines of enquiry, draw on existing knowledge and identify the consequent learning needs. EBL is usually organised around collaborative work in small groups or with structured support from others, thus promoting the social interaction and cohesion that can be difficult in a mass system (Kahn and O'Rourke, 2005, p. 1).*

The advantages of EBL are that, in addition to specialist knowledge, students develop skills in critical and creative thinking; communication; information retrieval; self-directed learning; project management; teamwork; and problem-solving. In general, they also enjoy the process (Albanese and Mitchell, 1993; Cowan, 1998; Norman and Schmidt, 1993; Barrett *et al*, 2005). EBL also assists "in synthesising learning, which can be an issue in modular and interdisciplinary programmes; enquiries typically cross boundaries" (Kahn and O'Rourke, 2005, p. 2).

The terms EBL and PBL are often used interchangeably in the literature, but there are some important differences between the two types of learning. Kahn and O'Rourke (2007, p. 4) present problem-based learning (PBL) as a subset of enquiry-based learning, with the other two subsets being small-scale investigations and project work. Tosey and McDonnell (2006) make some distinction between EBL and PBL, however. In particular, they note that in EBL, "the learner has significant influence on or choice about the aim, scope and topic of their learning", whereas in PBL, the "tutor establishes the task" (Tosey and McDonnell, 2006, p. 2). Barrett (2005) agrees, adding that students define their own learning issues from the problems given to them by their teachers. Another important distinction is that PBL always involves group work, whereas EBL can at times be individual enquiry – that is, a small-scale research investigation. In addition, PBL uses a set process for its group work – for example, the Maastricht process (Schmidt and Moust, 2000, p. 23) or the Barrows process (Barrows and Tamblyn, 1980).

Despite the confusion in the literature about whether EBL and PBL are interchangeable, distinctive or overlapping, they usually have some features in common. In this chapter, we will focus on the following:

- a process of enquiry usually stimulated by a real-life scenario
- a self-directed aspect
- a collaborative aspect – that is, group work (as we have noted above, EBL does not always involve collaboration, but here we consider examples in which it does).

In this chapter, we will use the more encompassing term EBL (Kahn and O'Rourke, 2005; 2007). Readers interested in pursuing the differences and overlaps between EBL and PBL should see Tosey and McDonnell (2006).

Organising Group Work in EBL
EBL usually involves group work organised to undertake a common activity where the students lead or choose the line of enquiry, with or without a predetermined process. The intended outcomes of some group work activities may involve simple discussion, whereas others may involve making or designing an item. The latter has a less defined format and is often organised by students in out-of-class time. Students may also be familiar with this type of group work from previous educational experiences. Group size varies considerably in EBL and can be as small as two students (although this is rare). There is usually a group facilitator, who can be either a student or a tutor (staff member or senior student). Students often benefit from initial guidance on group processes, especially if they are unfamiliar with them. EBL is usually more successful if accompanied by early student education on group dynamics and the setting of ground rules (Oakley *et al*, 2004)

Activities involved in group work vary between facilitated group sessions, usually at fixed periods in time, and periods of unfacilitated group work by the students. It can be challenging for teachers to achieve the right balance between supporting students and leaving them to work independently, and "many ... facilitators appear to oscillate between being directive toward the students and saying very little at all" (Kahn and O'Rourke, 2007, p. 6).

Students and tutors can have quite distinct roles in the EBL group-work process. Roles include group leader (chair): groups may be chaired either by a student group member or by

the tutor. The subtly different role of facilitator is usually undertaken by the tutor, and involves providing guidance and feedback to the group. The tutor may or may not be an expert in the subject area (see Schmidt and Moust (2000) for a review of studies of student and tutor chairs, and expert and non-expert tutor chairs). In addition to the chair, there is often a student scribe who records "the group's problem-solving on whiteboards or easel paper" (Hmelo and Evensen, 2000, p. 2) and other student roles such as reader or time-keeper. These student roles actively involve students in the group process and encourage group ownership.

Considerable space and staff resources are required if tutors facilitate EBL groups. In addition, enquiries may involve several facilitated sessions (in-class and/or online). Given these requirements and demands, it is not surprising that those teaching large classes default to lectures. Nevertheless, staff members who have attempted EBL have addressed the issues described above, and this chapter will explore some examples from the literature and from current practices known to the authors.

EBL survey

We surveyed coordinators of large-class EBL modules in the UK and Ireland to discover what strategies they use to implement group work in EBL environments. We designed a semi-structured questionnaire to gather information on:

- the module (student numbers, discipline, year of study)
- the extent to which EBL is used in the module (curriculum design)
- how group work is organised in the module (including e-learning)
- how group work is timetabled.

We handed these questionnaires individually to the module coordinators, and were able to build nine case studies from the responses:

1. Electrical Engineering, Loughborough University, UK
2. English Literature, University of Manchester, UK
3. Geography, University College Dublin, Ireland
4. Manufacturing Engineering, Loughborough University, UK
5. Occupational Therapy, Trinity College Dublin, Ireland
6. Educational Theories, University College Dublin, Ireland
7. Computer Science, University of Manchester, UK
8. Veterinary Medicine, University College Dublin, Ireland
9. Manufacturing, Automotive and Civil Engineering, University of Manchester, UK.

More detailed information on these cases is available from the UCD Centre for Teaching and Learning website at http://www.ucd.ie/teaching/projects/epl/AISHE2007.html.

Strategies for implenting group work

The case studies confirm the literature's identification of four main strategies for implementing group work in EBL: group organisation and facilitation; timetabling; e-learning; and curriculum design. E-Learning appears to be used very successfully in scaffolding the organisation of the groups, and helped teachers monitor group activity – for example, through collaborative and exchange tools and content and creation tools (Woo and Reeves, 2007; Jacques and Salmon, 2007; Oliver, 2006; Smith *et al*, 2005). This e-learning activity is strongly linked to the strategy of group organisation and facilitation; therefore,

we have incorporated e-learning into the discussion of group organisation and facilitation below.

The discussion below integrates the findings from the literature and our case studies, and discusses these findings under the following headings:

- group organisation and facilitation (including e-learning)
- timetabling
- curriculum design.

It should be noted that in practice these strategies are often used concurrently.

Strategy 1: Group Organisation and Facilitation (including e-learning)

This strategy is the most complex, comprehensive and diverse. In large classes, group organisation and facilitation vary greatly according to context, but here we explore four main approaches within this strategy:

- independent subgroups from a larger group
- the roving tutor
- train the trainers
- combination of the roving tutor and train the trainers.

Independent subgroups from a larger group

In this approach, a large group meets with the facilitator/lecturer and then the students subdivide for work outside the facilitated session (Figure 1).

Figure 1: Independent Subgroups from a Larger Group
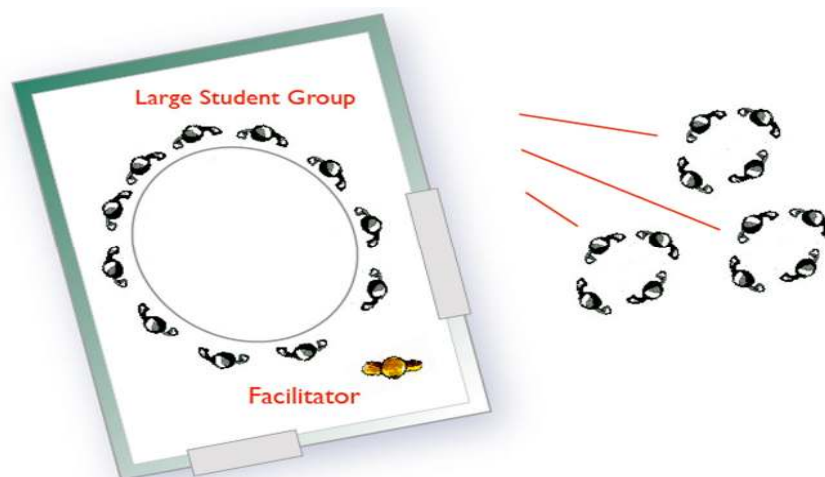
In case study 1 (Electrical Engineering), a class of 80 second-year students were divided into the equivalent of four real-life "companies", each with 20 students. Four robotic Olympic events had been defined (sprint, basketball, javelin and high jump) and each company had to design and build a robot to compete in each of the four events. The company therefore divided into a further four sub-groups (n=5 students) and met outside timetabled sessions. The whole company met on a weekly basis. This weekly company "board room meeting" was chaired by the tutor or a departmental professor. In addition to the weekly board meeting,

the students sought advice from other staff members, described as "consultants". This approach to group work, as in many enquiry-based approaches, has the advantage of mirroring the real-life group process that engineering students may encounter in industry.

The roving tutor

The second approach in the group organisation and facilitation strategy is probably one of the most common, particularly when more traditional PBL processes are being used. In this situation (Figure 2), a staff facilitator roves among student-chaired groups, monitoring the students' (in particular, the student chair's) adherence to the steps or categories of the PBL process (Schmidt and Moust, 2000; Barrows and Tamblyn, 1980).

Figure 2: The Roving Tutor
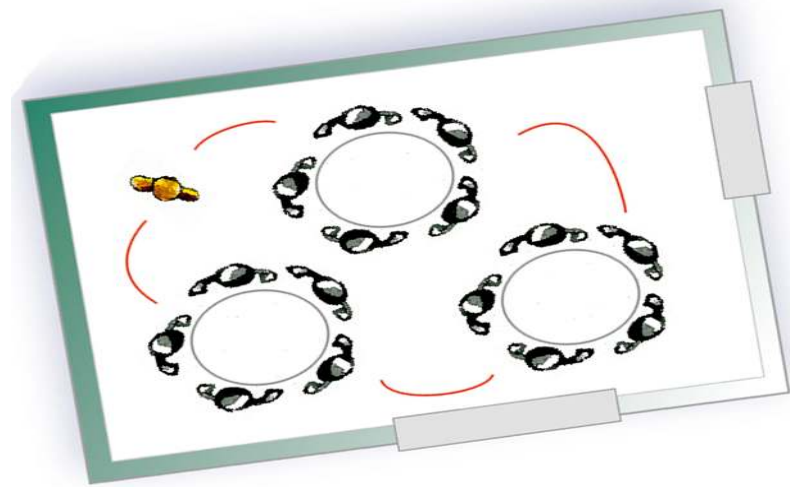
This approach was used in a second-year nursing programme at a Canadian university (Pastirik, 2006). The study of this programme explores the application of PBL in a class of 42 students with one tutor. In this scenario, students had an initial introduction to the PBL process, with information available online. Following this, students were divided into six groups of seven students and met in the classroom with the full cohort. The students chaired/facilitated the groups according to set instructions, with a "floating" or roving tutor (see Figure 2). Having brainstormed and decided on their learning goals, they presented these back to the full cohort (six sets of goals). These goals were combined into one to two topics by the tutor and students and then redistributed to the groups. Each group reformed to allocate these redistributed goals to individual students. The students then contributed their individual findings to the online group discussion forum, where one student synthesised the material for each group. This aspect of the process replaced the face-to-face discussion that often occurs in more standard PBL processes. One student from each group then presented the findings back to the full cohort of students in the next face-to-face session. Groups then reformed in the class to evaluate their progress towards their aims.

The online environment was put to good use in this scenario to facilitate discussion. But it seems there was no small group face-to-face discussion of the findings. The presentation of seven different findings to the full cohort would have given a good overview of the full problem, but more than seven presentations in a single session would be difficult to manage

in groups larger than 42. Therefore, this approach seems manageable for numbers up to this size. Students were generally positive about the experience; they were initially uneasy with the process but gained in confidence over the semester. Their concerns included students "who did not pull their weight" and the issue of student anxiety when presenting to the larger group (Pastirik, 2006, p. 265).

Woods (1996) reports on the use of "tutor-less groups" in a class of 50 students in Chemical Engineering. Like the process studied by Pastirik (2006), students also facilitated their own groups following a period of group-work induction. In Woods (1996), however, an online environment was not used; rather, students carried out some worked examples of problems in Chemical Engineering in a third session. Woods (1996) carried out a thorough evaluation of this approach and discovered that the students' problem-solving skills and self-directed skills, measured using standardised inventories, improved over the duration of the course. Alumni and employers surveyed also commented on the effectiveness of these students' problem-solving skills.

Case study 2 (English Literature) also employed this approach as did case study 5 (Occupational Therapy) on occasions. In these programmes, the emphasis was on face-to-face interaction; they did not use the online environment.

Train the trainers

The train the trainers approach is also common in many traditional group tutorial settings. In this approach, the key academic teacher works (outside the classroom context) with some assistant facilitators (for example, graduate students or tutors) to improve their group facilitation skills. The assistant facilitators then work directly with student groups (Figure 3).

Figure 3: Train the Trainers
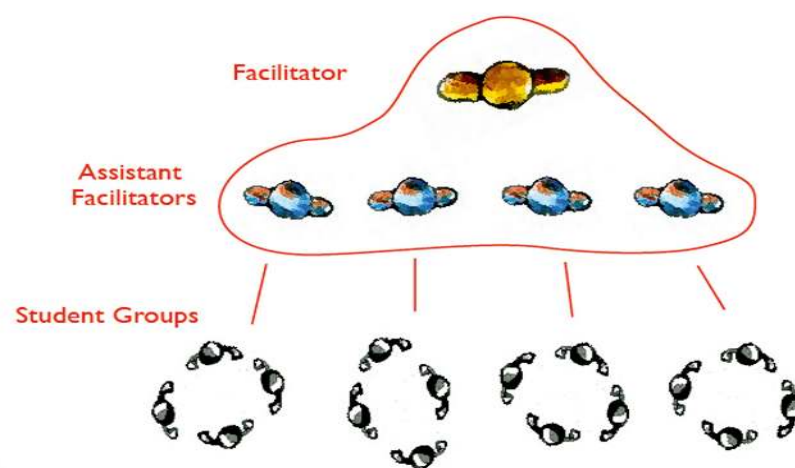
This approach, which can be an effective use of the lecturer's time in a large class, was implemented in a class of 400 first-year Geography students (case study 3) where a large proportion of group work was undertaken in small-group tutorials run by geography postgraduate students. The lecturers designed the tutorials and provided training on content for tutors.

This case study relied heavily on the Moodle e-learning platform, because the face-to-face tutorials (16 students) were further subdivided into two groups of eight students in an online discussion. The lecturers designed assignments to be submitted online and used online tools such as discussion boards and wikis. The Geography lecturers integrated material from the students' online discussions back into lectures, which they believed motivated students to engage in the online discussion and gave them some control over the module's evolution.

Combination of the roving tutor and train the trainers

The final approach used to implement group work in EBL environments appears to be a combination of the roving tutor and train the trainers. In this approach, the lead staff facilitator supports some assistant facilitators (tutors or senior students) while roving around the classroom (Figure 4).
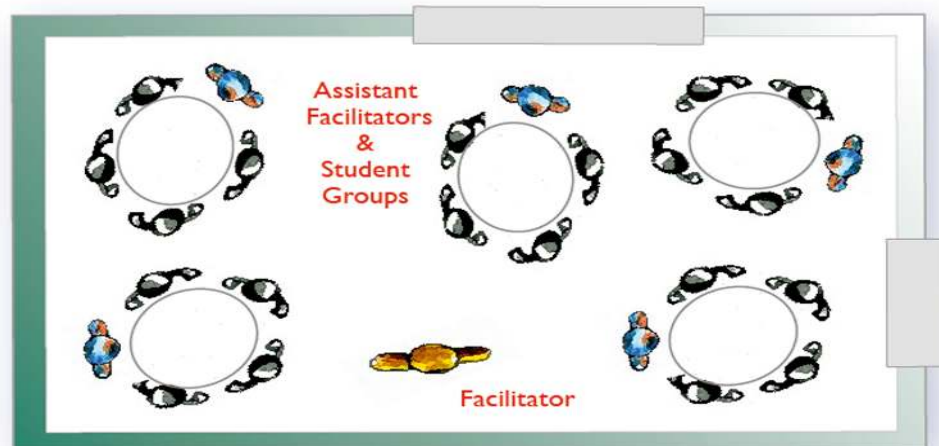
Figure 4: Combination of the Roving Tutor and Train the Trainers

An example of this approach is described by Roberts *et al* (2005). In a class of 250 first-year medical students, 22 groups were organised to carry out an "integrated learning activity" (ILA). In this ILA, all 22 groups attended a lecture theatre where they watched a video on the first problem. In their groups, the students then brainstormed the first five of the seven Maastricht PBL steps (Schmidt and Moust, 2000), with two staff "floating" in the lecture theatre, so there were 22 tutor-less groups. Each group was instructed to nominate a group leader. The two staff facilitated any questions as they emerged. A student-only meeting "was timetabled at the end of the first week to enable students to check progress" (Roberts *et al*, 2005, p. 529). Following this, each student group leader emailed their learning objectives and a summary of their group work to one of the facilitators. Roberts *et al* (2005) emphasise that tutor training was a key ingredient for success in this approach.

Case study 4 (Manufacturing Engineering) also used this approach in a class of 112 second-year students. The focus of the enquiry in this case was an industry-based project, in which seven companies were established, each consisting of four teams of four students. This resulted in 28 different groups of four students. Each group was supported by a staff tutor and a fourth-year student mentor. The student mentors regularly facilitated their student

groups independently. Occasionally, the whole company met and industrialists were invited to join these meetings, giving rise to meeting sizes of up to 22.

Strategy 2: Timetabling

The next strategy to support students working in EBL environments in small groups illustrates the creative use of timetable design. In the literature, a cycle of EBL appears to occur twice a week in many of the Health Science programmes; however, this is not always possible in a large class. To support this in multiple groups, some coordinators organise for one group of students to meet, for example, on Tuesday and Friday, while the other group meets on Monday and Thursday (or alternatively two groups on the same day). These extra teaching hours for staff could be a disadvantage, however, and there is still a limit to how many groups can meet in a week. Case study 5 (Occupational Therapy) concerns a group of 40 students: here the tutors timetabled two groups in a day, so there were 1.5-hour, back-to back tutorials with four groups of 10 students each, with two tutors tutoring for three hours in one day.

When twice a week is not possible, a cycle of EBL could occur for one group of students weekly or fortnightly. For example, each group could meet the staff facilitator once a week or fortnight and work independently in between. This meeting could be either a timetabled or a tutor-appointment slot (case study 7, Computer Science). In case study 6 (Educational Theories), face-to-face sessions were timetabled once a fortnight and the students worked independently in between.

In the literature, Woods (1996) presents an example of an EBL problem process that lasted for one week only, in contrast to Pastirik's (2006) two-week cycle for one problem.

Strategy 3: Curriculum Design

The final strategy involves making decisions about where and how EBL is used in the full programme. The strategic introduction of EBL across a full programme offers more opportunity to take advantage of the programme's collective resources.

One approach within this strategy is to select a core, sometimes integrated, module in each year (m3 in Figure 5) and put resources into this module for EBL group work.

Figure 5: Selecting a Core Module or a Core Week
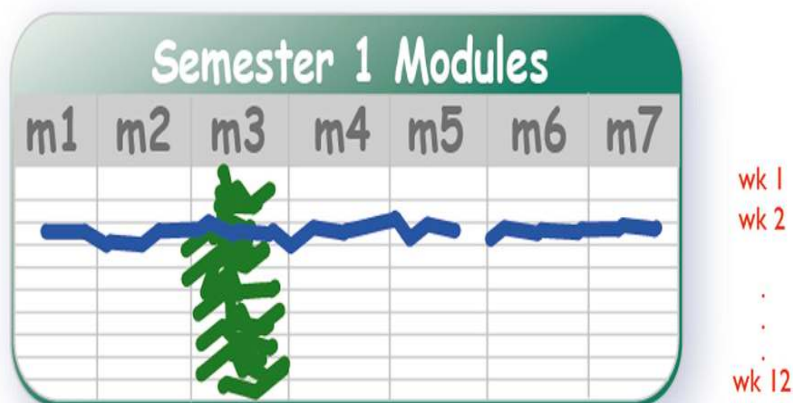
In case study 8 (Veterinary Medicine), for example, EBL modules aimed at generic skills development in veterinary clinical scenarios were organised as stand-alone components of the veterinary course. However, the students were encouraged to link material from other modules. The module coordinator noted that the modules' intended learning outcomes were to integrate student knowledge across subject boundaries; to add to student knowledge as part of a team; to identify, retrieve, abstract and prioritise relevant new information; and to analyse and resolve possible courses of action and rank their appropriateness. In the literature, this type of module is often described as a "synoptic" module if it achieves the aim of integrating material from other related modules. A programme team may decide that this is an economic approach to allocating resources to group work across a few semesters/years

Another approach is to focus the group EBL experience in one or two weeks of the semester or term and integrate all modules in the programme (horizontal line in Figure 5). In this approach, tutors from multiple modules come together to work intensively on the same one-week or two-week group projects. Case study 9 (Manufacturing, Automotive and Civil Engineering) is a good example. In this first-year programme, all modules were suspended in week 5, and students from all courses in the year met to work in groups on an EBL exercise that was intensely pursued over the week. This had an added advantage of freeing up academic staff to support the activity.

These two approaches appear to require more input from strategic senior staff – for example, head of school or programme. Therefore, not all academic staff will be in a position to implement this strategy.

Discussion and conclusions

This chapter has presented three distinct strategies that may be used by academic staff teaching large classes to implement the group work required for EBL. Many of the examples both in the literature and the case studies, however, use a combination of these strategies.

The first strategy, group organisation and facilitation, is an option available to staff who have control over how the groups are organised. It can be broken down into four diverse approaches. Some of these approaches, such as the roving tutor, appear to be more practical at the smaller end of the large-class continuum – that is, in groups of 40 to 50 students. Other approaches, such as train the trainers, have been implemented in very large classes (between 150 and 400) and do require some additional resources, such as tutors or postgraduate students. Smith *et al* (2005, p. 154) describe how their postgraduate students, who became EBL teaching assistants, moved from being assistants to being "partners with the faculty (staff) in carrying out the course goals".

It appears that e-learning was used across these different approaches when there appeared to be a danger that the monitoring of progress was a concern, such as in extremely large classes, or where the students were doing more independent group work. Oliver (2006), who also used EBL with a group of 350 students, argues that the technology in this context provides an opportunity for staff to scaffold learner-centred individual and group-based learning. Technology can very easily track group contributions gathered in one space, which is much more difficult to achieve in the large-class face-to-face context. The recent e-learning literature (Jacques and Salmon, 2007; Woo and Reeves, 2007) increasingly

supports the more streamlined use of group work online. Staff who are developing new e-learning activities may need additional institutional support.

The other two strategies, timetabling and curriculum design, both require more senior input into EBL implementation. Curriculum design, in particular, may require a head of school/programme decision to redeploy resources; heads of school/programme may also need to develop their curriculum designer role, a role often neglected in their busy managerial lives. The approach of selecting a core module in each year of a programme has been described as a hybrid approach in the PBL literature. Some authors argue strongly that PBL should be all or nothing and that hybrid programmes are not pure PBL (Armstrong, 1991). Nevertheless, in practice hybrid programmes are widespread and research into them has demonstrated evidence of a range of successful student learning outcomes (O'Neill, 2007).

In conclusion, this chapter provides the reader with some ideas for implementing group work in large classes, by drawing on lessons from both the literature as well as Irish and UK EBL case studies. We hope that this will promote some debate on the bigger issues of redistribution of resources and change in lecturer/tutor/head of school roles that are needed to support an increase in group work. It will be necessary to carry out more comprehensive research into these strategies – for example, on best practices in student assessment and/or evaluation of these strategies. In the meantime, we hope that we have empowered readers by giving them some starting points.

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References

Albanese, M. and Mitchell, S. (1993) "Problem based learning: a review of the literature on outcomes and implementation issues", *Academic Medicine*, vol. 68, no. 1, pp. 52–81.

Armstrong, E. (1991) "A hybrid model of problem-based learning", in *The Challenge of Problem-Based Learning*, eds D. Boud and G. Feletti. London: Kogan Page. pp. 137–149.

Barrett, T. (2005) "What is problem-based learning?" in *Emerging Issues in the Practice of University Teaching and Learning*, eds G. O'Neill, S. Moore and B. McMullin. Dublin: All Ireland Society for Higher Education (AISHE). pp. 55–66. Available online from: http://www.aishe.org/readings/2005-1/barrett-What_is_Problem_B_L.html [accessed 12 July 2008].

Barrett, T., Mac Labhrainn, I. and Fallon, H. (eds) (2005) *Handbook of Enquiry and Problem-based Learning: Irish Case Studies and International Perspectives*. Galway: All Ireland Society for Higher Education (AISHE) and Centre for Excellence in Learning and Teaching (CELT), NUI Galway. Available online from: http://www.aishe.org/readings/2005-2/contents.html [accessed 12 July 2008].

Barrows, H.S. and Tamblyn, R. (1980) *Problem-based Learning*. New York: Springer.

Biggs, J. (1999) *Teaching for Quality Learning at University*. Buckingham: Open University Press.

Boekaerts, M. and Minnaert, A. (2006) "Affective and motivational outcomes of working in collaborative groups", *Educational Psychology*, vol. 26, no. 2, pp. 187–208.

Carlile, O. and Jordan, A. (2005) "It works in practice but will it work in theory? The theoretical underpinnings of pedagogy", in *Emerging Issues in the Practice of University Learning and Teaching*, eds G. O'Neill, S. Moore and B. McMullin. Dublin: All Ireland Society for Higher Education (AISHE). Available online from: http://www.aishe.org/readings/2005-1/carlile-jordan-IT_WORKS_IN_PRACTICE_BUT_WILL_IT_WORK_IN_THEORY.html [accessed 12 July 2008].

Cowan, J. (1998) *On Becoming an Innovative University Teacher*. Buckingham: Open University Press.

Hmelo, C.E. and Evensen, D.H. (2000) "Problem-based learning: gaining insights on learning interactions through multiple methods of inquiry", in *Problem-Based Learning: A Research Perspective on Learning Interaction*, eds D.H. Evensen and C.E. Hmelo. London: Lawrence Erlbaum Associates. pp. 1–16.

Jacques, D. and Salmon, G. (2007) "Enabling group interaction: the role of tutor and e-moderator", in *Learning in Groups: A Handbook for Face-to-Face and On-line Environment*, eds D. Jacques and G. Salmon, 4th edn. London: Routledge. pp. 159–194.

Kahn, P. and O'Rourke, K. (2005) "Understanding enquiry-based learning", in *Handbook of Enquiry and Problem-based Learning: Irish Case Studies and International Perspectives*, eds T. Barrett, I. Mac Labhrainn and H. Fallon. Galway: All Ireland Society for Higher Education (AISHE) and Centre for Excellence in Learning and Teaching (CELT), NUI Galway. pp. 1–12. Available online from: http://www.aishe.org/readings/2005-2/chapter1.pdf [accessed 12 July 2008].

Kahn, P. and O'Rourke, K. (2007) *Guide to Curriculum Design: Enquiry Based Learning* [online]. York: Higher Education Academy. Available from: http://www.heacademy.ac.uk/resources/detail/id359_guide_to_curriculum_design_ebl [accessed 12 July 2008].

Lave, J. and Wenger, E. (1999) "Legitimate Peripheral Participation", in *Learners, Learning & Assessment*, ed. P. Murphy. London: Open University Press. pp. 83–89.

Light, G. and Cox, R. (2001) *Learning and Teaching in Higher Education: The Reflective Professional*. London: Sage Publications.

Norman, G. and Schmidt, H. (1993) "Does problem-based learning work? A meta-analysis of evaluative research", *Academic Medicine*, vol. 68, pp. 557–565.

Oakley, B., Felder, R.M., Brent, R. and Elhajj, I. (2004) "Turning student groups into effective teams", *Journal of Student Centered Learning*, vol. 2, no. 1, pp. 9–34.

Oliver, R. (2006) "Exploring a technology-facilitated solution to cater for advanced students in large undergraduate classes", *Journal of Computer Assisted Learning*, vol. 22, no. 1, pp. 1–12.

O'Neill, G. (2007) "Designing a problem-based learning module on 'Educational Theories' for lecturers (Faculty) in higher education", paper presented to the American Educational Research Association annual conference, Chicago IL, 9–13 April.

O'Neill, G. & Moore, I. (2007) "Enquiry-based learning in large classes: Strategies for organising group work", poster presented to the All Ireland Society for Higher Education (AISHE) conference 2007, NUI Maynooth, 30–31 August [online]. Available from: http://www.aishe.org/events/2006-2007/conf2007/proceedings/paper-44.pdf [accessed 12 July 2008].

Pastirik, P.J. (2006) "Using problem–based learning in a large class-room", *Nurse Education in Practice*, vol. 6, no. 5, pp. 261–267.

Rangachari, P.K. (1996) "Twenty-up: problem-based learning with a large group", *New Directions for Teaching and Learning*, vol. 68, pp. 63–71.

Roberts, C., Lawson, M., Newble, D., Self, A. and Chan, P. (2005) "The introduction of large class problem-based learning into undergraduate medical curriculum: an evaluation", *Medical Teacher*, vol. 27, no. 6, pp. 527–533.

Rogoff, B. (1999) "Cognitive development through social interaction: Vgotsky and Piaget", in *Learners, Learning & Assessment*, ed. P. Murphy. London: Open University Press. pp. 69–82.

Roth, W-F. (1999) "Authentic school science: intellectual traditions", in *Learning and Knowledge*, eds R. McCormick and C. Paechter. London: Open University Press. pp. 6–20.

Savin-Baden, M. (2004) *Challenging Research in Problem Based Learning*. Maidenhead: McGraw Hill.

Schmidt, H.G. and Moust, J.H.S. (2000) "Factors affecting small-group tutorial learning: A review of research", in *Problem-Based Learning: A Research Perspective on Learning Interactions*, eds D.H. Evensen and C.E. Hmelo. London: Lawrence Erlbaum Associates. pp. 19–52.

Smith, A.C., Stewart, R., Shields, P., Hayes-Klosteridis, J., Robinson, P. and Yuan, R. (2005) "Introductory biology classes: a framework to support active learning in large enrollment introductory Science courses", *Cell Biology Education*, vol. 4, pp. 143–156 [online]. Available from: http://www.lifescied.org/cgi/content/full/4/2/143 [accessed 12 July 2008].

Tosey, P. and Mc Donnell, J. (2006) "Mapping enquiry-based learning: discourse, fractals and a bowl of cherries", paper presented to the first Annual Conference of the Learning through Enquiry Alliance of CETLs, University of Manchester, 29 June 2006 [online]. Available from: http://www.campus.manchester.ac.uk/ceebl/events/archive/ltea2006/tosey_mcdonnell_paper.pdf [accessed 12 July 2008].

Woods, D.R. (1996) "Problem-based learning for large classes in Chemical Engineering", *New Directions for Teaching and Learning*, vol. 68, pp. 91–99.

Woo, Y. and Reeves, T.C. (2007) "Meaningful interaction in web-based learning: a social constructivist interpretation", *Internet & Higher Education*, vol. 10, no. 1, pp. 15–25.

SUPPORTING GRADUATE TEACHING ASSISTANTS AT TRINITY COLLEGE DUBLIN (TCD)

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Introduction

Although the main activity of postgraduate students is research, many also have significant teaching roles and responsibilities. These individuals are known as graduate teaching assistants (GTAs). Their role is particularly significant in research-intensive institutions (Travers, 1989). For example, one recent estimate reported that 85 percent of the undergraduate courses within a school at a research-intensive Canadian university were taught by non-faculty staff, many of whom were postgraduates (Hickson and Fishburne, 2007).

GTAs support undergraduate student learning in various different teaching contexts, and their roles vary in relation to disciplinary contexts, opportunities and constraints. Typical responsibilities of GTAs include facilitating student learning and helping students prepare for assessments (Morss and Murray, 2005). In some higher education institutions, particularly in the United States, the role of GTAs is officially recognised with employee status, whereas in others the role is not as formalised (Park, 2004). Even within an institution, support and recognition may vary from department to department.

Postgraduates' motivations for becoming involved in teaching vary considerably, and may include the need to supplement their incomes as well as a desire to gain experience in teaching as preparation for developing their career prospects (Park, 2004; National Postgraduate Committee, 1993). Postgraduates who have taught or are intending to teach noted the value of the experience in a survey conducted at the University of Oxford, with 87 percent of those considering an academic career indicating that teaching was likely to benefit their research (Trigwell and Dunbar-Goddet, 2005).

The challenge of supporting GTAs has been researched internationally. Reports such as that by the UK Council for Graduate Education (UKGCE) (1999) have attempted to summarise key elements of practice. For example, the UKCGE report (1999, p. 10) identified a postgraduate teaching development programme at University of California at Davis, which contained many of the features cited as best practice by Sprague and Nyquist (1989). These included faculty/staff member involvement (mentoring/supervision); accommodation of time constraints (released time); and the development of a recognised teaching culture (continuing professional development).

At a national level in Ireland, the Irish Universities Quality Board (IUQB) (2005) has acknowledged and identified the teaching roles of postgraduate tutors and demonstrators. The Board recommends that basic training to support these roles be provided, as well as indicating that it might be desirable for those students considering an academic career to acquire a formal teaching qualification during the course of their research studies.

There is currently a range of provisions available, or in development, for GTAs across Irish higher education institutions. These provisions differ in structure, content and location for delivery within institutes, reflecting the history of support provision prior to the national guidelines, institutional variations in the roles of GTAs, and funding mechanisms.

Examples from the sector include:

- accredited modules or programmes provided by central teaching and learning support units, varying from 10 to 12 weeks in duration and including the use of peer observation and micro-teaching
- short "clinics"
- discipline-specific provisions, ranging from one-day workshops to short courses leading to certification, for example, a Certificate of Continuing Postgraduate Professional Development in 'Sociological Teaching and Learning', delivered by the Sociology Department, NUI Maynooth)
- accredited modules or parts of modules and a cross-institutional initiative from NUI Galway, University College Cork (UCC) and Trinity College Dublin (TCD) to develop an inter-institutional module for GTAs, building on the strengths and approaches within the collaborating institutions.

We begin this chapter by describing briefly the historical context of support for GTAs at Trinity College Dublin (TCD). We then present and compare three case studies of central teaching support structures, introduced and evaluated as pilot approaches for GTA support at the University during 2006 and 2007. From these case studies, three themes emerge: the role of the disciplines in supporting GTA teaching development; the need for peer support of GTAs; and the importance of appropriate timing for GTA teaching development. Towards the end of the chapter, we consider TCD's case studies in relation to the national context, considering implications for future development.

Supporting postgraduate students who teach at TCD

A central educational enhancement unit, the Centre for Academic Practice and Student Learning (CAPSL), was established at TCD in 2003. Between 2003 and 2006, it regularly delivered two standard workshops for GTAs on presentation skills and small-group teaching. These were promoted to heads of discipline and delivered within disciplines and departments at their request. The large number of disciplines and the small number of attendees at individual disciplinary workshops made the approach increasingly difficult to sustain, however. When, in 2006, the disciplines were restructured into 24 schools assigned to one of three faculties, the opportunity arose to consider a central approach to support GTAs. The new system was planned by CAPSL with input and endorsement from the Graduate Studies Office, school officers with responsibility for postgraduate students, and the Graduate Students Union.

The new system featured three main initiatives:

- a short, introductory course in third-level teaching
- a one-day induction to teaching and supporting learning
- an annual events programme.

These initiatives are described below as brief case studies and their key features are compared in Table 1. The different activities aimed to provide a varied range of teaching development opportunities accessible throughout the teaching year, aimed at both experienced and novice GTAs. Following the case studies and table, this section presents and discusses the following emerging and recurrent themes:

- the role of the disciplines in supporting GTAs
- the need for peer support and community building as a key element of professional development for GTAs
- the importance of scheduling, timing and prioritising teaching development for GTAs.

Case Study 1: Introduction to Teaching at Third Level – A Short Course

In Spring/Summer 2006, a short course was delivered through 10, three-hour sessions run fortnightly over a five-month period, supported by a virtual learning environment (VLE) (WebCT) with resources and discussion forums. The course aimed to introduce participants to key aspects of third-level teaching and prompt them to apply principles and techniques within their disciplines using a critically reflective approach. Session topics included:

- lecture design and delivery
- active learning in small groups
- assessment of student learning
- course and module design
- teaching and learning
- e-learning
- evaluation of teaching.

The course was structured to encompass the development of a reflective teaching portfolio and the involvement of a discipline-based mentor. Participants chose a mentor who would be available to observe their teaching and offer feedback on it; an additional session brought mentors and participants together to discuss the course aims and the mentoring role prior to the observations. A certificate of successful completion was offered to participants who completed a reflective teaching portfolio and an assignment on course design.

Case Study 2: One-Day Induction to Teaching and Supporting Learning

A team of three developers contributed to the design, content and delivery of a one-day induction to teaching and supporting learning. The day was designed specifically for postgraduates with no prior teaching experience. The initiative was influenced by four main factors: the IUQB (2005) publication; international models and research on supporting GTAs; the experience in the previous academic year of a 10-fold over-subscription for the short course for postgraduate teachers (case study 1); and the feedback from the short course participants. The induction day was offered six times at the beginning of the academic year. The day consisted of four sessions on the following topics:

- understanding the GTA role
- introducing the scholarship of teaching and learning
- working with diverse learners
- evaluating and developing teaching practice.

The main aims of the day were to enable participants to build their confidence, skills and enthusiasm through a range of activities and discussions within a network of peers. Participants were also given a folder of materials and resources with which to initiate their own teaching portfolio.

Case Study 3: Annual Events Programme

In October 2006, a series of activities commenced to maintain support for GTAs, with some specifically for participants of the one-day induction (case study 2) and the five-month short course (case study 1).

An interactive VLE was developed within WebCT, and the participants registered for access. The VLE incorporated faculty-based discussion forums and discipline-related teaching and learning resources. An activity prompting reflection on teaching was added after a few weeks, and updates were made periodically during the year. Fifteen of the 57 registered site users accessed the VLE, many doing so after being informed of additional resources or activities.

Acknowledging that face-to-face meetings are integral to sustaining online interactions, we also scheduled a series of one-hour discussion sessions. The first session was attended by six GTAs – two in their first year of teaching and four who had participated in the short course. Based on feedback, the subsequent sessions were scheduled in early evening. Unfortunately, however, only two or three GTAs responded for each session and met in these small groups or individually. This pattern of low numbers recurred across the year, including the final session in May that followed an online activity on reflecting on teaching.

In March 2007, a one-day Teaching and Learning Colloquium was held. The day was planned to support novice and more experienced GTAs. It consisted of parallel workshops on topics suggested as future areas for development by participants of the one-day induction course. Participants from the short course were invited to take part as session facilitators.

Table 1: Comparison and Evaluation of Three Initiatives to Support GTAs at TCD

Approaches	Key features	Successes	Issues Raised	Student Comments
Short Course: Introduction to Teaching at Third Level	Structured short course: 30 hours plus independent study over a five-month period Certificate of completion provided for attendance and the development of a reflective portfolio Participants mentored by academic colleagues from their own disciplines	Discussions with peers developing the reflective portfolio Participating in the sessions All participants completing the course Mentoring process	Some respondents suggested that there should be more discipline-specific focus and that they would have liked greater involvement from members of schools or experienced tutors Some participants felt the mentoring process was of limited value, or they did not participate in the process	*I thought the quality of the content was most significant. The different disciplines within the class also made it easy to gain new ideas.* *Interaction with other course participants – exchange of thoughts and experiences with people from different disciplines was brilliant.*
One-day Induction to Teaching and Supporting and Learning	Four study units delivered in one day Presented and modelled various small-group teaching methods and communication skills, and introduced the scholarship of teaching and learning Participants could choose to attend days for disciplinary or cross-disciplinary groups	Opening task to identify, pool and resolve teaching concerns The interactivity of the day created by discussion, exercises and problem-solving	Ambivalence about value of exploring learning theories Participant fatigue towards the end of the day, so less gained from afternoon sessions Raised awareness of differences among local, departmental approaches to supporting postgraduates in teaching roles	*Getting to know that others have the same worries and realising my concerns were natural.* *Discussing key concerns and coming up with practical solutions.* *…finding ways to promote active learning in lectures and seminars and experiencing some of these techniques directly on the course.*
Annual events programme consisting of seminars, online activities and a one-day colloquium	Tutor and peer-led meetings throughout the year VLE populated with generic and discipline-specific teaching and learning resources and hosted online discussion forums One-day teaching and learning colloquium	Postgraduates contributing their experience and expertise by leading seminars, colloquium discussions and via the VLE	Low engagement with the VLE and attendance at tutor-led meetings Better attendance at end of the year peer-led meeting and colloquium	*…learning from experience of others.* *Like every other postgrad,* finding time to participate is difficult but I would certainly like to contribute when I can.

The Role of the Disciplines

The initiatives described in the case studies above were all university-wide developments and brought together GTAs into generic, central activities to develop their teaching. The generic approach allowed us to acknowledge common issues and foster constructive learning among peers from across the disciplines, and participants appreciated this. On the other hand, the initiatives were also tailored to some extent to better meet disciplinary teaching contexts. In this, we anticipated participant feedback that they would like more discipline-specific focus. With this in mind, for example, we:

- organised for discipline-based mentors to contribute to the learning environment for the participants in the short course (case study 1 – when this worked successfully, the mentor–mentee relationship was a very positive and significant component of the course)
- worked with faculties to coordinate the one-day induction courses (case study 2)
- ran workshops at the teaching colloquium focused on some discipline-specific aspects of teaching practice (case study 3)
- used examples and activities relating to discipline-specific teaching contexts in activities where possible.

These were built-in refinements, and it was clear from participant feedback that their disciplinary teaching contexts and approaches to learning were foremost in their thoughts, providing a lens through which they appraised the relevance of the course content.

What now emerges is the challenge of exploring whether local and central teaching support can be developed further to work synergistically to support GTAs. Recent research and analysis by Knight *et al* (2007) points to the importance of supporting part-time teaching staff through situated, informal learning (within disciplinary teams and academic structures such as schools and departments). They suggest that "professional formation is ecological in the sense that it is evoked by engagements with other colleagues in the 'lived' workplace environment" (Knight *et al*, 2007). They identify more formal learning opportunities (such as those developed, structured and delivered by central educational development units) as "only a part of the picture" (Knight *et al*). They also note several issues related to institutional and local policy and practice in supporting part-time teachers – for example, the need for local structures to value, support and enable reciprocal learning with and from part-time tutors.

The Need for Peer Support and Community

One feature across the three case studies was the sharing of experience, practice and problem-solving approaches among peers – the participants singled this out for positive comment. This feature was usually linked to developing a sense of unity and community. Community-building was a universal, often explicit, objective of all these centralised initiatives, and built upon CAPSL's general aim of creating networks, enabling dialogue and fostering "teaching commons" at TCD (for example, see Hanratty and O'Farrell, 2007). This was achieved through tutor-led approaches to small-group work (see Exley and Dennick, 2004), carefully matching the interactive teaching methods and content used by course and workshop facilitators to the teaching roles and contexts of the postgraduate participants. Other strategies to encourage the development of peer support included the:

- involvement (by invitation) of participants from the short course (case study 1) in contributing to and leading some of the open events and activities (case study 3)
- peer-led learning sessions on facilitating discussion in small groups, held throughout the year
- web-based activities to encourage discussion and the sharing of practice on generic themes and on faculty-specific teaching contexts and experiences.

Despite the positive feedback received by the community-building aspects of the initiatives, only a small percentage of GTAs carried their networking through into the discussion forums on WebCT (both the general and faculty-specific forums) or attended the lunchtime "get-together" discussions. This indicates that, without direct support from coordinators and facilitators of the GTA initiatives, the sense of community is relatively fragile and would need further consideration of ways to create strong, institution-wide, student-led or virtual networks for collegial exchange. It is possible that the lack of interest in or commitment to independent networking occurred precisely because the GTA initiatives described above were quite structured and depended on the leadership of facilitators and coordinators. It may also be related to the third emerging theme below, which is time. Additionally, there may be pre-existing networks of peers, particularly within schools or discipline areas, which obviate the need for GTAs to retain links with colleagues from the wider college community. There is certainly evidence of local networks and communities within some areas of the University, where postgraduates are actively working with their schools to provide supports for other postgraduates who are teaching. For example, some schools provide annual inductions for part-time tutors, including postgraduates, and others have established their own central postgraduate skills development programmes that incorporate support for teaching.

Scheduling, Timing and Prioritising Teaching Development

The third theme that emerged from our analysis of the GTA initiatives was the difficulty of scheduling central teaching support – of ascertaining the most appropriate time of year, the optimum duration of events and the most appropriate time of day to enable attendance. During the planning of each course or event, we were very aware of the need to ensure that the activities were scheduled sensitively to allow participation but did not require a heavy time commitment that would interfere with postgraduates' primary research responsibility.

Generally, there was better attendance at the one-day induction course for postgraduates new to teaching (case study 2) than at other individual events (case study 3). The former was scheduled at the beginning of the academic year and we presume that the "just in time delivery" approach addressed an acute and immediate need. Some events in the annual programme were rescheduled based on feedback from potential participants; however, even with these efforts, attendance was not high. Most frequently, difficulty attending was "physically articulated" by absenteeism post-registration, although a peer-led session on facilitating small-group discussion, the last event of the academic year, reversed the trend of declining attendance. It proved difficult, however, to determine whether this was because of the topic and format, the scheduling or other factors.

Conversely, feedback from participants on the short course (case study 1) indicated interest in more frequent meetings with overall greater duration:

- I found the time quite restrictive. Maybe the course could run on a weekly basis.
- *Perhaps two meetings a week of two-hour duration – because I am so swamped with my own work I think I would have been a little less of a procrastinator at the end if we met more frequently – it would serve to reinforce the programme and keep the ball rolling.*

This may suggest that if participants make an initial commitment to a scheduled and structured course, they would accommodate it within their schedule. The additional approaches of an award (certificate of completion) and the active involvement of a mentor to support the participant's progress may also have acted as incentives for committed attendance and participation.

National developments, directions and context

The one-day induction (case study 2) attempted to assist the University in meeting the IUQB (2005) guideline that states that institutions must provide "basic training in appropriate teaching and supervisory skills … with a sufficiency of such training given in advance of the commencement of teaching".

It also aimed to reflect similar international approaches by central educational development units at comparable research-intensive institutions – for example, those at the Universities of Durham and Warwick in the UK. When reviewing the support provided to GTAs in other countries and institutions, it is important to consider the number of hours that GTAs are permitted to teach and relate this to the provision of associated training. Six hours per week is the recommended limit for those on university and national research body bursaries. In such circumstances, the central support programmes are not comparable in scale to those in the US for similarly appointed graduate teaching assistants (Park, 2004). It is envisioned, however, that the centrally-delivered training is only part of the support infrastructure, which would best consist of a mixed model of formal, central provision and local support in the "lived" teaching environment.

Although many GTAs noted the value of participating in a programme for supporting their current teaching role within contexts such as tutorials and laboratories, many were looking further ahead, with a view to pursuing an academic career. In formal and informal feedback, as well as discussions with GTAs, recognition and certification emerge as strong incentives for participation in central programmes, including the short course (case study 1). The issue of certification is noted in the IUQB guidelines:

> *Provided it does not impinge on progress with the PhD project, and with the agreement of the supervisor(s), it is possible for students planning an academic career to acquire a formal teaching qualification, such as a certificate in higher education (IUQB, p. 29, 2005).*

The stage of postgraduates' research projects, their teaching experience and their confidence may all influence their relative interest in and need for teaching support (for example, see Park, 2002). Those approaching the end of their research projects may be more determined to gain teaching experience and participate in associated programmes, particularly for certification. Feedback to CAPSL recorded frequent requests from GTAs for support with teaching large groups and lecturing. It is possible that some postgraduates are strategically planning an academic career from the outset of their research and want to spend their time as efficiently as possible by gaining teaching experience and certification during their early research career. Unlike in the UK, it is not currently a requirement in Ireland that academics

employed as lecturers possess (or are pursuing) a postgraduate certificate in education or equivalent. The emergence of a growing number of GTAs with teaching certificates or qualifications may prompt further discussion on this issue, however.

Time as a valuable and limited resource clearly emerges as a running theme from the case studies. Although the guidelines may limit teaching to no more than six hours per week, GTAs may be spending additional time on preparation, feedback, assessment and attendance at lectures. They may experience the same tensions and challenges as academics in terms of balancing their research and teaching; however, as the postgraduates' primary role is to undertake research, difficulties with time management may result in major problems with the progress of their research and may require intervention by supervisors. As Park (2004) notes in his review of approaches to supporting GTAs in the US, GTAs in US higher education institutes have a more significant and recognised role as well as more established support structures, compared to GTAs in the UK.

Future institutional approaches

At TCD and across the Irish university sector, centrally coordinated discussions and developments have prompted the careful examination of postgraduate skills development, including its availability and timing. While these wider discussions continue, at TCD, teaching skills is one of six areas currently being developed as part of an inter-institutional project with colleagues at University College Cork (UCC) and National University of Ireland Galway (NUIG). Here we define some of the general principles that are emerging and will inform central practices and priorities for the further short-term development of central support structures for GTAs at TCD.

Strengthened Central Structures

The case studies document a series of central initiatives that can contribute to a more comprehensive programme of central support, matched to GTAs' various stages and roles. The most pressing issues now are scaling central provision to meet demand and creating the opportunity for an accredited study route or a similarly in-depth learning experience that is formally recognised. It may be that these are interrelated, insofar as the experiences to date show that the more formal and structured courses have generated the greatest interest among the GTA community. Both issues pose challenges in implementation, not least because of resource limitations. This might prompt CAPSL to explore approaches such as resource-based learning and student-led learning networks. At institutional level, developing accredited study routes will test the existing curriculum resource models.

Complementary Local Support for Centralised Teaching Development

Internationally, it has not always been the case that GTA supports have developed so readily from within disciplines and schools, although many GTA teaching development programmes in the US are situated within the disciplines. In the UK, "Roberts funding" has significantly influenced and enabled the development of central programmes and support units, although colleagues in an institution comparable to TCD are identifying the emerging need to move the location/ownership of skills training closer to the main academic experience (Turner, 2007). On the basis of evidence from our own institution and the wider international experience and literature, we contend that local support is a core component of an effective "partnership approach" to support GTAs. By this, we mean a mixed approach of local support from academic colleagues and peers within the discipline complemented by access to central formal learning opportunities. Central programmes allow cross-disciplinary discussion and learning, which add value to local support. Developing an integrated local and central

support model poses challenges for development and implementation, but it is likely that this approach will best support GTAs' individual experiences, roles and aspirations, as well as their home disciplines and departments. It will also fulfil the University's commitment to supporting the graduate and undergraduate learning experiences.

CAPSL's Role in Continuing Development and Evaluation of GTA Programmes

As formal and informal and local and centralised support for GTAs continues to develop at TCD, CAPSL's role may need to broaden beyond responsibility for central training and support. As national developments in postgraduate skills training continue and international experiences are increasingly shared, CAPSL will play an important role in maintaining a critical and informed perspective on the currency of emerging programmes. It will be important for CAPSL to be active in feeding ideas and practices from other contexts to schools and disciplines and supporting innovation and development at local level. Similarly, if a holistic model is to be taken forward, CAPSL may also have a role to play in developing appropriate evaluation approaches that can capture and respond to accounts of GTAs' experiences, as well as those of their students, supervisors and academic colleagues.

Conclusions

The Irish government has clearly articulated a commitment to expanding and developing research activity and to increasing the number of students both at fourth and third level. As the country's universities prepare to meet these goals, it is likely that the presence of postgraduate teachers in undergraduate classrooms will become critical in enabling institutions to meet their missions. The development and implementation of effective, inclusive and appropriate programmes that support postgraduates in developing their teaching skills in a range of disciplinary teaching contexts will contribute to the increasing professionalisation of teaching within Irish higher education as well as to the personal and professional development of individual postgraduates who teach. The creation of such structures will challenge a range of existing practices and paradigms. This is no bad thing, because it is likely to enrich the debate on teaching, learning and research as synergistic activities at institutional, disciplinary and individual levels.

References

Exley, K. and Dennick. R. (2004) *Small Group Teaching: Tutorials, Seminars and Beyond*. London: RoutledgeFalmer.

Hanratty, O. and O'Farrell, C. (2007) "Reflective teaching portfolios for continuous professional development at Trinity College Dublin" in *Teaching Portfolio Practice in Ireland: A Handbook*, ed. C. O'Farrell. Dublin: All Ireland Society for Higher Education (AISHE). Available online from: http://www.aishe.org/readings/2007-2/ [accessed 17 July 2008].

Hickson, C.N. and Fishburne, G.J. (2007) "Can we help? Mentoring graduate teaching assistants", paper presented to the Australian Association for Research in Education, Adelaide, 2006. Available online from: http://www.aare.edu.au/06pap/hic06205.pdf [accessed 21 August 2008].

Irish Universities Quality Board (IUQB) (2005) *Good Practice in the Organisation of PhD Programmes in Irish Universities*. Dublin: IUQB. Available online from: http://www.mic.ul.ie/quality/IUQB%20Good%20Practice%20-%20Organisation%20of%20PhD%20Programmes.pdf [accessed 17 July 2008].

Knight, P., Baume, D., Tait, J. and Yorke, M. (2007) "Enhancing part-time teaching in higher education: a challenge for institutional policy and practice", *Higher Education Quarterly*, vol. 61, no. 4, pp. 420–438.

Morss, K. and Murray, R. (2005) *Teaching at University: A Guide for Postgraduates and Researchers*. London: Sage.

National Postgraduate Committee (NPC) (1993) *NPC Guidelines for the Employment of Postgraduate Students as Teachers* [online]. UK: NPC. Available from: http://www.npc.org.uk/page/1003801995 [accessed 17 July 2008].

Nyquist, J.D. and Wulff, D.H. (1996) *Working Effectively with Graduate Assistants*. London: Sage Publications.

Sprague, J. and Nyquist, J.D. (1989) "The challenge of TA training in the 1990s", *New Directions for Teaching and Learning*, vol. 39, no. x, pp. 7–14.

Park, C. (2002) "Neither fish nor fowl? The perceived benefits and problems of using graduate teaching assistants (GTAs) to teach undergraduate students", *Higher Education Review*, vol. 35, no. 1, pp. 30–42.

Park, C. (2004) "The graduate teaching assistant (GTA): lessons from North American experience", *Teaching in Higher Education*, vol. 9, no. 3, pp. 349–361.

Travers, P.L. (1989) "Better training for teaching assistants", *College Teaching*, vol. 37, no. 1, pp. 147–149.

Trigwell, K. and Dunbar-Goddet, H. (2005) *The Experience of Postgraduate Research Students at the University of Oxford*. Oxford: Institute for the Advancement of University Learning (IAUL), University of Oxford.

Turner, J. (2007) "Delivering high quality doctoral training: a Scottish perspective", paper presented to the Ireland–UKCGE Inaugural Colloquium on Graduate Education (Strategies for Generic Skills Training, Development of Research Supervisors and Innovation in Doctoral Programmes), Dublin, 24–25 October.

UK Council for Graduate Education (UKCGE) (1999) *Preparing Postgraduates to Teach in Higher Education* [online]. Available from: http://www.ukcge.ac.uk/NR/rdonlyres/70713230-34E7-43D0-BD40-1A47BEA208FA/0/PreparingPgToTeach1999.pdf [accessed 17 July 2008].

**TEACHING FOR UNDERSTANDING FOR LECTURERS:
TOWARDS A SCHOLARSHIP OF TEACHING AND LEARNING**

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Introduction

This chapter reviews the introduction of Teaching for Understanding (TfU) to lecturers taking the Postgraduate Certificate in Teaching and Learning in Higher Education (PGCTLHE**)** at University College Cork (UCC) in 2006–07.

TfU is a pedagogical framework that focuses on helping teachers understand what students need to understand. We have introduced TfU at UCC as a means of engaging lecturers as teachers in the process of reviewing their own teaching practice, a process for which TfU provides a lens. TfU also has the potential to address some of the challenges facing lecturers in the planning and teaching of courses, such as:

- coverage and detailed planning (goal setting, learning outcomes)
- engaging students in learning
- continuing and formative assessment.

Finally, TfU can provide lecturers with a vocabulary and a way of thinking, a process of opening up and interrogating practice. This process helps the documentation of practice and hence the movement towards approaching teaching as research (Brew, 2006) – in short, towards a Scholarship of Teaching and Learning (SoTL). My chapter in *Emerging Issues 1* was based on conceptualising SoTL and framing its first steps in UCC. It is therefore fitting that in this volume I should build on that foundation and indicate in more detail how SoTL plays out in practice in UCC and how TfU is a useful theoretical and practical framework in mapping out that journey.

This chapter begins with an introduction to the research work of Project Zero at the Harvard Graduate School of Education, out of which the TfU Project emerged. It goes on to provide an overview of understanding and the performance view of understanding at the heart of the TfU model. An exploration of the dimensions of understanding identified in each discipline then follows. The key elements of TfU are then explored. The chapter subsequently focuses on how third-level teachers have benefited from this framework, through a study of some themes and insights emerging from the course portfolio work of participants on the Postgraduate Certificate in Teaching and Learning in Higher Education (PGCTLHE) in the 2006–07 academic year. The chapter concludes with the idea that the TfU framework has much to offer third-level teachers in the 21st century, where accountability and transparency are at a premium, but where disciplinary understanding and student learning must also hold equal sway and act as our compass in guiding teaching as research.

Project Zero and TfU: Background

Project Zero (PZ) is a research group based at the Harvard Graduate School of Education (Hetland, 2002, p. 1–5). For over 30 years, and through dozens of research projects, PZ has investigated the development of learning processes in children and adults. PZ was founded in 1967 by the philosopher Nelson Goodman, to study cognition and development in the arts. Goodman believed that arts learning should be studied as a serious cognitive activity but that close to "zero" had been firmly established about the field, hence the project's name.

Having worked with Nelson Goodman from PZ's inception, Howard Gardner and David Perkins became co-directors of the project in the early 1970s. In 2000, Steve Seidel became the director of PZ. The organisation has expanded its concerns from education in the arts to education across all disciplines and in a variety of contexts, including classrooms, schools, and other educational and cultural organisations.

Although research is a central part of PZ's purpose, the organisation also engages seriously in developing collaborations with educators, offering annual summer institutes and online courses and creating websites and publications. In all these forms, PZ continues to support the creation of communities of reflective learners, encourage the pursuit of deep understanding within and across disciplines, and promote critical and creative thinking. It is in this context that the TfU approach emerged.

The Emergence of the TfU Project

The TfU framework grew out of a sustained collaborative research project, conducted by PZ researchers between 1989 and 1997, with groups of effective teachers working in a range of subject areas and school contexts. According to Wiske (2005, p. 4), the purpose of this project was to clarify the nature of understanding and then to define features of educational practices that helped students develop deep and flexible understanding. The TfU framework emerged as the researchers and teachers analysed case studies of effective teaching practices in relation to current theories of cognition and instruction. As a leading authority on TfU, Wiske (2005) is confident of its influence:

> *In the years since the TfU project published its findings and framework, this educational model has served as a structure for designing educational materials and activities in a wide variety of locations and types of settings throughout the United States and around the world: preschools, elementary and secondary schools, universities and professional development programs (p. 4).*

It is in the context of its application to university teaching that I wish to examine the concept and framework of TfU.

What is Understanding?

Having reviewed both educational research and the effective practices of teachers, the project defined understanding a topic as the ability:

> *to perform flexibly with the topic – to explain, justify, extrapolate, relate and apply in ways that go beyond knowledge and routine skill. Understanding is a matter of being able to think and act flexibly with what you know (Perkins, 1998, p. 42).*

Perkins (1998) uses the metaphor of jazz playing to highlight the nature of learning for understanding:

> *To put it another way, an understanding of a topic is a "flexible performance capability" with emphasis on the flexibility. In keeping with this, learning for understanding is like learning a flexible performance – more like learning to improvise jazz or hold a good conversation or rock climb than learning the multiplication tables.... Learning facts can be a crucial backdrop to learning for understanding, but learning facts is not learning for understanding (p. 40).*

Perkins' argument hinges on a *performance view* of understanding, which foregrounds the application of intelligence in a real context. It is about an active approach to understanding, where students are engaged in their learning and invited to work things out for themselves. It suggests that understanding is in doing and that lecturers need to ask: What do I want my students to be able to understand by the end of this course/session, and what do I want them to do to get that understanding? In this view of understanding, teachers design, scaffold and facilitate learning. Learning does not happen haphazardly, nor does it emerge from textbook recitation. Rather, it is a very real process that requires lecturers to ask some probing questions (see the key elements of the framework below) and to design, teach and assess the course accordingly.

The performance view contrasts with the *representational view* of understanding, which claims that there is a definite representation of understanding, which teachers transmit, and which learners do or do not possess. As Perkins (1998, p. 47) points out, the problem with this possessive view of understanding is that it does not allow for learners who do not "get" or "have" the picture. Neither does it allow much for teacher intervention, other than that of a didactic kind, whereby teachers try to transmit their understanding.

The performance view of understanding is much more open and flexible, suggesting an incremental and transformational view of learning as that which is acquired over time, through what Perkins (1998, p. 42) terms "understanding performances" or "performances of understanding". By definition, these are activities that go beyond rote and routine and challenge learners to demonstrate their understanding. Indeed, these performances are learning outcomes in action – after all, learning outcomes indicate what students should be able to do by the end of a course (Kennedy, 2007).

At this point, it is helpful to distinguish between the expectations of "entity" learners and "incremental" learners in order to highlight the attitude and commitment necessary to pursue understanding (Hetland, 2002, p. 26; these terms were originally coined by Carol Dweck and her colleagues at the University of Illinois). *Entity learners* are more at home in the representational model of understanding, because they expect that they should "get it", that learning is about taking in an entire entity at once, and that the role of teachers is to supply this product, in the form of "the notes" or "set answers". *Incremental learners*, on the other hand, come gradually to understand by performing, doing, or engaging in activities that are real within the world that is to be understood. Incremental learners believe that learning requires persistence, that understanding is won through continued effort, and that mastery is acquired in steps. The TfU model is a good fit for these learners and their characteristically interactive, experiential and dynamic methods of learning; this kind of learning also forms the base for the TfU model's account of the disciplines and disciplinary understanding.

The Dimensions of Understanding and Their Role in the Disciplines

As university lecturers, we come to the classroom as specialists in a discipline, as well as teachers of that discipline; this is a key aspect of TfU, which is based on the solid foundation of disciplinary understanding. It is also a key aspect of the Scholarship of Teaching and Learning (SoTL), which acknowledges that our disciplines inform our pedagogy and affect and, indeed, effect teaching and learning (Huber and Morreale (eds), 2002; Huber, 2006). Disciplinary understanding implies that we need to teach students how to think in the discipline and to act as experts in the field. For us as lecturers, disciplinary understanding

implies that we model what it is like to think in and work in the discipline and that we involve our students in this process.

TfU proposes that embedded in each discipline are the following four dimensions of understanding, which we should bear in mind when planning classes and teaching:

- knowledge of important concepts in the discipline (What is the knowledge base?)
- methods of disciplined reasoning and inquiry (How is knowledge created?)
- purposes of the discipline (What drives inquiry in the discipline?)
- forms of expressing understanding (How is knowledge communicated?)
  (These dimensions are explained more fully in Boix and Gardner, 1998).

An awareness of the dimensions of understanding embedded in each discipline and their implications for how and what we might teach is a central aspect of a TfU approach and a necessary element in helping lecturers to critique the conventional lecture, which for various reasons is still a primary teaching method for many lecturers. It is my contention that the conventional lecture has in many cases decontextualised knowledge and disconnected the various dimensions of understanding from each other, rendering students passive absorbers of knowledge and throwing them back on rote learning in an attempt to make sense.

In contrast, the TfU model proposes vital connections between the four dimensions. The *knowledge* dimension, for example, focuses on declarative knowledge and describes the quality and sophistication of how we recognise and use facts, names and rules; it is best seen holistically in the context of the other dimensions. Without disciplinary *methods* (how we learn to build knowledge in the discipline), disciplinary *purposes* (why this knowledge has significance for us and how we own and make sense of it) and disciplinary *forms* (the various representations we give to knowledge in making it our own and sharing it), knowledge is inert and without context. Until students are engaged in the learning from a personal perspective (purpose) and given the opportunity to build knowledge as part of the lecture (methods) and to share and represent their understanding of what is being taught (forms), Bligh's (1972, 1998) critique of lectures as too passive will hold sway for many years to come. Lectures in the 21st century should represent only a small subset of the teaching repertoire; they require significant pedagogical framing (as opposed to presentational packaging) and must rise to the challenge of prioritising student understanding, or become outmoded.

The dimensions of understanding are important because they remind lecturers that theirs is a double-edged sword, at once disciplinary and pedagogical: as lecturers, we must both advance the discipline and engage our students. In SoTL terms, we must be acutely aware of our disciplinary stance, but we must also be equally aware of developing "pedagogical content knowledge" (Shulman, 1987) and of documenting our evidence for student learning. An appreciation of the dimensions of understanding helps us to bridge the gap between the discipline and the classroom; with such an appreciation, we can examine the nature of each dimension of the discipline and then allow that to inform how we plan and teach, so that our students will learn.

Key Elements of the TfU Framework

Wiske (2005) defines the goal of education as the cultivation of a "flexible capability to think and apply one's knowledge" (p. 4). This has significant implications for the process of learning and teaching and is certainly a challenge for third-level teachers. If understanding

is demonstrated by performance, it follows that understanding is also developed by performances of understanding. According to Wiske (2005), "Such performances require learners to stretch their minds, to think using what they have learned, and to apply their knowledge creatively and appropriately in a range of circumstances" (p.5). Therefore, the TfU project made "performances of understanding" the centrepiece of its model and provided teachers with a theoretical and practical framework in which to ground and map active learning.

The TfU framework poses four questions, which are designed to elicit understanding (Wiske, 1998):

1. What topics are worth understanding?
2. What is it in these topics that needs to be understood?
3. How can we foster understanding?
4. How can we tell what students understand?

What topics are worth understanding?

In the TfU framework, the topics worth understanding are known as *generative topics*, because they generate the knowledge that forms the basis of the course to be taught. This question challenges teachers to choose a topic that is central to the discipline, interesting to students and teachers, accessible to students, relevant to our students' lives and learning experiences, and that provides opportunities for multiple connections with other topics on the course. When teachers choose generative topics appropriately, they teach for understanding and not for coverage. They must be selective and justify the topic's centrality and necessity. Generativity begets passion and motivation and is much prized in Boyer's (1990) concept of scholarship.

What is it in these topics that needs to be understood?

The TfU framework proposes that this question can be answered by identifying *overarching goals* (long-term goals)*, also known as *throughlines*, and *unit-long understanding goals* (short-term goals) for the course under consideration. These goals take the form of questions or statements that express what is most important for students to understand in a course. Planning is central to this activity. These goals must be made public and accessible to students. This aspect of the TfU framework implies that we must be accountable to our students and that our course outlines must be clear, stable and accessible. In this respect, the framework is also consistent with the Bologna agreement's emphasis on the importance of learning outcomes: TfU goals and learning outcomes both articulate what we want students to understand and be able to do by the end of the module (Kennedy, 2007).

By grounding learning outcomes in a TfU framework, lecturers can maximize the use of Bloom's Taxonomy within a constructivist context. That is, some lecturers worry that learning outcomes may be narrow or inflexible. But the TfU framework is holistic, dialogical and flexible, because it focuses on active learning via performances of understanding, as well as the constant assessment and adaptation of those performances in relation to the goals of the course and the generativity of the module. Lecturers might also bear in mind that Bloom's taxonomy is a flexible tool that has survived the test of time (Anderson and Krathwohl, 2001) and that its revision "emphasises the use of the taxonomy in course planning, instruction and assessment" (Moseley *et al*, 2005, p. 103). Because TfU is also designed to maximise course planning, instruction and assessment, Kennedy's (2007) point that there is a process of "dynamic equilibrium" between TfU and learning outcomes is well

taken.   It is the concept of a performance view of understanding that facilitates such equilibrium, since it focuses on what we want the students to do in order that they might understand. In a TfU model then, the concept of learning outcomes is already in-built.

How can we foster understanding?

This question invites us to think of our learning and teaching methodologies not as ends in themselves, but as ways of developing understanding and ways of demonstrating it – that is, ways of facilitating performances of understanding. As already discussed, these performances are activities that both develop and demonstrate students' comprehension of the understanding goals in question, by requiring students to use what they know in new ways. Such performances provide a real context for active learning in the university classroom. Students are given focused tasks/performances that are integral to the key goals and outcomes of the course and that challenge their thinking and assumptions. In line with the dimensions of understanding, performances are devised with the methodologies of the discipline in mind, so that pedagogical and disciplinary methods intersect and interact. In relation to learning outcomes, the performances of understanding undertaken by the students already beget these.

How can we tell what students understand?

We can tell what students understand by designing *ongoing assessments* that elicit and support students' incremental understanding. Importantly, these assessments are the means by which students gain continual feedback about their performances of understanding as the basis for improving them. In this framework, then, assessment is not the tail that wags the dog; rather it is a formative, diagnostic tool that helps students to build confidence as they grow into the methods and thinking of the discipline they are studying. Embedding learning outcomes in a TfU approach provides the constructive alignment necessary between the lecturer's goals and the students' learning. Within the TfU model, the learning outcomes are not an appendage, but an intrinsic part of the process of learning and feedback.

Teaching for Understanding in the PGCTLHE (2006-07)

My evidence regarding how lecturers approach TfU is derived from a series of course portfolios that lecturers produced as part of the Postgraduate Certificate in Teaching and Learning in Higher Education (PGCTLHE) in May 2007. For full details of the portfolio assignment on this course, see the Appendix. Lecturers were asked to take a TfU approach to the teaching of a course or module and to document this in a course portfolio.

The portfolio is an important vehicle for documenting and developing practice (Hutchings 1998). It encourages lecturers to focus on the design of the course they are teaching, its enactment – that is, how it plays out in daily teaching and interaction – and finally on its results – that is, its student learning. At the same time, lecturers must adopt a reflective stance as they present and critique their practice. It includes a creative element insofar as lecturers are invited to tell the story of the course from several perspectives.

In the PGCTLHE, the course portfolio also gave participants a chance to engage in SoTL by making their practice publicly available, open to critique and capable of being built on by others (Shulman, 1993). In this case, participants had two opportunities to present their portfolios. In the first term (TL4000), they presented a first draft of their work. In the second term (TL4001), they were asked to review the portfolio in the light of their progress and of feedback given. Note that for the final reflection (see the Appendix) they were asked

to consider in what ways (if any) they found the TfU framework useful for documenting their teaching and enquiring into student learning.

The following section presents the reflections of participants on the course, all of whom are colleagues across all faculties of UCC. I have organised this material in relation to common themes that emerged during my research, and which provide several perspectives on TfU.

TfU: A Vehicle for Professional Development

Many lecturers take the PGCTLHE because it is an opportunity for them to stand back from practice and explore the role of teachers as researchers of student learning. The reflections below discuss the lecturer as learner and highlight one of the fundamental insights often gained as a result of a TfU and SoTL to academic development – that teaching is about learning.

> *The TFU framework confirmed that I was doing many things right, but that there was room for improvement.*
> *(Lecturer A, Department of Government)*

> *Approaching my role from the TFU framework has allowed me to take myself off the hook and focus my energy on designing, delivering and assessing courses to facilitate students learning, rather than proving my own knowledge. I felt liberated.*
> *(Lecturer B, Department of Food Business and Development)*

> *Up to starting this course, I had been overly concerned with the quality of presentation of my information. While I realise that this is still important, [I have] moved from looking solely at me as a teacher to looking at my students, their level of understanding and how I may help them develop their understanding of Humanities Computing.*
> *(Lecturer C, Department of History)*

> *In terms of my career as a university teacher, I have generally found myself having to get on with the practice of teaching , with little chance to consider why I was doing what I was doing.*
> *(Lecturer D, Department of Applied Social Studies)*

> *This framework has caused me to reflect on my teaching practice and question my role. I now see my role as facilitator of student enquiry rather than transmitter of information.*
> *(Lecturer E, Department of Nursing and Midwifery)*

> *I am reminded of Schön's idea of reflection in action where we think as we act, enabling us to understand what it is to think clearly about something. Jazz musicians think on their feet when improvising, taking a musical idea and creating a unique musical expression running over an idea until one can say "that's it". I think we, as a class, probably did the same. Certainly my journey from generic to singular presentation of the TfU theme was an illustration of Schön's idea of reflection-in-action.*
> *(Lecturer F, Department of Economics)*

TfU: A Structure for Planning and Reflection on Student Learning

These reflections underline the systematic and holistic nature of the TfU framework. As such, it facilitates the examination and redesigning of courses and provides a clear structure that allows for critical reflection.

> *It (TfU) has given me an incentive to explicitly question what it is I want my students to know and understand, which has led to an explicit and formal statement of the desired learning outcomes for the module. In essence, applying the TFU framework has facilitated attainment of these learning outcomes. In their turn, they have encouraged me to examine and redesign my teaching plans to ensure that learners are supported and empowered in reaching these important skill levels. With its emphasis on generative topics, understanding goals, performances of understanding, the TfU approach has encouraged me to place student understanding at the centre of my teaching design and has allowed me to shed my prior concern with coverage and to incorporate a focus on uncovering those key questions that I consider it crucial that my students appreciate and understand.*
> *(Lecturer G, Department of Accounting, Finance and Information Systems)*

> *It (TfU) is a systematic framework – we move from throughlines to generative topics to understanding goals and performances and back again. The framework enables a relative transparency to the teaching process that should be accessible to other teachers and students.*
> *(Lecturer D, Department of Applied Social Studies)*

> *TfU provided a local theory of educational practice or a framework for structuring reflection that facilitated a more systematic and critical reflection of my teaching practice than I had previously undertaken. TfU provided a number of layers of inquiry and within each of these layers a number of techniques for design and development.*
> *(Lecturer H, Department of Applied Psychology)*

> *TfU forces one to look more scientifically at the approach to teaching and learning. The important thing is not what we want to teach but how we can help the student learn to engage in various activities linked to this. The important thing is to empower students.*
> *(Lecturer I, Department of Applied Social Studies)*

TfU: The Development of a New Vocabulary

TfU gives lecturers a new discourse that allows them – and their students – to name the parts of their practice and therefore to reflect on and discuss pedagogy.

> *The new course design, aided by the TfU framework, provides students with a greater understanding of what is expected of them. They now have the tools and vocabulary of reflection. As a result, the standard of placement work has increased significantly.*
> *(Lecturer A, Department of Government)*

> *I felt unsatisfied with many aspects of my teaching, but I did not have a vocabulary that would allow me to express the reservations I had, nor did I have a way to systematically analyse the purpose of what I was teaching in terms of*

student learning. I felt that the dimensions of understanding framework was especially helpful in that it allowed me to systematically analyse what I was teaching and why I was teaching it. It also helped me to develop a vocabulary to express what I was doing and this has allowed me to engage in meaningful conversations with colleagues.
(Lecturer C, Department of History)

TfU: Active Learning and Performances of Understanding

These quotations focus on TfU as a way of facilitating active learning and performances of understanding that are about learning how to learn.

As a result (of TfU) in delivering my masters course on intellectual property law, I now incorporate student-led teaching as a key aspect of my teaching approach and already I can identify a fresher and more engaging group of students who seem somewhat less intimidated by the notion of speaking up and certainly might feel somewhat responsible for the success of the seminar.
(Lecturer J, Department of Law)

One of the revelations of both modules is that we should not just be teaching students information or knowledge (facts, figures, theories) but how to be active learners (that is, learning how to learn) a necessary skill which reaches beyond the higher education setting.
(Lecturer D, Department of Applied Social Studies)

I strongly feel that course success can be attributed to whether the students embrace the subject area through participation in class and group discussions and of course whether they are open to trying new learning techniques.
(Lecturer K, Department of Accounting, Finance and Information Systems).

Conclusion

This chapter set out to contextualise TfU, to outline its framework and its theoretical underpinnings, and to give readers some idea of how lecturers experienced working with TfU. Unfortunately, it is beyond the scope of this chapter to provide detailed exemplars of the TfU framework in its application to at least 50 contexts across all faculties during 2006–07. The individual course portfolios testify, however, to the flexibility of the framework in accommodating different disciplines and to its power in revealing the deep structure and unfolding of a particular course. One of the most important points to emerge about TfU is that it is:

a continual process, not a method that teachers perfect and implement once and for all. The process is part of an ongoing inquiry that professionals carry out as they focus on research-based principles of good practice, apply these principles to design and modify their own practice, and study the results of these efforts to make further improvements (Wiske, 2005, p. 9).

The TfU framework is worth considering at university level because it is based firmly on the promotion of disciplinary understanding. In terms of SoTL, it supports a process of enquiry that invites third-level teachers to reflect rigorously on teaching and learning; define goals; design new practices; assess how they work; and then reconsider both the practices and the guiding principles (Wiske, 2005). This cyclical and dynamic process aligns well with Schön's (1995) vision of how SoTL plays out as a new epistemology, as "a kind of action research".

Indeed, based on their sustained use of the TfU approach, the PGCTLHE class of 2006–07 produced a series of posters for an international conference held in UCC in November 2007, International Perspectives on Teaching and Learning in Higher Education. The published proceedings (Ryan, 2008) include the posters and TfU designs discussed above.

The TfU approach has done much in the certificated courses in UCC to open up new ways of thinking about teaching and learning. It structures a powerful curriculum development process at the same time as it encourages teachers to reflect on and make public their practice. Thus it moves us further along the road to a scholarship of teaching and learning – in short, towards a view of teaching as an intrinsic part of research.

References

Anderson, L.W. and Krathwohl, D.R. (eds) (2001) A Taxonomy of Learning, Teaching and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives. New York: Longman.

Bligh, D. (1972) What's the Use of Lectures? Hammondsmouth: Penguin.

Bligh, D. (1998) What's the Use of Lectures? Exeter: Intellect.

Boix, M.V. and Gardner, H. (1998) "What are the qualities of understanding?" in Teaching for Understanding: Linking Research with Practice, ed. M.S. Wiske. San Francisco: Jossey-Bass. pp. 161–196.

Boyer, E. (1990) Scholarship Reconsidered: Priorities of the Professoriate. The Carnegie Foundation for the Advancement of Teaching, San Francisco: Jossey-Bass.

Boyer, E. (1997) "Prologue: Scholarship – A personal journey" in Scholarship Assessed: Evaluation of the Professoriate, eds E. Glassick, M. Huber and G. Maeroff. The Carnegie Foundation for the Advancement of Teaching, San Francisco: Jossey-Bass. pp.1-3

Brew, A. (2006) Research and Teaching: Beyond the Divide. London: Palgrave MacMillan.

Hetland, L. (2002) Educating for Understanding: A Guide to the Video Series. Port-Chester NY: Dude Publishing.

Huber, M. (2006) "Disciplines, pedagogy and inquiry-based learning about teaching", in Exploring Research-based Teaching, ed. C. Kreber. San Francisco: Jossey-Bass. pp. 69-77

Huber, M. and Morreale, S.P. (eds) (2002) Disciplinary Styles in the Scholarship of Teaching and Learning. Washington DC: American Association for Higher Education (AAHE) and the Carnegie Foundation for the Advancement of Teaching.

Hutchings, P. (ed.) (1998) The Course Portfolio: How Faculty Can Examine Their Teaching to Advance Practice and Improve Student Learning. Washington DC: American Association for Higher Education (AAHE).

Kennedy, D. (2007) Writing and Using Learning Outcomes: A Practical Guide. Cork: University College Cork.

Moseley, D., Baumfield, V., Elliot, J., Gregson, M., Higgins, S., Miller, J. and Newton, D. (2005) Frameworks for Thinking: A Handbook for Teaching and Learning. Cambridge: Cambridge University Press.

Perkins, D. (1998) "What is understanding?" in Teaching for Understanding: Linking Research with Practice, ed. M.S. Wiske. San Francisco: Jossey-Bass. pp. 39–58.

Perkins, D. (1999) "The many faces of constructivism", Educational Leadership, vol. 57, no. 3, pp. 6-11.

Ryan, N. (2008) Proceedings of the International Perspectives on Teaching and Learning in Higher Education Conference. Cork: National Academy for Integration of Research & Teaching & Learning (NAIRTL).

Schön, D. (1995) "The new scholarship needs a new epistemology", Change, November. pp. 27-34

Shulman, L. (1987) "Knowledge and teaching: foundations of the new reform", Harvard Educational Review, vol. 36, no. 1, pp. 1–22.

Shulman, L. (1993) "Teaching as community property: putting an end to pedagogical solitude", Change, November/December, vol. 25, no. 6, pp. 6–7.

Wiske, M.S. (1998) "Introduction: the importance of understanding", in Teaching for Understanding: Linking Research with Practice, ed. M.S. Wiske. San Francisco: Jossey-Bass. pp. 1–10.

Wiske, M.S. (2005) Teaching for Understanding with Technology. San Francisco: Jossey-Bass.

Appendix 1

ASSESSMENT GUIDELINES FOR POSTGRADUATE CERTIFICATE IN TEACHING AND LEARNING IN HIGHER EDUCATION 2006–07: TL 4000 AND TL 4001

PGCTLHE Module 1: Theories of Teaching, Learning and Assessment (TL 4000)
Assessment Guidelines (Extracts relate to Course Portfolio Guidelines)

1. Create a course portfolio of teaching, which will contain a series of entries based on the lecturer's work in a particular course. The three central entries should be no longer than eight pages each of typed script (2000 words each, 12-point, double spacing). The introduction and conclusion should be a maximum of three pages each of typed script (750 words, 12-point, double spacing).
(Portfolio submission date: 29 January 07)

Guidelines for creating and developing your course portfolio

The course portfolio should be structured as follows:

- Introduction: Present your teaching context and beliefs about teaching and learning.
- Entry 1: Create/review the design/structure of your course, using a TFU approach.
- Entry 2: Investigate a student-centred strategy implemented in teaching the course.
- Entry 3: Analyse what students have learnt as a result of the course/key session.
- Conclusion: Write a reflection drawing the portfolio strands together.

Introduction (three pages max)

Give the context in which you teach and explore why you want to look in particular at the course you have chosen. Develop your introduction by focusing on your own teaching philosophy, and the theories of teaching and learning that you embrace and that underpin the course you are designing. Use your understanding of and reflections on the teaching and learning theories discussed in the PGCTLHE course thus far to frame/guide your introduction.

Entry 1: Design: Creating and planning the course (eight pages max)

Use the Teaching for Understanding (TfU) framework to revisit/create your course plan. Design the course using the four key elements of TFU: Generative topic; Understanding goals; Performances of understanding; and Ongoing assessment. Present your course as concisely as possible so that it could be shared/taken up by colleagues. Reflect on the elements of the course in the light of the role they play in engaging students and promoting their learning.

Entry 2: Enactment: Teaching the course (eight pages max)

Investigate one student centred-strategy you used in teaching the course. In terms of TfU, focus on one key performance of understanding and on how you developed this to involve students and facilitate their learning.

Entry 3: Results: Assessing student learning (eight pages max)

Analyse what students have learned as a result of this intervention/performance. How do you know what your students know and understand from this performance of understanding? What ongoing assessment strategies have you put in place to harness their learning? What criteria are there to assess this performance?

Conclusion: Overall reflection and implications for future practice (three pages max)

What have you learned as a result of this course portfolio process? In what way/s does the course need to be reviewed/redesigned? Review the key elements of the course from a TfU perspective, focusing on what you would change in the light of experience and student learning/feedback.

Note: If you have not yet had the opportunity to teach the course, focus in your entries on potential preconceptions, misconceptions, rigid practice and lack of skills that students might have, which are informing your decisions/design of the course. Relate to your own learning in the discipline to help anticipate students' bottlenecks.

PGCTLHE Module 2: Practice Approaches to Teaching, Learning and Assessment (TL4001) Assessment Guidelines (Extract relates to Course Portfolio and TfU)

1. Development of the course portfolio from Term 1: Submission of full portfolio: Friday, 4 May, 2007. (Note dates below for individual entries. These are necessary deadlines if you are to make the most of ongoing feedback for your final draft.)

   The course portfolio should be developed as follows:

   1. **Design of your chosen course/module:** Your first entry should be refined in the light of feedback and in line with the TfU model. For example, you must present an outline of your module using the four elements of TfU.
   2. **Teaching/enactment:** Present a second entry on your teaching practice as follows: Make a 10–15 minute video of your own practice and critique this in line with the observation schedule guidelines presented in Peer Review sessions. Include details about the time and date you recorded the class and provide details/context of the class. Critique your practice using any three of the following: action sequence; learning environment; discourse analysis; movement; cultural context. Then use the TfU questions in the schedule to draw your critique together. You can work alone or with a colleague to complete this assignment. If you are including the perspective of a peer/colleague, you need to reflect on this critique. (900 words max; submission Friday, 30 March, 2007).
   3. **Assessment/results:** A second entry to be added. Write the learning outcomes for your chosen course and align these with an ongoing assessment approach in keeping with the TfU framework. (900 words max; submission Monday, 12 March, 2007)
   4. **Final Reflection:** Before presenting the final draft of your portfolio for 4 May, 2007, you need to take into account the feedback presented on all assignments. In drawing your portfolio together, answer question 1 and either 2 or 3 below:
      i. In what ways, if any, did you find the TfU framework useful in documenting and enquiring into your teaching and student learning?
      ii. What have you learned from your portfolio about your teaching and student learning? What are the implications of this portfolio for your future planning and teaching of your chosen course?
      iii. How did the course portfolio help you as a way of enquiring into and documenting your teaching and student learning?

ENCOURAGING STUDENT CREATIVITY IN HIGHER EDUCATION

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Introduction

> *People seem to concentrate best when the demands on them are greater than usual and they are able to give more than usual. If there is too little demand on them, people are bored. If there is too much for them to handle, they get anxious. Flow occurs in that delicate zone between boredom and anxiety (Csikszentmilhalyi, 1986, cited in Goleman, 1996, pp. 91–92).*

This chapter focuses on how teachers encourage the development of creative states of flow in their students and in themselves. The chapter aims to stimulate educators in higher education to think freshly about creativity and to widen their range of strategies for encouraging student creativity.

In our knowledge society, it is more and more important to encourage students to develop their abilities to reason and think creatively. The notion of the knowledge society is widely discussed in the literature, with many ideas about knowledge and education emerging in recent years. For example, exploring theoretical underpinnings of the concept, Hammershøj (2006) strongly contends that the knowledge society is an economic concept based on the idea that the primary focus of production has shifted from industry to knowledge. This production is of specifically *creative* knowledge, as indicated by a contemporary discursive emphasis on both "creativity and innovation". From the literature, the following question arises: when the capacity to be creative is in demand, what is important for artists, thinkers and students in higher education to learn? Laurillard (2002) has argued that universities have responded to the knowledge society's need for more graduates, mainly taking the form of improved access policy and strategies to programmes of study. Although the notion of a knowledge society is contentious, its currency in the 21st century highlights the need for the development and facilitation of student creativity.

The first part of the chapter prompts readers to think about creativity – their students' and their own – in new ways. Indeed, encouraging educators to think about creativity is critical for developing students' creativity. The second part of the chapter addresses the question of how to develop student creativity by discussing practical strategies for encouraging it through designing curricula for creativity, facilitating learning for creativity and devising assessment strategies that promote creativity. The implications of this for the professional development of teachers in higher education are discussed. The chapter also includes in an appendix a list of references and resources aimed at prompting readers to play further with their understanding and practice of encouraging student creativity.

Exploring the nature of creativity

Here we offer some ideas about student creativity, drawing on:

- philosophical and theoretical understandings of creativity
- starting points for creativity
- the four interweaving elements of creativity

- perspectives on the outcomes of creativity.

Philosophical and Theoretical Understandings

Brockling (2006, p. 516) presents an illuminating four-dimensional philosophical view of creativity. It illuminates the argument on creativity in this chapter as it is propagating the need for creativity, freedom and self-determination to harmonise all aspects that teachers can support in their own students. It is:

> *firstly, something that everyone has – an anthropological capacity; second, something one ought to have – a binding norm; third, something one can never have enough of – a telos without closure; fourth, something that can be intensified through methodological instruction and exercise – a learnable competence.*

Starting Points

For us, the creative process begins when the gap between "who we are and what we do" (Kane, 2004) is narrowed. This is a Rousseauism: I am myself to the extent that I am creative. Therefore, the first role of the educator in developing creativity is to encourage students to explore who they are by identifying their particular passions, interests and gifts:

> *So if one wishes to inject creativity in the education system, the first step might be to help students' find out what they truly love, and help themselves to immerse themselves in the domain – be it poetry or physics, engineering or dance. If young people become involved in what they enjoy, the foundations for creativity will be in place (Csikszentmihalyi, 2006, pp. xix-xx).*

Once students have identified their domains of interest, they can be encouraged to go on to enquire into more specific topics, projects, specialisations and employment niches that engage them.

The Four Elements of Creativity

The operational definition of creativity for this chapter is provided by Robinson (2001, p. 211), who characterises creativity as having four main elements:

- the medium
- expertise in or mastery of the medium
- the need to play and take risks
- the need for critical judgement.

Each of these elements gives rise to important considerations for learning and teaching.

For example, it is important to consider media for creativity in order to answer the following types of questions about learning and teaching strategy:

- What are the right media for individual students in relation to their interests, talents and preferences?
- As an educator, how can I best develop creativity in students by allowing or encouraging them to find the right medium or combination of media?
- What are my critical reflections on the media I currently use in my teaching?

We should be aiming not only to help students explore media for creativity, but also to achieve expertise in or mastery of certain media. Therefore, we might consider the following questions:

- What opportunities do we provide as educators for our students to reach high skills levels in the use of a variety of media?
- Do we teach academic writing, creative writing, visual literacy, drawing or whatever skills are relevant to our students to develop their creativity?
- How do we foster both the development of learning skills and imagination?

As we answer these questions, we might remember that creativity "is not only a matter of control: it's about speculating, exploring new horizons, and using imagination" (Robinson, 2001, p. 133).

Kane (2004) asserts that play has replaced work as the dominant mode of the 21st century for generating meaning. In higher educations, we can encourage students to play with the ideas and interrelationship between concepts by asking ourselves the following questions:

- Do we give students freedom enough to play?
- Are we, as educators, enthusiastic and playful about our subjects?
- How do we encourage students to combine creative thinking with critical thinking, brainstorming with judgements, and exploration with discipline in ways that will enhance their creativity?
- How do we stimulate students to articulate the questions they want to explore rather than simply transmitting knowledge to them?

By dialoguing with these questions we can find concrete ways to encourage students to engage in the creativity of playfully combining things that they have not previously combined together.

The outcomes of creativity

Creativity is also characterised by the nature of its outcomes. Thus Robinson (2002, p. 118) defines creativity as "imaginative processes with outcomes that are original and of value". It is important that in our work of developing creativity we both widen and revitalise our notion of originality. Originality is not only about producing something new but also about combining old elements in new ways or applying old ideas to new contexts in order to work on a problem, advance a particular field and to add to the storehouse of knowledge and the repertoires of professional and artistic practices. Murray and Moore (2006, p. 31) note that creative people are "more likely to think in boundary-less ways about a topic, and are happy to 'borrow' important notions from fields of enquiry other than their own". The outcomes of creativity are personal and/or economic, but can also be spiritual, social, environmental and political.

The importance of developing student creativity

Jackson *et al* (2006) argue that it is important to develop student creativity in higher education for personal, economic and social reasons.

On a personal level, improved creative capacity is likely to generate gains in satisfaction, wellbeing, happiness and self-identity, as well as enhanced potential for professional development. These gains occur as individuals explore their own potential and imagine new

possibilities for themselves and others. Personal creativity, understood in terms of the play ethic, is a way of thinking that tries to close a huge gap in modern living, the gap between who we are and what we do (Kane, 2004).

Increased global competition, and the growth of the information society and new technologies, has resulted in the emergence of new forms of work and the demand for new kind of workers – that is, knowledge workers. These workers draw on creative knowledge to produce new products and services to support economic growth. Brockling (2006, p. 513) argues that:

> *The importance of being creative is nowadays connected to the mobilisation of the entrepreneurial self. Entrepreneurial action demands permanent innovation and consequently ceaseless creative exertion. Everybody not only has to be simply creative, but more creative than the others.*

The social reasons for developing students' creativity are paramount. The contemporary world is ever-changing and "supercomplex", rather than complex:

> *A* complex *world is one in which we are assailed by more facts, data evidence, tasks and arguments than we can easily handle* within *the frameworks in which we have our being. By contrast a* supercomplex *world is one in which the very frameworks by which we orient ourselves to the world are themselves contested (Barnett, 2000, p. 257)*.

New, different and creative thinking will allow students to respond to both the possibilities and problems presented by this supercomplex world. For example, we need creative thinking to tackle global problems including world poverty and global environmental issues, to "enrich the future instead of impoverishing it" (Csikszentmihalyi, 2006, p. xiix). In turn, we need pedagogies that can support and nurture this kind of thinking.

> *The challenge to humanity is to adopt new ways of* thinking*, new ways of* acting*, new ways of* organising *itself in society, in short, new ways of* living *(Wilson, 1997, p. 11)*.

Facilitating student creativity

If creativity is so important, how do we facilitate it? There have been extensive and comprehensive reviews of the large literature bases within creativity, teaching and learning by Stein (1988) and Fryer (2003), among others. There has, however, been a lack of critical engagement with the question of introducing creativity to the higher educational system. Indeed, Gardner (1982) notes that earlier studies of learning and development had mostly neglected creativity. Recently, this gap has been addressed by Jackson *et al* (2006), who focus on the role of creativity in higher education.

Csikszentmihalyi (2006) believes that if young people become involved with what they enjoy, the foundations for creativity will be in place. It follows therefore that teachers must model the joy of learning themselves, and be able to spark it in their students. Similarly, pedagogy should be focused on arousing student imagination and engagement. Since the late 1990s, several studies have identified common themes in what students and teachers say about how best to facilitate student creativity in higher education. For example, Cropley (2001) suggests that surveys have shown that in theory at least, teachers overwhelmingly support creativity as something that should be fostered in the classroom. Moreover, teachers who

successfully facilitate creativity are likely to be those who encourage independent learning, take student questions seriously, promote self-evaluation, reward courage as much as correctness, and who have a cooperative, socially integrative teaching style.

Research by Oliver *et al* (2006) on students' experiences of creativity in a broad spread of subject disciplines points to specific teaching techniques that students consider to be creative. These include role-playing, debates and posters for class presentations. Some quite conventional forms of teaching are also nominated as creative, specifically dialogic teaching with discussions that concentrate on students' current understanding or beliefs. One-to-one tutorials are highlighted as especially helpful to students, as are providing encouragement, giving examples or offering feedback. Teachers should note that it is *how* these techniques are used, rather than the mere inclusion of them within our repertoire of techniques, that is the key to success.
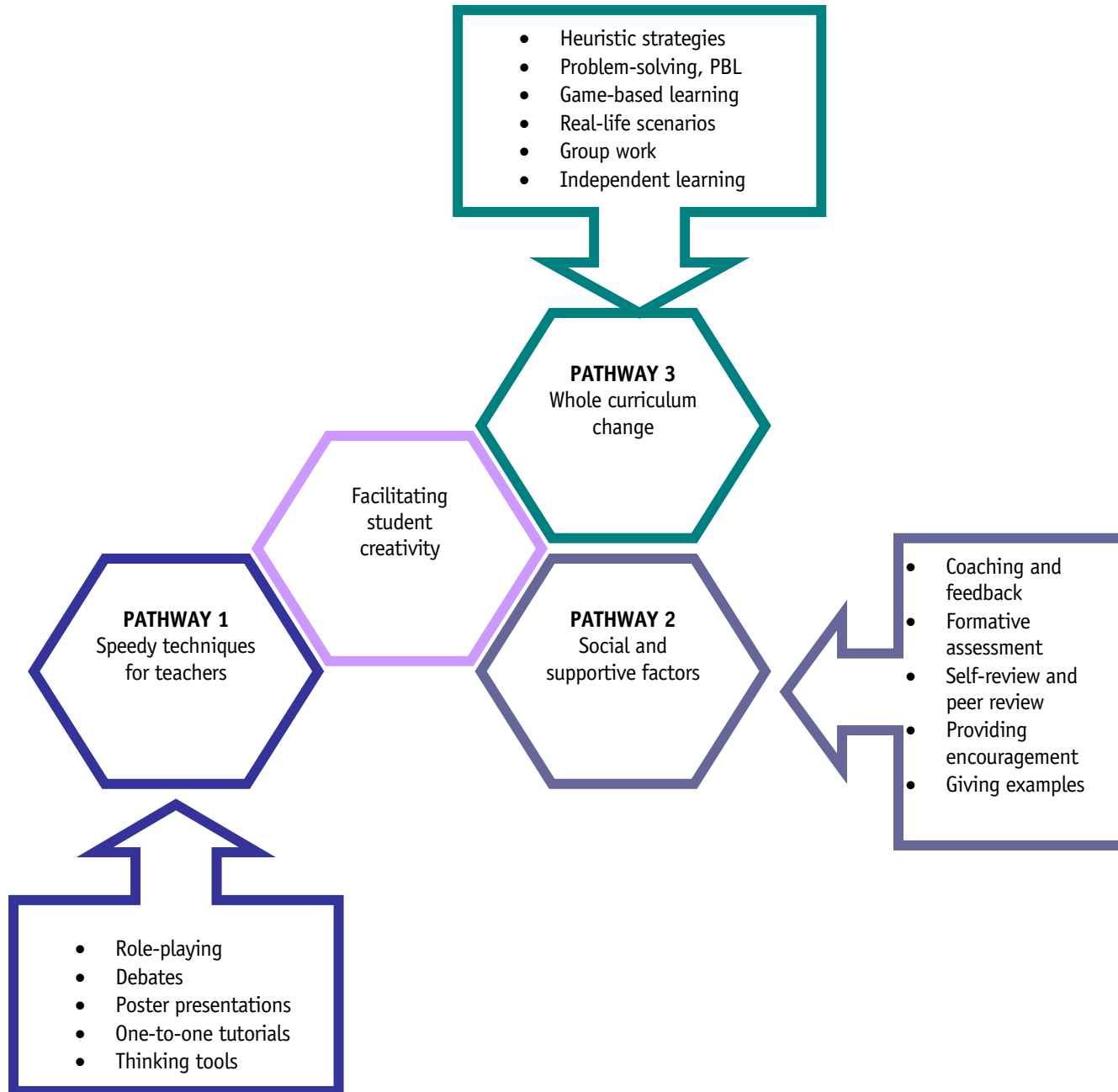
A study by Fryer (2006) identifies several teaching techniques for facilitating creativity: heuristic strategies ie problem-based learning (Barrett 2005); game-based learning that utilises challenging problems; real-life scenarios; practical exercises; and group work. As in Oliver *et al* (2006), Fryer's work shows that positive teacher attitudes and supportive factors such as the relationship between tutor and students are also significant in facilitating a creative learning environment.

Teaching specific creative thinking tools in a way that is embedded into the discipline is important in providing tools to work creatively (Baille 2003). There are several thinking tools, such as the six thinking hats technique that can be used to stimulate creativity among students (de Bono, 1999; Baille, 2003). These techniques have been proven to stimulate creativity in both education and work contexts.

Several initiatives are taking place in learning and teaching to foster student creativity. For example, Diehm's (2004) research focuses on the use of electronic portfolio projects to highlight the creative nature of student learning. Through the use of 'efolios', students are encouraged to learn new skills and concurrently are being challenged to implement them. Indeed, in recent years, technology has been regarded as having a potentially critical role to play in supporting and transforming creative communities at all levels and stages in the higher educational process. It is argued in this chapter that the challenge for educators is to research fully these opportunities, as well as to learn how to sustain the creative process successfully within higher education. The technology, whatever its nature, should support the pedagogical purpose underpinning creative learning by sharing goals, purposes, knowledge, multiple perspectives and experiences.

Figure 1 below depicts suggested approaches for fostering student creativity. Although none of the pathways must be followed in a linear manner, we do suggest a possible route towards the integration of creative learning strategies into teaching practice.

Figure 1: A Suggested Approach to Facilitating Student Creativity

- Heuristic strategies
- Problem-solving, PBL
- Game-based learning
- Real-life scenarios
- Group work
- Independent learning

PATHWAY 3
Whole curriculum change

Facilitating student creativity

PATHWAY 1
Speedy techniques for teachers

PATHWAY 2
Social and supportive factors

- Coaching and feedback
- Formative assessment
- Self-review and peer review
- Providing encouragement
- Giving examples

- Role-playing
- Debates
- Poster presentations
- One-to-one tutorials
- Thinking tools

Pathway 1 encompasses several pedagogical strategies that can be integrated relatively quickly with students. All are creative, participatory teaching techniques that are important tools in the teaching repertoire. These approaches involve high group member involvement while they facilitate meaningful and fun learning, through strategies such as role-playing, debates, poster presentations, one-to-one tutorials and the use of creative thinking techniques and tools. They all have their own complex structures and variations, but are all also conducive to tapping into the creative potential of students. For example, role-plays are structured and have a defined set of participants with specific times, places, equipment and rules. Debates are powerful models of teaching because they help students to master concepts and learn to be effective in pursuing goals. And finally, with presentations, the student must not only understand what is being presented, but also to whom it is being presented, and apply appropriate presentation strategies. As long as no one is forced to participate, competition can be positive and encourage player discovery, examination and learning. Each of these strategies help foster creative potential as they are in contrast to the passive reception of knowledge of teacher-centred classrooms; this style of teaching promotes active, student-centred learning. From the author's experience of implementation with postgraduate students, they are essentially instructional strategies that are conducive for creative thinking.

Pathway 2 emphasises the significance of feedback and support from someone who understands the creative process. More specifically, formative feedback (including self-review and peer review) can be used to prompt creative performance, develop creative talent, improve learning relationships, deal with creative "blocks" or "dry spells" and help students learn specific skills such as presentation, negotiation, coaching and influencing others. It can also:

- encourage students to reflect on their creative processes and working relationships
- help students tap into powerful "creative flow" states
- develop students' unique creative thinking and learning styles
- help students explore strategies for more effective communication and collaboration.

Pathway 3 concerns whole curriculum change. Torrance (1974), a leading researcher on creativity in the curriculum, believes that the focus of education should be not so much on what students learn as on what they can do with their learning. He is particularly concerned with addressing all aspects of cognitive development, especially students' capacity to think and to be happier. According to Torrance, creativity involves forming ideas or hypotheses, testing them and communicating the results; adventurous thinking (stepping into the unknown); and invention, discovery, curiosity, experimentation and exploration. He believes that creativity is relevant right across the curriculum. He focuses on teacher education and development, the classroom context, teacher–student relationships and students' learning needs at various levels. Any programme that addresses creative education needs to cover every aspect of being creative, including motivational and emotional factors, the development of knowledge and skills, the capacity to imagine (especially via the arts) and the capacity to solve fuzzy problems using heuristics and insight learning (in mathematics and other areas such as drama). It should be noted that in this pathway, the term "problem-solving" is used to mean "resolving anything puzzling or unclear". This is a key function of all thinking and active learning, equally applicable to creativity in the arts, sciences and humanities. The negative connotations often associated with the term "problem" do not apply here.

Assessments that stimulate creativity

Assessment is among the most important influences on learning, as highlighted by Biggs (1999). Dissatisfaction with assessment practices in higher education continues to the present day, and in recent years, there have been increasing calls for alternative assessment approaches that include performance-based, portfolio and authentic assessment (Anderson, 1998). Beghetto (2005) suggests that assessment practices can influence students' creativity. Studies have demonstrated that imagination and visualising had a positive effect on student performance on exams, and such studies have illustrated that creativity is intertwined with reasoning (Claxton, 1999). Building on the work of Csikszentmihalyi (1997), Beattie (2000) concludes that creativity can and should be assessed although it is recognised that attempts to produce methods for the assessment of creativity have not been straightforward. The tensions that arise from the assessment of creative activities exist for different reasons. Does it involve creating measures of creativity for statutory exams or is the assessment of creativity for providing feedback to individuals on their achievements and ways forward for progression? Indeed, does it extend to having a process to recognise and celebrate meaningful and original personal expression?

Students feel that essay-based course-work is more effective than exams in supporting creativity through collaboration, with peer assessment offering the potential to improve students' work. The general consensus from the literature is that assessment should be varied in order to support the development of different aptitudes and encourage thinking in different ways. A diversity of assessment types can be an important stimulus to creative work, including more formative assessment and a balance of written and practical work. Particular examples are report-writing, article critique, group work and negotiated projects between students.

There are, however, well-recognised difficulties with integrating creativity in assessment practices. Cowan (2006) argues that of all the cognitive abilities, synthesis or creativity is the most difficult to assess. There is significant variation in the evidence teachers seek for creativity: examples include originality, innovative thinking, entrepreneurship, problem-solving ability, initiative, inventiveness, the ability to generate ideas, and motivation. The core problem is that the creative process, for any learner, is unpredictable and difficult to capture. But moving from assessing the creative process to assessing a creative product does not necessarily offer an easier solution. Arguably, this is partly because the best person to judge the conception and development of an innovatory product is the creative student him or herself.

Nevertheless, two methods of assessing creativity have emerged from the literature. Cowan (2006) believes self-assessment can be a way forward. The role of the teacher is to create the conditions that facilitate creative learning and "help the students develop their capacity to recognise, represent and evaluate their own creativity" (Cowan, 2006, p. 162). Alternatively, Balchin (2006) suggests consensual assessment, which involves several appropriate assessors who are familiar with the domain in which the product is created to agree that it is creative. One of the main benefits of this latter form of assessment is that it engages teachers in purposeful professional dialogue about creativity. These serious conversations have the potential for teachers to develop new and deeper understandings about the nature of creativity. This leads us to our final issue for discussion – how does all this impact on the professional development of educators?

Incorporating creativity into the professional development of teachers

Howard-Jones (2008) argues that the UK government presently considers creativity to be a key "employability" skill in terms of the creative industries and beyond, including within the sectors of science and technology. There has been a recent flourishing of interest in the nurturing of creativity among young people (Roberts, 2006, Downing *et al*, 2007) and yet the provision of support for teachers and trainee teachers to achieve this remains a major challenge for education. It is important to consider how best to support teachers to teach creatively so that they can in turn transfer the benefits of creative learning strategies to their students.

One of the many questions to emerge from the field of creativity is why should higher education teachers be interested in creativity? We argue that it is because we live in a complicated and messy world in which work for most of our graduates is a continuous stream of "problems" with no simple or unique solutions. Our ability to work creatively as educators will in turn help our students survive and thrive in this world and help them to lead more satisfying and meaningful lives.

It is vital that teachers have a good understanding of creativity and creative education. Many teachers are already doing impressive work that could be capitalised on, in collaboration with other providers, to put creative education firmly on the teacher professional development agenda. Indeed, some such training could be provided online.

Much of the professional literature appears to lean towards creative thinking being a challenging endeavour. An integral part of teaching methodologies designed to foster creative reflection is the type of classroom environment which the teacher helps to create. What is needed are teachers who engage their students in meaningful activities – ones which incorporate students' unique interests, abilities, backgrounds and community needs.

Underpinning the development of creative thinking is the need for cultural change in higher education so that the value of creativity is more accepted (Wisdom, 2006). We argue that teachers need professional development opportunities to develop the knowledge and skills to nurture creativity in their students. Teachers need to understand and appreciate their own creativity and to recognise it as a fundamental part of their professional development. Each student has some innate creative potential, which can be enhanced by teachers who are aware of and knowledgeable about proven and effective ways to teach creative behaviour.

Support for professional academic development in recent years within the Republic of Ireland has mirrored the situation in other countries. Some important steps have been taken: for example, the All Ireland Society for Higher Education (AISHE), the professional association for higher education, was established in 2001. Even more recently, the establishment of the Educational Developers in Ireland Network (EDIN) moves us towards greater professionalisation of education developers in Irish higher education. Within both forums, it is essential to cultivate attitudes and practices that encourage creativity.

Accredited teacher preparation programmes are on the increase in the higher education sector and are supported by the dual use of the teaching portfolio (Donnelly, 2006) as a vehicle for reflection on practice and as a means of formative self-assessment. The portfolio has the ability to embrace risk and reflection and create the conditions that promote teachers' creativity. The reflective processes of portfolio development can be as important as the final product. Ideas and beliefs about what constitutes good teaching practice change

through personal experience of both teaching and learning. Through these experiences we learn to identify the most effective and creative teaching methodologies, what works for us as teachers and what helps us as learners. Furthermore, with the increased use of e-portfolio learning technologies such as PebblePad and Mahara, teachers who create their own digital teaching portfolios can become aware of the potential of the technology to enable the creative thinking process.

Conclusions

In this chapter, we have reflected on the relationship between the literature and the evolution and fostering of creativity within teacher professional development in higher education. The chapter has attempted to suggest how the educational developer can apply the literature to the activity of teaching academics the importance of creativity in the higher education curriculum, and of passing this on to their students. There is little doubt that many questions still exist for teachers wishing to develop both themselves and their students creatively and through the newly formed professional societies and teacher education programmes. One thing, however, is clear: it is vital that academics nurture and celebrate their own creativity if they are to model creative processes for their students and if they are genuinely to convey their enthusiasm for creative endeavours to their students.

The following poem succinctly captures the fluency aspect of creative flow and has contributed to our understanding of it. It suggests the natural unfolding of personal potential as individuals perform at their particular optimal levels:

> *"Fluent"*
>
> *I would love to live*
> *Like a river flows*
> *Carried by the surprise*
> *Of its own unfolding.*
>
> *(O'Donoghue, 2000, p. 30)*

The idea of 'fluency and flow' is the key concept that underpins our understanding of creativity. We wish to create the conditions that will allow it to flourish, both for ourselves and for our students. The concept is best elaborated by Csikszentmilhalyi (1986, 1996, 1997, 2006) and we therefore leave the last word to him. Flow is:

> *being completely involved in an activity for its own sake. The ego falls away. Time flies. Every action, movement, and thought follows inevitably from the previous one, like playing jazz. Your whole being is involved, and you're using your skills to the utmost (Csikszentmihalyi, 1996, p. 1).*

References

Anderson, R.S. (1998) "Why talk about different ways to grade: the shift from traditional assessment to alternative assessment", in *Classroom Assessment and the New Learning Paradigm*, eds R.S. Anderson & B.W. Speck. San Francisco: Jossey-Bass. pp. 5–16.

Baille, C. (ed.) (2003) *The Travelling Case: Creativity in Art, Science and Engineering. How to Foster Creative Thinking in Higher Education* [online]. York: The Higher Education Academy. Available from: http://www.heacademy.ac.uk/resources/detail/ourwork/tla/The_Travelling_CASE [Accessed 26 June 2008].

Balchin, T. (2006) "Evaluating creativity through consensual assessment", in *Developing Creativity in Higher Education*, eds N. Jackson, M. Oliver, M. Shaw & J. Wisdom. London: Routledge. pp. 173–183.

Barnett, R. (2000) "Supercomplexity and the curriculum", *Studies in Higher Education,* vol. 25, no. 3, pp. 255–388.

Barrett, T. (2005) "Understanding problem-based learning", in *Handbook of Enquiry and Problem-based Learning: Irish Case Studies and International Perspectives*, eds T. Barrett, I. Mac Labhainn & H. Fallon. Galway: Centre for Excellence in Learning & Teaching, National University of Ireland Galway &All Ireland Society for Higher Education.pp. 13–26. Available online from: www.nuigalway.ie/celt/pblbook [Accessed 26 June 2008].

Beattie, D.K. (2000) "Creativity in art: the feasibility of assessing current conceptions in the school context", *Assessment in Education: Principles and Practice*, vol. 7, no. 2, pp. 175–192.

Beghetto, R.A. (2005) "Does assessment kill student creativity?" *The Educational Forum*, vol. 29, no. 2, pp. 254–263.

Biggs, J. (1999) *Teaching for Quality Learning at University*. Buckingham: SRHE & Open University Press.

Brockling, U. (2006) "On creativity: A brainstorming session", *Education Philosophy and Theory*, vol. 38, no. 4, pp. 513–521.

Claxton, G. (1999) *Wise Up*. New York: St Martin's Press.

Cowan, J. (2006) "How should I assess creativity?" in *Developing Creativity in Higher Education*, eds N. Jackson, M. Oliver, M. Shaw & J. Wisdom. London: Routledge. pp. 156–173.

Cropley, A.J. (2001) *Creativity in Education and Learning: A Guide for Teachers and Educators*. London: Kogan Page.

Csikszentmihalyi, M. (1996) Interview with *Wired Magazine* [online], no. 4, 9 September. Available from: http://www.wired.com/wired/archive/4.09/czik.html [Accessed 26 June 2008].

Csikszentmihalyi, M. (1997) *Creativity: Flow and the Psychology of Discovery and Invention*. London: Harper Collins.

Csikszentmihalyi, M. (2006) "Foreword: developing creativity", in *Developing Creativity in Higher Education*, eds N. Jackson, M. Oliver, M. Shaw & J. Wisdom. London: Routledge. pp. xviii-xx.

deBono, E. (1999) *Six Thinking Hats*. London: Penguin Books.

Diehm, C. (2004) "Classroom practice: from worn-out to web-based: better student portfolios", *Phi Delta Kappa*, vol. 85, no. 10, p. 792.

Donnelly, R. (2006) *Teaching Portfolios: Case Studies of Good Practice in the Assessment of Student Learning in Higher Education*. Dublin: Higher Education Authority.

Downing, D. and Lamont, E. with Newby, M. (2007) *HEARTS Higher Education, the Arts and Schools: an experiment in educating teachers*, Slough: NFER.

Fryer, M. (2003) *Creativity across the Curriculum: A Review and Analysis of Programmes Designed to Develop Creativity*. London: Qualifications and Curriculum Authority.

Fryer, M. 2006 in *Developing Creativity in Higher Education*, eds N. Jackson, M. Oliver, M. Shaw and J. Wisdom. London: routledge. pp. xviii-xx.

Gardner, H. (1982) Art, Mind, Brain: A Cognitive Approach to Creativity. New York: Basic Books.

Goleman H. (1996) Emotional Intelligence. London: Bloomsbury Publishing.

Hammershøj, L. (2006) "Bildung in the knowledge society: creative knowledge production as a question of self-Bildung". Paper presented to the European Conference on Educational Research, University of Geneva, 13–15 September.

Howard-Jones, P. (2008) *Fostering Creative Thinking: co-constructed insights from neuroscience and education*, Bristol: HEA Academic Subject Centre for Education. Available online from: http://escalate.ac.uk/4389 [Accessed 16 July 2008].

Jackson, N., Oliver, M., Shaw, M. & Wisdom, J. (eds) (2006) Developing Creativity in Higher Education. London: Routledge.

Jackson, N. (2006) "Creativity in higher education: creating tipping points for cultural change", SCEPTrE Scholarly Paper 3. Available online from: http://portal.surrey.ac.uk/pls/portal/docs/PAGE/SCEPTRE/RS/PAPER%202%20PDP%20AND%20CREATIVITY%20JAN%2006.DOC [Accessed 26 June 2008].

Kane, P. (2004) The Play Ethic: A Manifesto for a Different Way of Living. London: Macmillan.

Laurillard, D. (2002) "Rethinking teaching for the knowledge society", EDUCAUSE, vol. 37, no. 1, pp. 16–25.

Murray, R. & Moore, S. (2006) The Handbook of Academic Writing: A Fresh Approach. Maidenshead: Open University Press.

O'Donoghue, J. (2000) "Fluent*", Conamara Blues*. London: Doubleday.

Oliver, M., Shah, B., McGoldrick, C. and Edwards, M. (2006) 'Students' experiences of creativity', in N.J. Jaackson et al (eds) *Developing Creativity in Higher Education: an Imaginative Curriculum*, London: Routledge-Falmer.

Roberts, P. (2006) *Nurturing Creativity in Young People*. London: Department for Culture, Media and Sport.

Robinson, K. (2001) *Out of Our Minds: Learning to be Creative*. Chester: Capstone Publishing.

Stein, M.I. (1988) Creativity: The process and its stimulation. In Flach, F. (Ed.), *The creative mind* (pp 50-75). Buffalo, NY: Bearly Limited.

Torrance, E.P. (1974) *Torrance Tests of Creative Thinking: Norms and Technical Manual*. Bensenville IL: Scholastic Testing Service.

Wilson, Richard A., ed (1997) World Commission on Culture and Development (1995) *Our Creative Diversity*, Paris: UNESCO. Wilson, Richard A., ed.

Wisdom, J. (2006) "Developing higher education teachers to teach creatively", in *Developing Creativity in Higher Education*, eds N. Jackson, M. Oliver, M. Shaw & J. Wisdom. London: Routledge. pp. 183–197.

APPENDIX

Several useful resources are listed in the following section. We also include some commentary on how these resources can inform us as teachers and educational developers in the quest for increasing the potential for student creativity in higher education.

General Resources for Developing Initiatives to Encourage Student Creativity

Buzan, T. (2005) *The Mindmap Book*. London: BBC Worldwide.
>This book introduces readers to "mindmapping". This is a very effective method that combines verbal and visual tools to help users generate ideas or to take notes on other people's work. The aim is to make powerful connections between ideas.

Cameron, J. (2002) *Walking in this World*. New York: Penguin Putnam.
>This book provides a range of practical strategies and short exercises to get the creative juices flowing. These exercises can be effectively integrated into teaching.

Craft, A., Jeffery, B. & Leibling, M. (eds) (2001) Creativity in Education. London: Continuum Publishing.
>This is a seminal text in the field of creativity.

deBono, E. (1999) Six Thinking Hats. London: Penguin Books.
>This practical, easy-to-follow book suggests a proven method that helps us to do one type of thinking at a time, instead of juggling too many types at the same time. This book provides a framework for brainstorming an issue, imagining the future and working towards creative solutions that work. It is a simple and appealing creative thinking method to teach students.

Jackson, N. & Shaw, M. (2005) Subject Perspectives on Creativity: A Preliminary Synthesis [online]. York: The Higher Education Academy.
>Available from: http://www.heacademy.ac.uk/resources/detail/ id570_subject_perspectives_on_creativity [Accessed 26 June 2008].
>The theme of creativity in higher education and how we might encourage change towards a culture that is more valuing of students' creative development is at the heart of this article. Issues explored are the problem of creativity in higher education and cultural change, along with reasons for why we should be concerned to support students' creative development.

Maisel, E. (2000) *The Creativity Book*. New York: Penguin Putman.
>This book provides a year's worth of inspirational triggers and guidance. The individual exercises, discussions and projects in the book could be integrated into learning sessions.

McGoldrick, C. (2002) *Creativity and Curriculum Design: What Academics Think* [online]. York: The Higher Education Academy.
>Available from: http://www.heacademy.ac.uk/resources/detail/ id60_creativity_and_curriculum_design [Accessed 26 June 2008].
>This research article highlights the teacher's perspective on integrating creativity within the higher education curriculum.

Puccio, J.G. (1994) "An overview of creativity assessment", in The Assessment of Creativity, ed. S.G. Isaksen. Buffalo NY: Center for Studies in Creativity. pp. xx–xx.
>Several assessment strategies are explored in relation to enhancing student creativity in the learning process.

Sternberg, R.J. (2002) The Creativity Conundrum. London: Psychology Press.
>One of the leading researchers and writers on the development of creativity, Sternberg explores ongoing debates about the field, and includes several important contributions from practitioners across the globe.

Torrance, E.P. (1993) "Understanding and recognising creativity", in The Emergence of a Discipline, eds S.G. Isakeson, M.C. Murdoch, R.L. Firestien & D.J. Treffinger. Norwood NJ: Ablex Publishing Corporation. pp. xx–xx.
This article takes a theoretical look at how best to stimulate professional discussion on creativity and how it relates to academic programmes in higher education.

General Online Resources on Creativity

Baille, C. (ed.) (2003) The Travelling Case: Creativity in Art, Science and Engineering. How to Foster Creative Thinking in Higher Education. York: The Higher Education Academy. Available from:
http://www.heacademy.ac.uk/resources/detail/ourwork/tla/The_Travelling_CASE [Accessed 26 June 2008].
This is a treasure trove of colourful and stimulating creative thinking tools that will act as effective springboards for encouraging your students' creativity.
Buzan World
http://www.buzanworld.com
This website offers information on mindmapping books, software and training course.

Creativity and Innovation, Science and Technology

http://www.mycoted.com
This website includes a great variety of creative thinking techniques that can be applied to many disciplines.
Infinite Innovations Ltd
http://www.brainstorming.co.uk/tutorials/creativethinkingcontents.html
At this website, users can learn how to use specific creative and lateral thinking techniques.

Subject-specific Online Resources on Creativity

Forum on Creativity in Engineering Education
http://www.ijee.dit.ie/forum/forum1home.html
This forum explores creativity within engineering education and practice, with particular attention to how it may be fostered and assessed in learning programs. The forum aims to develop a framework for implementing and evaluating such programs.
Clarke, M.A. (n.d.) Creativity in Modern Foreign Languages Teaching and Learning. York: The Higher Education Academy.
Available from: http://www.heacademy.ac.uk/learningandteaching/mfl_paper.doc [Accessed 26 June 2008].
This research paper discusses key issues involved in the creative teaching of foreign languages.

Additional recommended reading

This special issue in Innovations in Education and Teaching International, Volume 45, Issue 3 August 2008 entitled CREATIVITY OR CONFORMITY IN HIGHER EDUCATION? is available from:
http://www.informaworld.com/smpp/title~content=g794950400~db=all and includes important areas which have been considered throughout this chapter such as developing creative thinking and writing, conceptions of creativity, implementing creative activities, and assessment as a creative process.
Allam, C. (2008) Creative activity and its impact on student learning – issues of implementation. pp. 281 – 288.

Caridad Garcia-Cepero, M. (2008) The Enrichment Triad Model: nurturing creative-productivity among college students. pp. 295 – 302.

Clegg, P. (2008) Creativity and critical thinking in the globalised university. pp. 219 - 226.

Craft, A., Chappell, K. and Twining, P. (2008) Learners reconceptualising education: widening participation through creative engagement? pp. 235 - 245

Cunliffe, L. (2008) Using assessment to nurture knowledge-rich creativity. pp. 309 – 317.

Dillon, P. (2008) A pedagogy of connection and boundary crossings: methodological and epistemological transactions in working across and between disciplines. pp. 255 – 262.

Hargreaves, J. (2008) Risk: the ethics of a creative curriculum. pp. 227 – 234.

Jankowska, M. and Atlay, M. (2008) Use of creative space in enhancing students' engagement. pp. 271 – 279.

Kleiman, P. (2008) Towards transformation: conceptions of creativity in higher education. pp. 209 – 217.

McWilliam, E., Hearn, G. and Haseman, B. (2008) Transdisciplinarity for creative futures: what barriers and opportunities? pp. 247 - 253

McWilliam, E. (2008) Unlearning how to teach. pp. 263 – 269.

McVey, D. (2008) Why all writing is creative writing. pp. 289 – 294.

REFLECTIONS ON CONVERSATIONS
AS A CATALYST FOR CHANGE 2003-2007

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Dun Laoghaire Institute of Art Design and Technology

Introduction

This chapter presents a four-year dialogue between the authors, both lecturers in an institute of technology, during which time we explored concepts such as learning, collaboration, power and complexity. We also focused on the impact of teaching on students, colleagues, the Institute and the outside world. As we discussed teaching and learning, the context in which we worked changed. Here the dialogue is presented through the signposts we remember. We assess how this dialogue affected us as teachers in higher education, and we claim that our conversations changed our practice.

Haigh's (2005) article about conversations prompted this chapter. He argues that, even though everyday conversations with colleagues may be unplanned and occur with a range of people, they have an impact on thoughts about teaching and learning. He says that such conversations are spontaneous, typically ranging across an impromptu choice of local and personal topics; they value all contributions, are non-threatening, and have storytelling as a common ingredient (Haigh, 2005, p. 4). We could identify with these observations, and with Haigh's finding that as his knowledge of the value of conversations has moved from tacit to explicit, he has come to see conversations as a support for professional learning (p. 11).

This last point is particularly relevant to us as lecturers in an institute of technology, where there is no requirement for formal education or development of teachers. Therefore professional knowledge about teaching is necessarily learned informally, and much of it is tacit. Eraut (2000, p. 133) argues that tacit knowledge can be "embedded in taken-for-granted activities, perceptions and norms" – activities such as conversations.

Russell and Bullock (1999, p. 32) argue that critical dialogue can be powerful in "naming and transforming teachers' professional knowledge". The notion of critical dialogue seems particularly relevant to an exploration of the value of conversations as a source of tacit professional knowledge, so we have adapted it as the basis for this chapter's structure. That is, in this chapter, we present a synopsis of our discussions (as we remember them) and then critique them.

The chapter starts with an introduction to the context in which we work, then moves through our conversations as a journey. We provide a milestone for each snippet of conversation, and we also present both our points of view. We conclude by considering how our conversations have changed our practice as teachers.

Context

We work in an institute of technology. In Ireland, institutes of technology provide higher education with a strong practical focus on vocational education, and an emphasis on industry links. There are 14 institutes of technology in the country, ranging from large institutes such as Dublin Institute of Technology (DIT) to small institutes such as Dun Laoghaire Institute of Art Design and Technology (IADT).

IADT became an institute in 1997, and its programmes in Business and Humanities and Creative Technologies were developed and introduced between 1998 and 2001. It now has 1600 students across its three schools. Our students come from a broad range of backgrounds and with a wide range of points at Leaving Certificate level. We are required to work within the Irish National Qualifications Framework and have delegated authority to make awards at level 8. IADT programmes are developed and assessed locally.

As lecturers, our focus is on teaching (rather than research) and we are required to teach 16 hours per week during term. As teachers, we have full responsibility for curriculum, teaching and learning, and assessment. Each programme (course) is managed by a programme board, which consists of the programme lecturers with one person acting as programme coordinator, students representing the different years, and representatives from industry when available. The lecturers form a programme team to implement the programme.

Marion is now Head of Department of Learning Sciences and teaches instructional design. She used to teach physics and worked with primary and second-level teachers. Conor teaches accountancy, tax and other aspects of business and is programme coordinator for a level-7 degree in business and enterprise.

The conversations reported below took place as we went about our daily business. Sometimes we would meet to discuss a particular matter or plan a workshop or seminar. More often, we talked as we met in the corridor, over coffee and lunch, and occasionally in our offices.

Conversations and milestones

January 2003
From January to March 2003, Marion developed and ran a series of three workshops on "Learning", "Teaching" and "Assessment".

> *Marion*
>
> *I joined the Institute nearly ten years ago as a lecturer in science education after twenty years teaching and working at second level. The interest and engagement of my colleagues immediately struck me but I was stunned by the lack of theoretical frameworks for teaching.*
>
> *Taking courage, I organised and ran a series of workshops on learning, teaching and assessment. Originally the workshops were for my school (Science and Technology, now Creative Technologies), then I invited colleagues from Business and Humanities. Through these workshops I met Conor. We started talking about learning, teaching and assessment.*
>
> *Conor*
>
> *I joined the Institute in 2002. Previous work experience includes nine years as a third-level lecturer and 16 years as an accountant/tax adviser in three countries. My notion of teaching was based on how I had been taught – that is, keep explaining until most of the class "seem to get it". I had no idea of theoretical frameworks for teaching.*

September 2003

At the start of the new academic year, we set up an ad hoc Learning and Teaching Group with a colleague from Creative Arts. We recruited interested colleagues via email. About 25 of our colleagues from across the Institute expressed an interest in joining. During the year, we held several events, including workshops on setting exams and on using PowerPoint for presentations. These were well received.

> *Conor*
>
> *In the competitive world of accountancy practice, there is a natural desire to improve one's professional abilities in any way possible. As the third-level teaching environment is somewhat less competitive, I thought it would be logical to set up the ad hoc Learning and Teaching Group. I looked on this initiative as evolutionary – that is, helping learning by improving my/our efficiency – rather than revolutionary – that is, changing pedagogical philosophy. At Marion's seminars on learning, teaching and assessment in early 2003, I would sometimes disagree with her. When this happened, I would ask a few questions during the seminars and we would basically agree to disagree. Because I did not know Marion very well at that stage, I did not discuss informally my disagreements. While still firmly rooted in my "teaching delivery" approach, a few niggling doubts began to pop into my head.*
>
> *Marion*
>
> *Setting up the ad hoc Learning and Teaching Group was important. Even though in practice we did very little, it made a statement about teaching and learning in the Institute. It showed that we thought learning and teaching was important. It also made me start reading about teaching, learning and assessment in higher education.*

At this stage, we didn't quite know what we were doing. Teaching and learning was important. We thought everyone should be interested and many were. But the time to explore and consider our teaching practice had to be squeezed into the busy academic year. Were lecturers willing to make time? Did they just want teaching tips or did they want to understand the processes of teaching and learning?

Moreover, learning to teach in the institutes of technology is an on-the-job process; that is, new lecturers are allocated the same teaching loads as experienced lecturers. As a result, they may have "very challenging roles in their first week" (Eraut, 2007a, p. 408) and struggle to survive. Eraut (2007a, p. 408) suggests that for workers in such contexts, survival in the first year depends on prioritising tasks and developing routines to help manage the cognitive load. These routines can become tacit and embedded in personal knowledge and work for the lecturer. Engaging with ideas about teaching and learning can challenge lecturers' personal knowledge and make them question their tacit routines.

March 2004

All programmes were revalidated to match the new National Framework of Qualifications (see http://www.nfq.ie/nfq/en). This was the first contact we had with the Framework. One of the things we had to do was reframe our programme in terms of learning outcomes rather than content taught – this was a demanding task for some of us.

Marion

I found the revalidation process easy. I have worked in curriculum development and the matching of programme objectives to the Framework I found straightforward and enjoyed. The dimensions of the Framework made sense to me as I had read work by Lawton, Stenhouse and other curricular leaders. I didn't realise the fundamental shift it made to our work. The student-centred focus meant that we had to consider the practical implications.

Conor

I found the revalidation process tortuous. The terminology was difficult to understand, and the whole point of the exercise was lost on me. The process appeared to be limited to documents with little or no practical relevance. I saw this process as a distraction from the learning process. At this stage, I was "on my high horse" and convinced that I was correct. I did not think there was any need to discuss, either formally or informally, this issue. Perhaps this is a weakness of critical dialogue (Russell and Bullock, 1999) in that such a dialogue requires both parties to appreciate that there is an issue.

Marion

I disagreed with Conor. I saw the value of the process and thought it easy to do. But I did focus on the curriculum and the nature of the documents and didn't consider the impact on the assessment.

The implementation of the National Qualifications Framework for all our programmes was a critical point for teaching and learning in the Institutes of Technology. It shifted the focus of the curriculum from coverage of content – that is, teacher-centred – to learning outcomes – that is, student-centred. The implications of this shift are still being explored. There is an additional consideration here. The Framework was developed because the legislative basis of our sector of higher education changed with the *Qualifications (Education and Training) Act 1999*. This legislation very clearly states our responsibility in terms of fair assessment of students (Government of Ireland, 1999, p. 26). This is a further shift from content delivery to learning enablement.

September 2004

Three of us from IADT attended the first All Ireland Society for Higher Education (AISHE) Conference at Trinity College Dublin. Marion presented a poster on assessment and our colleague presented a poster on the National Qualifications Framework.

During this period, Peter Doolittle from the Educational Psychology Program at Virginia Tech spent a term at the IADT. Peter had presented at EdTech conferences over the years and is an educational psychologist with a strong interest in learning, teaching and e-learning. He developed and presented a series of seminars for IADT staff during the term he spent with us. Subsequently, he set up the *International Journal for Teaching and Learning in Higher Education* (see http://www.isetl.org/ijtlhe).

As part of the academic cycle, we are required to review all our programmes on a five-yearly basis. As a new institute, we started our first programme review at this time.

Conor

The AISHE conference was an energy booster. The exposure to so many practitioners with a genuine passion for teaching and learning boosted my confidence in the pursuit of better practice.

Peter Doolittle gave a series of seminars on teaching, learning and assessment from an educational psychology viewpoint. This profoundly changed my attitude to my work; the emphasis moved from what I did to what the student did (from teaching to learning). I began to make connections between what Peter and Marion were saying. It would have been easy to dismiss Peter's message as American and not applicable to the Irish learning environment. But because Marion attended Peter's seminars, I was able to approach Marion in the staff canteen to tease out the relevance to our students. These chats typically involved other academics who happened to sit at the same table. The general thrust of the conversations concerned how these ideas could make a difference to our students. The bouncing of these new (to me) ideas back and forth in a non-threatening environment was fascinating. I felt comfortable contributing to the conversations even though the area of educational psychology appeared to be a huge area of study. The conversations sometimes happened over two minutes in a corridor. If a thought came into my mind a few days later, I would just raise it with Marion or Peter the next time I bumped into them.

The combination of formal seminars and readily available informal conversations made a big difference to my approach to teaching and learning. It could be argued that I was very fortunate in having access to experts like Marion and Peter. But the availability of back-up informal conversations gave me and other people an opportunity to reflect on formal learning and tease out the issues relevant to our students.

Marion

This year brought many changes. We attended the first AISHE conference with a colleague. This linked us into the network of educational developers and those interested in teaching and learning in higher education. Independently, I attended all of Peter Doolittle's sessions. They were stimulating and although I was familiar with the concepts through my background, it was refreshing to hear and discuss them again. I refer to Peter's notes often. Peter's seminars provided a theoretical framework to start discussing teaching and learning and a context for conversations with colleagues.

The process of programme review was challenging. I became a programme coordinator of a level-8 honours degree in Psychology Applied to Information Technology. As programme coordinator, I had to lead the review. From a curriculum point of view, my experience in curriculum development helped. A colleague and I developed a template for writing modules and worked with the two schools to support module writing. I saw the gap between the modules and the different styles of writing learning outcomes, indicative content and particularly references and the overall programme. Linking modules to programme learning outcomes was quite a challenge. At this stage, I was reading Biggs

(2003) and thinking about constructive alignment, and we tried to incorporate this idea into our curriculum planning.

The teaching and learning seminars made teaching visible in the Institute. At the same time, programme review demanded that we review and develop an understanding of curriculum in higher education so that we could support each other and our colleagues. The two processes provided a theoretical framework for further development. Osborn and Johnson (1999, p. 5) argue that although "learning and teaching is finally receiving the recognition it deserves in tertiary education", the time needed to develop teaching is still at a premium. Informal discussions therefore provide a means of enabling lecturers to make changes in their everyday practice, even when their time is mostly taken up with large-scale changes such as programme review.

June 2005

By the end of the academic year, both schools had completed programme review and the revised programmes were ready for implementation in September 2005.

> *Marion*
>
> *By the end of programme review, I was tired. We reviewed the Psychology programme and developed it considerably. We focused on the needs of the students and tried to develop a coherent experience that enabled them to develop the disciplinary knowledge and skills required of psychology graduates. I am not sure that it is fully student-centred but it is a step on the way. I found again that when developing the curriculum, you get to a stage where all you want to do is to get it done. Did this affect the quality of the curriculum?*
>
> *Conor*
>
> *The review resulted in a complete overhaul of our business programme. Substantial change involves risk-taking, but the ability to run ideas by Marion on a continuing basis was extremely valuable. By this time, we had developed a working relationship where it was relatively easy to go straight to the issue without any distractions.*

This was a year of contrasts. There was the focus on teaching and student learning through the series of seminars and the curriculum focus of programme review. It was stimulating, demanding and exhausting.

2005–06 Academic Year

This year, IADT prepared for and received delegation of authority to make awards to level 8 in the National Qualifications Framework from the Higher Education and Training Awards Council (HETAC). Marion Palmer was seconded half-time to support e-learning across the Institute.

> *Marion*
>
> *In 2001, I started the Doctor of Education degree at Queen's University Belfast with the idea of researching science education. As I talked to Conor and other colleagues, I realised that I wanted to find out more about teaching in the institutes. This is now the focus of my doctoral dissertation. Our conversations*

challenge me to support my arguments about teaching and learning with appropriate research. Talking to colleagues about e-learning has made me articulate my ideas more clearly.

Conor

During the programme review process, we had committed ourselves to an annual "mini programme review" process. During the first review, it became clearer that the learner-centred approach required a more team-oriented approach from the teaching staff. It is one thing to formally declare that we will act as a team; however, it is quite different to get the team to act as a team or community (Kofman and Senge, 1993). Perhaps informal dialogue can help to bind individual academics into a team striving to bring students to their programme learning outcomes?

Marion

What struck me was how Conor used the resources available. For example, each year we host students from Loras College Dubecq Iowa. Each year, they are accompanied by a lecturer – in this case, psychology lecturer Dr Mary Johnson. She gave one presentation to students on the psychology programme, but we didn't meet her and talk to her about teaching and learning psychology. Yet Conor used her to help revise and develop the business programme.

September 2006

The second AISHE Conference was run at NUI Maynooth, and we attended. Again this gave us an opportunity to discuss teaching and learning with colleagues from across the third-level sector. It also provided stimulation and thought for the start of the year. Conor continued as programme coordinator. Marion was coordinating the psychology degree and continued her secondment to support e-learning. Marion started researching teaching in institutes of technology. One major change was the implementation of a new version of WebCT, which had to be rolled out to staff and students.

March 2007

As a result of many factors, the Institute established a Teaching and Learning sub-committee of Academic Council, meaning that learning, teaching and assessment were highlighted within the terms of reference of Academic Council. Marion and Conor became members of both Academic Council and the Teaching and Learning sub-committee.

Marion

I became Head of Department of Learning Sciences in February 2007. I am now responsible for leading the Institute in teaching and learning. This is a challenge. How do I help the Institute develop a coherent approach to teaching and learning?

Conor

Marion's advice, through informal conversations, has proven invaluable in helping the dramatic overhaul of a business programme during a time of significant

external changes. While we have very different teaching styles and paradigms, I think our conversations have worked for me because I:

- *had external challenges – that is, I moved to a new Institute with different students and different programmes, and also had to deal with the National Qualifications Framework*
- *was exposed to new ideas through Peter Doolittle's seminars*
- *had easy access to conversations with colleagues where the new ideas could be "tested"*
- *appreciated the non-threatening environment provided by such conversations (no minutes are taken). It is easier to fully examine ideas in an informal environment where political tensions are unlikely. It is easier to ask questions in a conversation than in a formal seminar because there are usually fewer participants*
- *found that informal conversations are, by their nature, customised to one's students.*

Marion

Over the past four years, I have been astounded at how Conor has put into everyday practice what we read and discuss. At the beginning of our conversations,the business courses were innovative in focus but delivered in a traditional way. Assessment was 70 percent examination and 30 percent continuous assessment (CA). The CA was Christmas and Easter exams. Now many of the modules are 30 percent examination and 70 percent CA. There is team teaching and integrated practical assessments. Conor and his colleagues have developed a process of using the academic structures, such as programme boards, to review the programme on an annual basis. The students are an integral part of the conversation. There seems to me to be true partnership. It is also clear that Conor and his team have made a paradigm shift from teaching to learning (Kugel, 1993, p. 321): they really have become student-centred.

The learning from experts, peers and students required by professionals (Eraut, 2007b, p. 132) was evident in the business programme where they had been revising and developing the curriculum and the programme teaching and learning strategies, as well as developing new and demanding assessments.

September 2007

At this time, the Teaching and Learning Committee was developing the Institute teaching and learning strategy. Many of the ideas and theories about learning and teaching, which we had discussed, were being fed into the strategic review process that was underway in the Institute. Conor was more confident in his own ideas because he felt that they had been "tested" in chats with Marion. There were many challenges – for example, all programmes in the Institute must achieve the same standards as identified by the learning outcomes in the National Qualifications Framework. The focus on learners and learning meant that assessment and assessment strategies were (and are) key issues in the Institute. Yet the allocation of resources – for example, teaching hours and class sizes– was and is related to traditional models of teaching in the disciplines.

At the time of writing, the Institute seems to be straddling two paradigms (Barr and Tagg, 1998, p. 700–701): the instructional paradigm and the learning paradigm. This is where we are now.

Review

We are now teaching (and learning) in an environment and a period that is different from the environment and period in which we learned; this means that our experiences as students are not sufficient for teaching today's students. One of us has formal education for teaching and the other does not, but we both find that putting educational theory and knowledge into practice is demanding and challenging. We agree that how we think about teaching and learning impacts on practice, but there is still a gap between theory and practice. Our conversations have informed us about our practice and values. One of us – Conor – has moved from tips to theoretical structures that support teaching practice; the other – Marion – has been challenged to put known theory into practice and has moved to research teaching.

These conversations were informal work-related discussions (Eraut, 2000, p. 120) where we explored our ideas about teaching and learning. There are considerable advantages to this type of informal workplace learning. For example, it suits the culture of teaching in the Institute; it can make an impact and change practice from the bottom up in classrooms and lecture halls; and it can explore new and risky ideas (Eraut, 2000, p. 120). There are also disadvantages, however. For example, learning may not take place if teaching and learning is not part of the everyday discourse. There is also a lack of documentation or record to revisit or follow up (Haigh, 2005, p. 14).

We are not educational developers – or at least not formally – but these conversations have been a form of educational development for both of us. This chapter is a means of reviewing and analysing a process that has emerged over a period of years. We have tried to capture "the spirit and vitality of the conversations" (Peseta, 2007, p. 17), so as to add to the discourse of educational development in Ireland.

Conclusions

These are just some of the conversations we have had about learning, teaching and assessment. They reflect our learning from and through theory and practice. Many of our colleagues contributed to these conversations. They have helped us develop as teachers in higher education. They have helped change career paths.

We claim the power of conversations and their impact on our teaching practice. Through talking over the years, we have explored assumptions about teaching and learning. We have put theory into practice in different ways. We have moved from changing ourselves and developing our students to changing and developing our Institute.

References

Barr, R.B. and Tagg, J. (1998) "From teaching to learning: a new paradigm for undergraduate education", in *Teaching and Learning in the College Classroom*, eds K.A. Feldman and M.B. Paulsen, 2nd edn. Boston MA: Pearson Custom Publishing. pp. 696–710.

Biggs, J. (2003) *Teaching for Quality Learning at University*, 2nd edn. Buckingham: SRHE and Open University Press.

Eraut, M. (2000) "Non-formal learning and tacit knowledge in professional work", *British Journal of Educational Psychology*, vol. 70, pp. 113–136.

Eraut, M. (2007a) "Learning from other people in the workplace", *Oxford Review of Education*, vol. 33, no. 4, pp. 403–422.

Eraut, M. (2007b) "Early career learning at work and its implications for universities", in *Student Learning and University Teaching*, eds N. Entwistle and P. Tomlinson. Leicester: The British Psychological Society. pp. 113–133.

Government of Ireland (1999) *Qualifications (Education and Training) Act 1999*. Dublin: Office of the Attorney General. Available online from: http://www.irishstatutebook.ie/1999/en/act/pub/0026/index.html [accessed 13 July 2008].

Haigh, N. (2005) "Everyday conversation as a context for professional learning and development", *International Journal for Academic Development*, vol. 10, no. 1, pp. 3–16.

Kofman, F. and Senge, P. (1993) "Communities of commitment: the heart of learning organizations", *Organizational Dynamics*, vol. 22, no. 2, pp. 5–23.

Kugel, P. (1993) "How professors develop as people", *Studies in Higher Education*, vol. 18, no. 3, pp. 315–328.

Osborn, M. and Johnson, N. (1999) "Helping academics to help themselves: a work embedded approach to professional development", paper presented to the HERDSA Annual International Conference, Melbourne, 12–15 July. Available from http://www.herdsa.org.au/wp-content/uploads/conference/1999/pdf/Osborn.pdf, [accessed 25 August 2008].

Peseta, T. (2007) "Troubling our desires for research and writing within the academic development project", *International Journal for Academic Development*, vol. 12, no. 1, pp. 15–24.

Russell, T. and Bullock, S. (1999) "Discovering our professional knowledge as teachers: critical dialogues about learning from experience", in *Researching Teaching*, ed. J. Loughran. London and Philadelphia: Falmer Press. pp. 132–151.

THE CHANGING ROLE OF THE ACADEMIC LIBRARY IN LEARNING AND TEACHING

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Introduction

This chapter explores the emerging role of academic librarians in the learning and teaching process through their involvement with teaching staff in the development of student information literacy skills. Information literacy – that is, the ability to find, evaluate and use information effectively – is a key component of university students' learning experience. It also equips students with skills for the workplace and lifelong learning:

> *It could be argued that the skill of the twenty first century graduate will be to articulate the right questions and to understand where and how they can search for knowledge, not remember the answers (Donnelly and Fitzmaurice, 2005, p. 96).*

The chapter provides a brief overview of the institutional and learning background against which contemporary information literacy development takes place. This background is characterised by a changing context for the operation of academic libraries; a changing higher education environment; a changing information environment; and a changing user. The chapter goes on to provide some formal definitions of information literacy, developed by library-related bodies. These are followed by some working understandings of the term, derived from responses given by several academic developers and lecturers to the question, "What does information literacy mean to you?" Finally, the chapter discusses the role of information literacy in higher education and the key role librarians play in information literacy development.

Background and context

Since the early 2000s, changes in the Irish higher education environment have had a significant impact on the role of librarians in the learning, teaching and research goals of universities. Changes include:

- *the introduction of semesterisation and modularisation*
- *the development of graduate schools and structured generic skills programmes for graduate students*
- *investment in teaching and learning centres*
- *an increasing emphasis on quality procedures*
- *new funding mechanisms including the allocation of central funding for the purchase of electronic journals and datasets.*

At the same time, university strategic plans now emphasise lifelong learning and the needs of a knowledge economy. They also highlight the increasingly diverse student body, including new national and international students and increased participation by non-traditional groups such as return-to-learning students and ethnic minorities.

Universities have also been exploring new methods of learning, such as enquiry and problem-based learning to support and develop independent learning. This is consistent with a

university culture in which flexible modes of delivery are being explored and utilised. All these factors are part of the context in which librarians and libraries now operate.

To ensure that all students participate equally and effectively in higher education, they must acquire the skills to locate, critique and use information effectively. This can present challenges in the rapidly changing Irish academic library and information environment.

The changing Irish university library

Since the late 1990s, the range and amount of information available via Irish university libraries has increased dramatically. Through the Irish Research electronic Library (IReL) initiative, over €20 million has been made available to support the development of a national information infrastructure, ensuring that Irish researchers have the necessary information resources to participate on the world stage. Through targeted funding from Science Foundation Ireland (SFI) and the Higher Education Authority (HEA), Irish university libraries have gained access to a vast range of electronic resources. These include electronic versions of peer-reviewed journals from the world's major publishers, including Taylor & Francis, Routledge, Elsevier, Oxford and Cambridge University Presses. In addition, university communities have access, via their libraries, to all major research databases – for example, Web of Knowledge, Academic Search Premier and Literature Online. These and other databases offer full-text journals, abstracts of journal articles, reference works, encyclopaedias and statistical data. These resources are available to university staff and both on-campus and remote students from any PC with Internet access, thus servicing the needs of distance, part-time and other users.

In keeping with a culture of increased cooperation and resource-sharing, including inter-university and intra-university research, libraries are participating in collaborative schemes to allow staff and students physical access to each other's libraries. Academic Libraries Co-operating in Dublin (ALCID) has been extended to allow taught and research postgraduates and staff access without borrowing to all Irish university libraries. The more recent development of the Society of College, National and University Libraries (SCONUL) Access is providing access (with borrowing in some cases) to university libraries in the UK and Ireland.

The Irish Universities Association (IUA) Librarians' Group has negotiated collaborative Strategic Innovation Fund (SIF) funding to develop local institutional repositories, where copies of journal articles and other publications by staff are being deposited (in accordance with copyright and licensing agreements). These local repositories – sometimes referred to as ePrint archives – are freely available via the Internet. This initiative aims to make the research output of the universities available free of charge, and also increases the visibility and accessibility of research, potentially leading to increased citation (Lawrence, 2001, p. 521). A national portal, currently under development, will provide a single interface to research output from all Irish universities.

To exploit and utilise these resources fully in support of the learning of a diverse user group, new levels and different forms of information skills – commonly referred to in the literature of librarianship as "information literacy" – are needed.

The changing user

Although universities are now endeavouring to support the learning of a diverse user group, the vast majority of those entering university are still aged between 17 and 21 years (OECD, 2004).

Today's students interact and use information in radically different ways from the pre-Internet generation. They are heavily engaged in new social networking tools such as BeBo, MySpace and Flickr. These students often display a high level of competence with information technology. They are becoming increasingly familiar with generating their own content through the use of blogs, wikis, YouTube and so on. On the other hand, Giannini (undated) notes that:

> Students are … navigating in a virtual world where distinctions are increasingly blurred between communication and information, published and unpublished, private and public, free and fee, author and reader, written and spoken, edition and update, original and copy.

Although their information technology skills are frequently well developed, research has shown that this group – sometimes referred to as the "millenials" or the "net generation" – lacks the information literacy skills and critical thinking skills needed to negotiate this complex information arena effectively (Barnes et al, 2007).

The first port of call for most students when given an assignment is the Internet. But students rarely distinguish between free content available on the Internet and the scholarly content to which the library subscribes, which is also delivered via the Internet. Typical undergraduate students doing a project on the benefits of immigration to the Irish economy, for example, may find a wide range of information and opinions on blogs, websites and so on and look no further. They may remain unaware that the information they are using for their project could be biased or unsubstantiated, and may lack authority or accuracy. Unless students have an awareness of the wide range of authoritative and scholarly sources available via the library, and understand the need to evaluate critically the information they find, their uninformed research may result in poor marks for their assignments and a negative learning experience. In contrast, students who have been introduced by librarians to the wide range of resources available via the library might have gained higher marks and demonstrated a deeper level of learning. This is because they have used resources such as scholarly journal articles via Academic Search Premier and other databases, including the Lexis/Nexis database of world newspapers (including archives of Irish newspapers) and reports from major international bodies.

Librarians play a key role in helping students exploit the quality information sources available via the library. At the same time, their teachers also need to be able to support them in developing their information literacy skills. The rapid expansion of databases and other information sources available to teaching staff challenges their ability to keep up to date with new resources to use in support of their teaching. It is therefore necessary for librarians and academics to work together to ensure students engage with high-quality and authoritative sources in their learning, through structured information literacy activities.

A starting point for librarians and academics working together on information literacy is a consideration of what information literacy is. Do academics and librarians share the same understandings of it? To answer these questions, we present some formal and working definitions of the concept in the following sections.

Information literacy definitions: the library perspective

Although the term "information literacy" is relatively new, what it represents has been with us for as long as there have been libraries. Changes in teaching and learning, the university environment and the information environment have brought the concept of information literacy into the discourse surrounding teaching and learning. Indeed, several Irish university teaching and learning plans articulate the need for information literacy as part of the student learning experience.

The definition of information literacy most often used and cited in the library literature is that provided by the American Library Association's Presidential Committee on Information Literacy report in 1989:

> *To be IL, a person must be able to recognise when information is needed and have the ability to locate, evaluate, and use effectively the needed information …. Ultimately, IL people are those who have learned how to learn. They know how to learn because they know how knowledge is organised, how to find information …. They are people prepared for lifelong learning because they can always find the information needed for any task or decision at hand (ALA, 1989).*

The Australian and New Zealand Information Literacy Framework provides the following definition:

> *Information Literacy is an intellectual framework for recognising the need for, understanding, finding, evaluating, and using information. These are activities which may be supported in part by fluency with IT, in part by sound investigative methods, but most importantly, through critical discernment and reasoning (Bundy, 2004, p. 4).*

The concept itself is much debated and no single authoritative definition exists. Nevertheless, most definitions recognise that students need to develop the appropriate knowledge and skills to:

- recognise they have a need for information
- be aware of the range of resources available to address their information needs
- effectively find information using a variety of tools and sources
- effectively evaluate the information they find
- use the information effectively to support an argument or develop a thesis
- communicate information effectively, understanding ethical issues such as the need to avoid plagiarism.

Information literacy definitions: the academic perspective

Although the professional body definitions are useful, we felt it would be interesting and informative to ask some Irish academics and educational developers what Information Literacy means to them. After all, if librarians are to work closely with academics and educational developers in developing information literacy, it is important that the two groups share a common understanding of information literacy as the basis for dialogue.

The following quotes were gathered from discussions between us and educational developers who participated in an Irish academic writing workshop. The quotes are not presented as a

conclusive answer to the question of what academics and educational developers understand information literacy to be, nor do they represent the sector as a whole.

What Does Information Literacy Mean to You?

Professor Sarah Moore, Dean of Teaching and Learning, University of Limerick:

> *From where I'm sitting information literacy is about alignment between teachers and students. Information literacy sessions need to support this alignment, with librarians working with lecturers in classrooms – effectively co-teaching. While the lecture would be teacher-driven, the librarian would be facilitating the learning process.*
>
> *Start where everyone is at, not where you or I think they should be. Just listen! Spend six months listening to people's frustrations and their dreams. Engage in really active listening. After listening take an active role in facilitating conversations. Go in to discussion without an agenda.*
>
> *Librarians might provide monthly clinics for lecturers and students that would address the needs of both. In these clinics they would diagnose where the person is at and work with them to develop their skills. They would also advise academics on how to engage students with information literacy, suggesting activities, learning experiences and so forth, which they could engage in, with the lecturer in a classroom situation. Working with a lecturer on a specific topic, creative ideas and ways to approach learning will emerge.*
>
> *It's vital that librarians work closely with centres for teaching and learning and that both lecturers and librarians understand where information literacy fits into the university teaching and learning strategy.*
>
> *The key, I think, is to remember that each learner's frame of reference is different and finding that out and working with it is essential.*

Dr. Geraldine O'Neill, Centre for Teaching and Learning, University College Dublin:

> *It's all about developing student ability, confidence and judgement. They need to know not only how to find information but how to judge the quality and appropriateness of it for the particular task in hand. There are multiple ways to get to information and many disciplines overlap.*
>
> *Effective partnerships between librarians and lecturers and education developers are crucial to pushing information literacy into the curriculum. We need to develop information literacy programmes that foster these skills early in the curriculum. There's also a need to design assessment for these programmes. This all needs to be mapped out and marking systems need to be explicit. With an increasing move towards self-directed learning, students need to understand both what information resources there are and the methods of assessing them. Becoming a member of your discipline involves understanding how knowledge is created, valued and shared.*
>
> *Through the discipline you can move from finding information (facts) to understanding this knowledge. There is a very important distinction between these. Students may then develop a capacity for knowledge creation. We need to*

get students to question how and where, not to be scared of this vast range of information resources, but to see finding information as part of the discipline. It's important in this electronic era that training on using print resources is not dropped.

Education development units have a role in this. They are currently involved in teaching academics. Aspects of information literacy should be designed, in conjunction with librarians, and integrated into the programmes offered through education development units.

There's also a need for the upskilling of librarians in teaching methodologies, designing learning outcomes, assessment techniques and so forth. At present few librarians are involved in designing assessment criteria, but if information skills are to be part of the curriculum, it needs to be aligned with the assessment and teaching approaches. Lecturers and librarians need to sit down and design the information literacy curriculum, explore the best methods of delivery and how the learning is to be assessed.

Saranne Magennnis, Director of Quality, NUI Maynooth:

Information literacy doesn't fit into my professional world as a concept. I'm sure it is something I engage with. If I consider various sources of information, my way of accessing information and people who can help me in this, I'm probably referring to information literacy. In my role of Director of Quality, with a remit that covers staff development, teaching and learning and institutional research, I certainly encounter multiple sources and categories of information and need the skills to use these effectively. However, I don't like the term information literacy. It sounds very impersonal. In my view one of the great strengths of librarians is that they are able to engage with the personal information needs of the individual user and provide a personal service.

Information literacy must take account of people's experience and expertise. It involves starting from where people are at and going from the known to the unknown. Dialogue is vital. Librarians must ask people what they need. Students and staff may not initially know what it is they need, but through dialogue this can be teased out and appropriate information literacies or skills developed.

A case can be made for generic rather than discipline-specific information literacy skills, particularly for first-year undergraduates. Basic skills would include finding books and journal articles and citing and referencing. If the library can help students to understand that they should not claim authority for material they have found on the web or via other sources that will go a long way to help overcome the problem of plagiarism.

While I recognise that information technology skills are different from information literacy skills, the former is often necessary as a backdrop to the acquisition of information skills. People who are not computer literate – and these are often members of underrepresented groups and mature students – may not be able to develop information literacy skills because of their lack of IT skills. Information literacy, with an emphasis on new technologies, provides opportunities to overcome barriers such as dyslexia and dysgraphia.

Perhaps information literacy is something which can help overcome inequalities not just nationally but globally!

Dr Jacqueline Potter, Centre for Academic Practice and Student Learning (CAPSL), Trinity College Dublin:

Information literacy is the difference between information and knowledge creation. It is about becoming a member of your own discipline, through understanding how knowledge is created, valued and shared. By being information literate and understanding how knowledge is created, you begin to see links over time in the literature. This move from information to knowledge is vital. The knowledge and skills developed through information literacy education is transferable to a range of subjects and contexts. Information literacy allows students not to be scared and to realise they are part of a discipline, where they can question, have a voice and see that they have something to contribute.

Some students might have an over-dependence on secondary sources, which already interpret the literature. A shift to knowing how to access and interpret research articles and other sources can happen through information literacy education. Some students may never make this transition. The need for this transition is not always made clear to students. Information literacy has a key role in all this.

The key themes emerging from this discussion include the importance of developing a shared understanding of information literacy, as well as partnerships to embed information literacy into students' learning experiences.

A shared understanding of information literacy

People experience information literacy differently. Different disciplines have different frames of reference and different ways of engaging with information. This point is borne out by a UK study (Webber *et al*, 2005). It is therefore important that librarians, lecturers, academic developers and students engage in dialogue on the concept of information literacy, its impact on learning and the most appropriate ways to integrate information literacy into the curriculum.

Another key issue that emerges from our conversations with academic developers is that consideration must be given to "where people are at"; that is, we must take into account their current expertise and experience of information literacy. For example, a millennial student's view and experience of information may be different from that of a mature student who has been out of formal education for some time. The latter may relate more easily to traditional print resources.

Collaboration and partnerships

There are two key partnerships for effective information literacy development – one between librarians and lecturers, and the other between librarians and teaching and learning centres.

Librarian–Lecturer Partnerships

It is crucial that librarians work closely with lecturers and course teams to identify explicit learning outcomes for information literacy skills development in the context of overall curriculum development. This should be followed by a discussion of the learning activities and experiences that will support those outcomes. Consideration must also be given to how

the learning will be assessed. This kind of partnership draws on librarians' expertise, and also gives them a more significant teaching role.

These curriculum development activities should take place against a background of more formal and informal discussion among librarians and academics. When such collaborations become the norm, they are likely to generate further opportunities – for example, collaboration on conference papers and publications.

Partnerships between Librarians and Teaching and Learning Centres

A close relationship between librarians and education developers is central to integrating information literacy into the learning and teaching strategies of universities, as well as into curricula. In addition, information literacy programmes or modules, delivered by librarians, should be part of the professional development programmes that centres offer to lecturers to develop their teaching. In this way, lecturers can develop their own information literacy skills and more effectively identify ways to engage students in seeking, evaluating and using information to support learning. The importance of the librarian/education developer is recognised in the literature (Bruce, 2001; McGuinness, 2006).

The partnerships between librarians and educational developers can also be enhanced by more opportunities for librarians to be involved in policy-making fora such as university teaching committees, faculty meetings, and course and programme boards. This will help librarians engage effectively in dialogue and keep abreast of curriculum developments and current thinking on learning and teaching.

Current methods of information skills development

The design and delivery of information literacy programmes and activities are an integral part of the activity of Irish higher education libraries (Breen and Fallon, 2005; Dodd, 2007; Fallon and McQuaid, 2007; Hegarty et al, 2004; McGuinness, 2007).

Three strategies for developing information literacy skills are outlined in Table 1.

Table 1: Strategies for Delivering Information Literacy

Type	Description	Example	Comment
Stand-alone classes	• Sometimes referred to as "one-shot" sessions. • Provide additional support for students. • Typically offered by a library independent of lecturer involvement. • May be initiated by lecturers, students or librarians. • Optional attendance.	• One-hour class on finding journal articles. • Two-hour workshop to give students an overview of the information sources in their discipline, held outside lecture hours but requested by a lecturer.	Practice has shown that this strategy on its own is not effective. These sessions are voluntary and attendance is often low. The sessions are not aligned with course learning outcomes, activities or assessment. Nevertheless, participants regularly comment on the sessions' value and usefulness (Breen and Fallon, 2005, p. 183).
Integrated	• Skills learned either early in a course or at point of need (Bruce, 2002, p. 13) and related to course of study. • Can be built on over time. • Dialogue between librarians and lecturers, with lecture time allocated for librarians to introduce students to key resources and library tools in their subject area. • Sessions generally not formally accredited.	• A slot of one to two hours in a research methodology course, introducing students to disciplinary resources and information-seeking processes. • "Effective literature searching", "Doing a literature search", "Finding information for your thesis".	Although such interventions are valuable, they are generally not formally assessed and depend on lecturers' awareness of the effectiveness of integrating information literacy skills.
Embedded	• "Curriculum that requires engagement in learning activities that require ongoing interaction with the information environment … and curriculum that provides opportunities for reflection and documentation of learning about effective information practices" (Bruce, 2002, p. 13). • Information literacy explicitly articulated as a core component at programme design stage. • Specific modules identified for information literacy skills development. • Student engagement with information literacy clearly mapped out, and consideration given to relevant learning activities and appropriate assessment at different levels. • Skills built on over time, recognising that different levels of engagement with information are necessary at different stages of a programme.	A typical learning outcome: "To design and execute an effective search strategy using a range of resources."	It is argued that generic skills such as IL can be successfully developed and learned only in this way –that is, in the context of course content, where skills development is explicitly articulated, developed, practiced and assessed (MacKeogh and Lorenzi, 2006).

Strategies for successfully embedding information literacy

The overview in Table 1 suggests that the most effective way to develop information literacy skills is by embedding them in the curriculum. Below we offer some suggestions for doing this:

- When designing a new course or module, or reviewing an existing one, engage a librarian in the process. Generally this person will be your subject/liaison librarian.
- The librarian will be able to advise on available resources or new resources required. S/he will work with you to identify and integrate information literacy learning outcomes into your curriculum. This includes consideration of the appropriate level of information skills needed at each stage of the programme. For example, your learning outcome might be to enable students to evaluate critically a number of different information sources. A suitable learning activity to achieve this might be to ask students to work in groups to find information on a topic using different sources. One group might look at free Internet resources such as Wikipedia, another might use an academic journal database such as Academic Search Premier, and another might look at printed and electronic books. Each group presents their findings and engages in discussion on the appropriateness and suitability of their findings for the task in hand. This activity introduces students to a variety of sources and requires them to reflect on and evaluate those sources.
- Teaching staff should also explore whether information literacy can be integrated into an online learning environment. For example, the task above could have taken place in the library or within a virtual learning environment (VLE). Here students would be provided with links to the information sources used in the activity. Discussion would occur in online forums, to which the lecturer and librarian could also contribute. Online quizzes and other tools could also be for formative assessment of skills development.
- It is important that learning outcomes are appropriately assessed. The assessment and marking criteria for assignments and tasks should be clear to students. It should include some criteria relating to their information use. For example, if students rely completely on one particular source, giving no evidence of having engaged in broader reading to support their arguments and viewpoints, they might expect to receive a low mark, clearly indicated by the assessment criteria.

Concluding comments

In this chapter, we have demonstrated the importance of information literacy and identified some key strategies that will help cultivate and develop students' information literacy knowledge and skills.

We believe librarians, academics and education developers have a wonderful opportunity to work together to enrich the learning experiences of our students. We hope this chapter will prompt you to think about information literacy and explore it within the context of your discipline, as well as the wider learning and teaching environment.

References

American Library Association (ALA) (1989) *Presidential Committee on Information Literacy* [online]. Chicago: Association of College and Research Libraries. Available from: http://www.ala.org/ala/acrl/acrlpubs/whitepapers/presidential.htm [Accessed 12 December 2007].

Barnes, K., Marateo, R. and Ferris, S. (2007) "Teaching and learning with the net generation", Innovate, vol. 3, no. 4 [online]. Available from: http://innovateonline.info/index.php?view=article&id=382&action=synopsis [Accessed 27 June 2008].

Breen, E., Fallon, H. (2005) "Developing student information literacy to support project and problem-based learning", *in* Handbook of Enquiry and Problem-Based Learning: Irish Case Studies and International Perspectives*, eds T.* Barrett and H. Fallon [online]. Galway: Centre for Excellent in Learning and Teaching, NUI Galway and All Ireland Society for Higher Education (AISHE). Available from: *http://www.aishe.org/readings/2005-2/chapter17.pdf* [Accessed 27 June 2008].

Bruce, C. (2001) "Faculty-librarian partnerships in Australian higher education: critical dimensions", Reference Services Review, vol. 29, no. 2, pp. 106–115.

Bruce, C. (2002) "Information literacy as a catalyst for educational change: a background paper" [online]. White Paper prepared for UNESCO, the US National Commission on Libraries and Information Science, and the National Forum on Information Literacy, for use at the Information Literacy Meeting of Experts, Prague, The Czech Republic. Available from: http://www.nclis.gov/libinter/infolitconf&meet/papers/bruce-fullpaper.pdf [Accessed 27 June 2008].

Bundy, A. (ed.) (2004) Australia and New Zealand Information Literacy Framework: Principles, Standards and Practice, 2nd edn [online]. Adelaide: Australia and New Zealand Institute for Information Literacy. Available from: http://www.caul.edu.au/info-literacy/InfoLiteracyFramework.pdf [Accessed 27 June 2008].

Dodd, L. (2007) "The future of librarianship: moving out of the library and into faculty – How problem-based learning is transforming the traditional role", SCONUL Focus, no. 41 (Summer/Autumn), pp. 4–7.

Donnelly, R. and Fitzmaurice, M. (2005) "Collaborative project-based learning and problem-based learning in higher education: a consideration of tutor and student roles in learner-focused strategies", in Emerging Issues in the Practice of University Learning and Teaching, eds G. O'Neill, S. Moore and B. McMullin [online]. Dublin: All Ireland Society for Higher Education (AISHE). Available fr*om:* http://www.aishe.org/readings/2005-1/donnelly-fitzmaurice-Collaborative-Project-based-Learning.html *[Accessed 27 June 2008]*.

Fallon, H. and McQuaid, M. (2007) "From librarian to lecturer: experiences of introducing an accredited information literacy module to a part-time undergraduate degree", SCONUL Focus, no. 41 (Summer/Autumn), pp. 8–11.

Giannini, T. (n.d.) Virtual Libraries on the Web, Dream or Reality? Studying the Impact of Information Architecture on Users in Real and Virtual Environments [online]. New York: Pratt Institute. Available from: http://pratt.edu/~lis-dean/virtual-libraries.html [Accessed 27 June 2008].

Hegarty, N., Quinlan, N. and Lynch, T. *(*2004) "A Portrait of Olas as a young information literacy tutorial", Library Review, vol. 53, no. 9, pp. 442–450.

Lawrence, S. (2001) "Free online availability substantially increases a paper's impact", Nature, vol. 411, issue 683, pp. 512-521.

MacKeogh, K. and Lorenzi, F. (2006) "An embedded approach to learning to learn online: strategies to increase student retention through developing subject-based competence", in Proceedings of the European Association of Distance Teaching Universities Annual Conference, 20–24 November, Tallinn.

McGuinness, C. (2006) "What faculty think: exploring the barriers to information literacy development in undergraduate education", The Journal of Academic Librarianship, vol. 32, no. 6, pp. 573–582.

McGuinness, C. (2007) "The use of reflective journals in a 1st year information literacy module", in Case Studies of Good Practice in Assessment of Student Learning in Higher Education, eds G. O'Neill, S. Huntley-Moore and P. Race [online]. Dublin: All Ireland Society for Higher Education (AISHE). Available from: http://www.aishe.org/readings/2007-1/No-03.html [Accessed 27 June 2008].

OECD (2004) Review of Higher Education in Ireland [online]. Dublin: Higher Education Authority. Available from: http://www.hea.ie/en/node/262 [Accessed 27 June 2008].

Webber, S., Boon, S. and Johnston, B (2005) "A comparison of UK academics' conceptions of information literacy in two disciplines: English and Marketing", Library and Information Research, vol. 30, no. 93, pp. 4–15 [online]. Available from: http://www.cilip.org.uk/NR/rdonlyres/1D8D25A6-F1C6-414F-A706-069B79F17BA7/0/article93b.pdf [Accessed 27 June 2008].

THE ROLE OF A VIRTUAL LEARNING ENVIRONMENT (VLE) IN THE TEACHING OF AN ACCREDITED MODULE IN INFORMATION LITERACY SKILLS

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Introduction

This chapter describes the design, delivery and evaluation of an accredited module in information literacy to part-time adult students on a BA degree in Local and Community Studies, offered by the Department of Adult and Community Education of the National University of Ireland at both its Maynooth and Kilkenny campuses. The chapter focuses on the role of a virtual learning environment (VLE) in the teaching of this module. Specifically, through evaluating the module according to recognised frameworks for evaluation in e-learning, we provide recommendations for the use of VLEs in the context of teaching information literacy.

The chapter begins with an overview of the degree programme and the decisions that led two of the authors to design an independent module in information literacy. We present the desired learning outcomes of the module and give some details of the content, modes of delivery, assessment systems and student feedback. We then present an overview of evaluation in e-learning, as well as two of the most commonly used evaluative frameworks. We then apply these to the information literacy module and show how the evaluative data was gathered. We discuss the outcomes of this evaluation process and provide suggestions for how other practitioners teaching in the relatively new area of information literacy could evaluate the roles of their own VLEs in the process.

Context: Background to the Programme

The BA in Local and Community Studies is a part-time modular degree programme. Modules are delivered in the evening and occasionally as one-week summer schools. Modules come in two varieties: a 5-credit module involving 24 contact hours and a 10-credit module involving 48 contact hours. To attain BA honours degree, a student must obtain 180 credits, with a diploma being offered on obtaining 90 credits.

The degree offers two strands of study: a Local Studies strand and a Community Studies strand. On completion of four introductory modules, students decide whether to major in Local or Community Studies. This decision affects their subsequent choice of modules. There are some modules open to both strands throughout the programme.

Why an Accredited Module in Information Literacy?

Chapter 12 of this volume discusses information literacy in detail, and notes that most definitions of information literacy recognise the need for students to develop the knowledge and skills to:

- recognise they have a need for information
- be aware of the range of resources available to address their information needs
- effectively find information using a variety of tools and sources
- effectively evaluate the information they find
- use the information effectively to support an argument or develop a thesis

- communicate information effectively, understanding ethical issues such as the need to avoid plagiarism.

The provision of information literacy training within this formal degree programme presented challenges not encountered in the traditional linear undergraduate degree programme, where there is a continuation from year to year, and information literacy can be embedded progressively into each year of the programme. The structure of this degree programme, where students select from over 40 modules across the social sciences, means that any attempt to embed information literacy into a particular module will disenfranchise students not taking that particular module. Following consultation with the Department of Adult and Community Education, it was agreed that a fully accredited stand-alone information literacy module was needed.

A further complication with this degree programme is that many of its students are in full-time employment and/or have other significant commitments. To be classed as mature students, they must be aged 23 or over by 1 January in the year of admission. They range in age from late-twenties to post-retirement age.

The programme's typical cohort is diverse not only in age, but also in life experience, as illustrated by student feedback:

> It was the first opening I got in my life back into education ... I had left school at thirteen ... if it hadn't been here in Kilkenny I wouldn't be part of it, it was that simple. And it all started from there ... elected to the County Council, Chairperson ... sure, if I had seen it on TV five years ago I would have said it was a daft script!
> (2002 BA Community Studies graduate, Chair of local council, mother of seven, grandmother)

> Having completed my degree, on an impulse I applied to the University to do a Masters in modern history and was later upgraded to a PhD ... The experience is certainly one to be savoured but should come with a warning – it's addictive.
> (2002 BA Local Studies (part-time) Kilkenny graduate, farmer from county Tipperary, currently completing his doctorate with the Department of History at NUI Maynooth)

> The BA offered by the NUIM Kilkenny Campus offered me the opportunity to achieve a degree. For one who did not have the opportunity to go on to University this course opened a door that had seemed to be permanently closed ... So for me the course was very successful and has offered me exciting, challenging and rewarding new career opportunities.
> (2002 BA Local Studies graduate, continued to the Higher Diploma in Education at NUI Maynooth, now teaches full-time in addition to his other interests)

Students participating in the BA Local and Community Studies come to either the Kilkenny or Maynooth campus to attend lectures. Outside lectures, they spend little time on campus because most live significant distances away from their place of study. Therefore, they need a way to use library resources without having physically to come to the library. In addition to this, many of the students have not been in formal education for some time or indeed may have had little access to formal education. Developments such as e-books and e-journals and the technologies to access these resources are generally unfamiliar to them.

Although students undertake a basic information technology (IT) module in their first semester (or get an exemption through passing a competency test), this module focuses on basic MS Word and Excel skills rather than on information literacy. Similarly, as part of the common study skills programme offered to new students, workshops giving a basic introduction to the library and its resources are provided. These are, however, at a very introductory level and focus on using the library catalogue and gaining familiarity with the physical layout of the library. Students, particularly those at more advanced stages in their courses, need a much higher level of information literacy skills. Following consultation with the Department of Adult and Community Education, a module was designed by colleagues in the Library and presented to Academic Council, where it was approved. The module would focus on electronic resources, addressing not only the information literacy skills deficit, but also the issue of students being unable to visit the library in person. It represented a further innovation in the involvement of Library colleagues in teaching as part of this degree programme, an issue to which we return later in this chapter.

The Information Literacy Module

The module aims to:
- teach students how to find and evaluate information sources via a range of electronic tools including library catalogues, electronic journals, electronic books, databases and the Internet
- teach students how to design effective search strategies
- provide training on the skill of compiling an annotated bibliography, including correct citation, writing a short abstract and structuring a bibliography
- provide an introduction to the Moodle virtual learning environment, which is used in other modules of the degree programme
- increase students' awareness of electronic information sources
- provide information skills for lifelong learning.

Learning Method

The module is delivered over 24 hours, 18 of which are in the evening. Classes are delivered in three-hour blocks, the first part being a lecture. This is followed by a practical session in which students have an opportunity to put into practice what they have just learned. Six of the module hours are carried out online, and students complete and submit assignments remotely via Moodle.

NUI Maynooth has Moodle as its institutional virtual learning environment (VLE) (see http://www.moodle.org and http://moodle.nuim.ie). In common with many similar environments at other institutions, Moodle is organised to provide course spaces for each taught module. These spaces are accessible only to tutors and students involved in the modules, and can contain course materials as well as online activities. The practical sessions for the information literacy module used several Moodle activities including quizzes and forums.

Assignment

As with all modules on this degree programme, there is no formal examination in the information literacy module. Instead, students compile an annotated bibliography on their thesis topic or another topic agreed with the librarian. This should:

- be on a specific rather than a general topic
- have some Irish context
- have a comprehensive introduction covering topics such as the reason for choice of subject, the scope of the bibliography and the range of electronic resources consulted
- have a minimum of 25 items listed
- follow the Harvard or the Irish Historical citation style
- have annotations (abstracts) of approximately four lines
- give some indication of the resources consulted to identify items included.

Marks are assigned as follows:

- 80 percent of marks to the bibliography
- 10 percent for quizzes carried out in Moodle
- 10 percent for a review of a database of the student's choice.

Evaluation and e-Learning: An Overview

We referred to our institutional VLE in the preceding section. Most institutions in Ireland have similar online environments to support face-to-face and distance learning. Our institutional VLE, Moodle, is an open source product and is freely available to download by anyone from its website at http://www.moodle.org/. Its functionality, but also its lack of costly licensing, has prompted its adoption beyond universities and the developed world, and in almost 200 countries (Moodle, 2007).

The mainstreaming of environments such as Moodle in higher education, as well as the growth in use of many other systems and software packages to support teaching and learning, has given rise to extensive discussion in e-learning research about the most effective ways to measure the impact of technologies on learning. People working in universities, and particularly those teaching, have invested considerable time and energy in adopting and implementing learning technology in their courses. Many wish to measure the effectiveness of this intervention, but very often lack the support and expertise needed in order to do this (Oliver *et al*, 2002). As a consequence, e-learning practitioners and researchers in the UK and Ireland have for some years been developing usable and practical evaluation tools suitable to the context of e-learning in higher education in these islands (Harvey *et al*, 2002).

This work has also served to highlight broader issues in the evaluation of e-learning. These include the often manifold purposes of evaluation, the methodological difficulties of measuring "impact" on student learning, and the political dimensions of evaluative studies and their recommendations (Oliver and Harvey, 2002). Evaluation as an area of research and development in e-learning has moved beyond consideration of pedagogical impact alone to the wider context in which technologies are introduced, implemented and used. Research in the 1990s, such as that conducted at the Open University, focused specifically on the impact of technology on students' learning (Scanlon *et al*, 2000; Scanlon *et al*, 1998). In the context of quality enhancement, however, and the significant political investment in e-learning in many countries at the end of the 1990s and beginning of the new century (Oliver, 2000), evaluation has taken on a more significant role in institutional approaches to e-learning.

Drawing on the research cited previously, we undertook a formative evaluation (Oliver, 2000) of the information literacy module described earlier in this chapter. The objective was to

refine and develop the module further for future cohorts of students. A further objective was to assess the suitability and effectiveness of Moodle for teaching this specific topic to this group of learners. The following section outlines our selected methods for this evaluation, and gives an overview of the data gathered.

Method: Evaluation frameworks

Evaluation research has shown that there is no one "right" way to evaluate learning with computers in a given course or module. In light of this, we have drawn on two evaluative frameworks to help us. These are:

- The CIAO Framework: Context, Interactions and Outcomes (Scanlon *et al*, 2000; Scanlon *et al*, 1998)
- *The Evaluation Cookbook* (Harvey (ed.), 1999).

Both frameworks were completed in the late 1990s and have been widely disseminated for several years. We considered that they therefore offered the potential benefits that come with widely used and trusted resources, but also gave us an opportunity to consider how effective these frameworks are in the context of new areas of teaching, such as information literacy and new VLEs.

The CIAO Framework

The CIAO framework (Scanlon *et al*, 1998), developed by educational technology researchers at the UK's Open University, offers evaluators three broad headings under which data can be organised in order to begin their analysis:

1. Context
2. Interactions
3. Outcomes

Under each, three further headings are proposed in order to frame evaluative activities. First, a rationale for each method should be given. Second, the types of data to be gathered should be identified. Finally, the methods by which the data will be gathered should be listed.

The researchers comment on what is meant by each of the headings:

> *By context, a wide interpretation of the rationale for use of the software including the aims of that use is meant. By interactions, documenting, in whatever way possible, the interaction of the students with computers and with each other to allow the focusing on the learning process is meant. By outcomes, a wide interpretation of the changes to students using the program is meant. Learning outcomes must be considered in order to assess the effectiveness of any program, but the importance of outcomes such as changes in learners' perceptions and attitudes is also argued for (Scanlon et al, 1998, p. 9).*

Although seeking to provide a clear tabular model for evaluation, Scanlon *et al* (1998) emphasise that evaluation should be as broad and comprehensive as the circumstances will allow.

The Evaluation Cookbook

The Evaluation Cookbook emerged from the Learning Technology Dissemination Initiative (LTDI) in the UK at the end of the 1990s (Harvey (ed.), 1999). It remains available in full online at http://www.icbl.hw.ac.uk/ltdi/cookbook/contents.html, or to download as a printable PDF document.

Figure 1: Screenshot of The Evaluation Cookbook Homepage
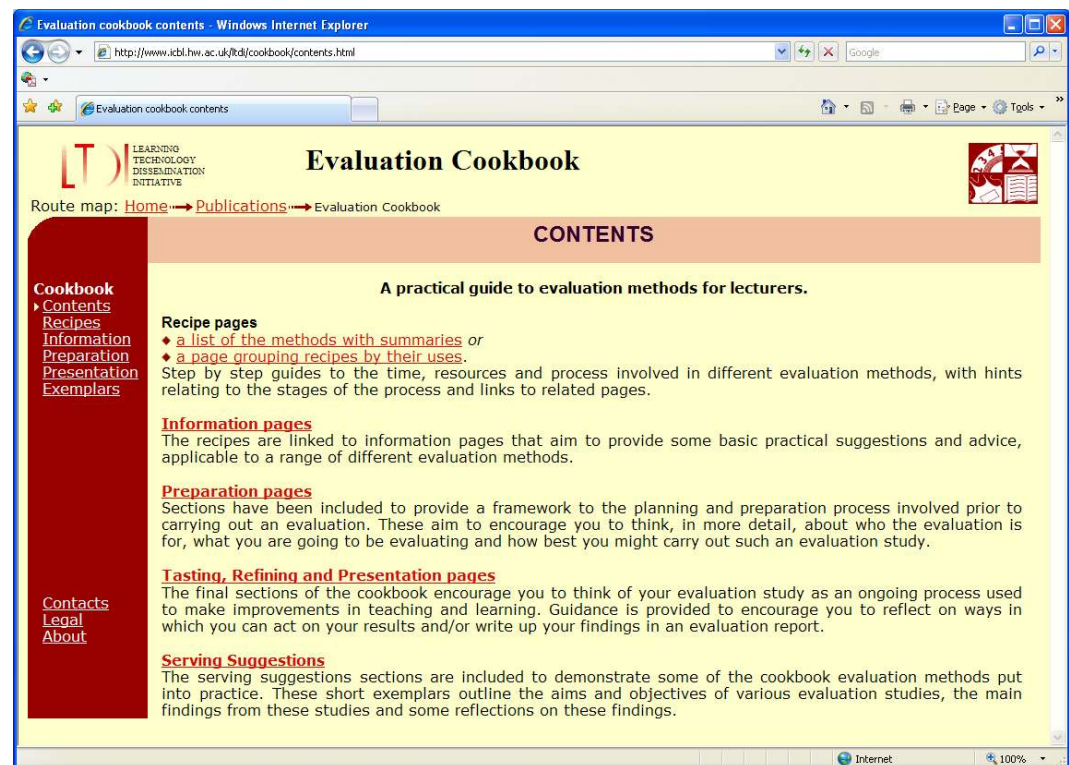
The *Cookbook* presents a series of methods for evaluation in the form of "recipes". The Information pages provide further information about each method, and the Preparation pages give guidance on how the methods can be combined. Further development and enhancement of the evaluation strategy is encouraged in the Testing, Refining and Presentation pages, and exemplar materials for various recipes are included in the Serving Suggestions. The user of the *Cookbook* is encouraged to read through the recipes and design an evaluation strategy based on the information given.

Although we have called both of these resources "frameworks" for evaluation in this chapter, it is important to be clear about what we mean. We have deliberately not called them methods. These are not discrete methods, or even very structured plans, for the analysis of particular sets of data. Rather, they are proposed as ways to organise other established qualitative and quantitative research methods, and contextualise them in order to conduct meaningful evaluation in e-learning. Just as the researchers proposing the CIAO Framework emphasise the breadth of the headings Context, Interactions and Outcomes, the researchers who were involved in authoring *The Evaluation Cookbook* maintain that:

> *Cookbooks … represent an alternative approach to supporting practitioners. Instead of focusing on a structured process, the cookbook provides rich*

descriptions of methods in an easy-to-use format.... the cookbook relies on the ability of readers to reflect on their needs, use descriptions of the scope and application of methods to develop an understanding of the options available, and then to select an appropriate method in a discriminating manner (Oliver et al, 2002).

While drawing on these two frameworks to develop an evaluation plan, we were also keenly aware of the practical constraints of time and resources in gathering data from the students in this module. In the event, the following data was gathered:

- standard departmental evaluation forms completed by the students at the end of the module
- information about students' interaction with the module in the VLE, derived from the VLE "logs"
- comments from the external examiner for the module
- course tutors' reflections written after the module had been completed.

The following section will show how this data was derived from plans developed using the evaluation frameworks outlined here.

Analysis

Evaluating Using the CIAO Framework

Using the CIAO Framework, we planned a small-scale evaluation to provide data about:

- The context of the module
- nature of student interactions with each other and with the online version of the module
- outcomes for students learning in Moodle as well as in their face-to-face sessions.

Table 2 overleaf maps (in italics) the data we knew we could obtain for the evaluation, and the methods by which it could be gathered.

Table 2: The CIAO Framework for our evaluation

	Context	**Interactions**	**Outcomes**
Rationale	To evaluate computer-assisted learning (CAL), there is a need to know about its aims and the context of its use.	Observing students and obtaining process data helps understand why and how some element works in addition to whether it works.	Attributing learning outcomes to CAL when CAL is only one part of a multifaceted course is very difficult. It is important to assess both cognitive and affective learning outcomes – for example, changes in perceptions and attitudes.
Data	*Module aims* *NUIM Strategic Plan* *Teaching and Learning Strategy* *Library Strategic Plan* *Tutors' written reflections*	*Logs of student interactions in Moodle* *Forum messages* *Logs of interactions with the module content in Moodle*	*Module evaluation form* *Assignment results*
Methods	*Tutors to write reflections* *Policy documents to be analysed* *External examiner comments to be considered*	*Automatic recording of interactions in Moodle environment* *NUIM Forum analysis tool to provide visual representation of Forum messaging*	*Evaluation form* *Assessment of module via assignment*

The Evaluation Cookbook

We also used *The Evaluation Cookbook* to develop an alternative evaluation plan for this module. The *Cookbook* was used online rather than on paper. One of the authors of this chapter progressed through each section in sequence and documented the decisions taken at each stage. It is important to acknowledge at the outset that she had previous experience using this resource, but had not used it for some time.

The *Cookbook* encourages careful consideration of fundamental issues before suggesting methods and "recipes": the user is reminded that an evaluation "question" is essential if a good strategy is to be designed. An evaluation focusing on internal needs and requirements, or one focusing on the experience of a small group of students, will be necessarily different in scale from an external evaluation involving hundreds of participants. Working through the Preparation section (see http://www.icbl.hw.ac.uk/ltdi/cookbook/preparation.html#endhead) helped us to focus on why the evaluation was being conducted and which methods might be appropriate.

The Information pages (see http://www.icbl.hw.ac.uk/ltdi/cookbook/info_pages.html#endhead) detailing each method helped to identify the constraints in our evaluation. For example, reading the description of an interview reminded us of the costs of time and resources in conducting this kind of data-gathering, and that it would not be possible (although desirable) at this stage of our work. The Recipes (see http://www.icbl.hw.ac.uk/ltdi/cookbook/recipes.html#endhead) themselves were clear and allowed quick identification of possible methods for our

evaluation, namely questionnaires (via the course evaluation form), and the use of system log data.

One area in which the Recipes appeared to have a gap, however, was in omitting tutors' input (including reflections, or feedback such as that of an external examiner) from the evaluation. Other methods (particularly Ethnography) would include this kind of data, but the roles of tutors and examiner, and indeed the context of institutional policy, are not immediately highlighted by the *Cookbook*. This is important in light of one of our concerns in this chapter: that information literacy is a new subject area, and that the people teaching in this area may not traditionally have taught in formally accredited courses in universities. Furthermore, many academic departments have not traditionally worked with Libraries in an interdisciplinary setting whereby modules such as this one are designed and taught.

These changes are significant and need to be included in evaluating new courses and modules. It has partly been through our engagement with these existing evaluation frameworks, however, that we have been shown this so clearly. Both frameworks have demonstrated flexibility and robustness in spite of the considerable length of time in which they have been in use. This is perhaps because both emphasise flexibility and breadth of scope on the part of the evaluator: a good evaluation strategy will be as broad as possible, and will seek to place the innovation in e-learning in the broadest possible context, with no set of data immediately ruled out for consideration.

Elements of both frameworks were therefore combined in finalising our methodology and data analysis for this module. Having described these frameworks and analysed our evaluation strategy, we now move on to discuss the evaluation findings themselves, both in relation to the module overall and the use of the Moodle environment as part of that module.

Discussion

Students' Responses: Becoming Information Literate
The course evaluation forms completed by students in both years indicated a high degree of satisfaction with the course overall:

> *This module opened up a whole world of information that I was not aware of.*

> *The sharing of views and the practical hands on experience was excellent.*

> *What I've learned about finding information will help me in my life outside college.*

> *The information gained was not so dense as to leave one's mind boggled.*

Specific resources people had enjoyed using or had found particularly relevant were highlighted in their comments. There was also very positive feedback about the course tutors, and specifically in relation to the support given by tutors. This is important to highlight as the students were keen to signal the value of interacting with tutors, and not only using resources in the classroom or independently online.

There were several comments relating to practical arrangements for the course, perhaps highlighting the difficulties sometimes experienced by part-time and distance students when

accessing university courses. Some suggested also that the course should be run in the first year of their degrees. Three referred to their IT skills as perhaps not being adequate to the course, and one person said that he/she would have liked more time to work on parts of the course.

Interactions with Moodle, Interactions in Moodle

Analysis of the Moodle usage logs indicates heavy use of the Moodle space throughout this module. The inclusion of Moodle quizzes as a component of course assessment undoubtedly contributed to this.

The quizzes in Moodle were referred to specifically by three participants, with two suggestions that these would be easier if downloadable for practice first before full completion:

> *The quizzes were great learning opportunities.*

> *I would like to have been able to download quizzes before submission.*

Interestingly, the comments in relation to Moodle tended to refer to it as part of other activities associated with students' learning, and not as an activity in itself. This would suggest to us that Moodle came to be regarded as an integral part of the course, but further data would be needed to support this interpretation.

> *Easy to understand. Notes on Moodle very helpful.*

> *All lectures were presented on Moodle and were clear and concise.*

There was also a good degree of interaction within the Moodle Forums for the module. Students communicated with the lecturers to check on various points raised in their face-to-face meetings, and also to provide specific feedback self-assessing their skills levels at intervals during the course.

The week-by-week structure of the Moodle space has been shown in other courses to support students and help them to build a picture of how the course topics are related, and how each builds upon the last (National University of Ireland Maynooth, 2006). Usage data does not allow us to suggest this definitively, but consistent use of resources week by week indicates that students found this structure easy to use and consistent.

Tutors' Reflections: Shifting Identities

Both of the librarians involved in tutoring this course wrote reflections on their experiences (see the Appendix). They highlight the change in their roles towards designing and tutoring an accredited course, and away from their existing practices:

> *While both of us have had experience of delivering information literacy sessions, we found the experience of designing and delivering an accredited module presented challenges we had not encountered in situations where there is no formal accreditation.*

This in turn led them to reflect more broadly on the wider change afoot: a change of identity from librarian to lecturer, as well as the need to engage with the full range of university systems involved in designing and teaching an accredited course:

> *Instead of being the helpful librarian at the end of the telephone/email or engaged in the reference query, we are lecturers and examiners imposing deadlines and standards. We ourselves have had to acquire new knowledge about how the academic system works including marking/grading systems, exam boards, external examiners, repeat submissions and so forth.*

Although some of this change is related to the practical aspects of running the module, there is also an ethnographic dimension. The librarians as tutors characterise this change as a "challenge (of) navigating new relationships":

> *We both have had to deal with disappointed students who questioned the fairness of their marks…. In effect we moved from being librarians to becoming lecturers, examiners, mentors and advisors without the real knowledge of where to draw the line in each role.*

From the point of view of this evaluation, these comments are not concerned with e-learning or information literacy specifically, but we argue that it is vital nonetheless that evaluative work accommodates this kind of articulation of change. The emergence of new professional roles, including teaching roles outside academic departments, is a significant change for any institution. Institutional policy documents, which have also been reviewed in relation to this evaluation, define strategic goals related to support for students' learning (including information literacy) and more broadly access to the university to students from all backgrounds. Modules such as the one under consideration here are central to these strategic goals. Our evaluation findings would suggest, however, that more support is needed for staff making the transitions necessary to implement and run these courses most effectively.

With the librarians' shift in identities, and their new teaching responsibilities, come the day-to-day challenges faced by other lecturers. The librarians talk particularly about the need for assessment procedures to reflect more adequately the kinds of assessment undertaken in new courses that cannot be assessed using traditional methods such as essay or examination. In terms of e-learning too, the librarians' experience mirrors that of many lecturers:

> *Students expect to have virtually 24-hour contact with us, anticipating instant feedback on their queries, which were submitted either via e-mail or through the Moodle forum. We have had to deal with and manage these expectations.*

The reflective writing of these librarian tutors includes only a short commentary on their experiences of using the VLE. What is important here is that the wider challenges and changes associated with running this course are clearly more significant to them. Although our evaluation was designed to examine the effectiveness of the VLE for this module, it has created a space in which these broader issues can be articulated and documented.

Examiners' Comments: Innovation in the BA Course

The external examiner for this module is an academic based in the UK. The external examiner's report included very positive feedback on this module. He commented that it was an exciting new development in this programme, and he also provided positive encouragement for the course tutors.

Policy Documents: Enacting Change and Its Implications

The use of the CIAO framework, in particular, encouraged us to consider data we had not initially thought about as part of the evaluation of this course: namely, the policy

documents of our institution. These include a *Strategic Plan* (National University of Ireland Maynooth, 2005), which has stated goals to open access to our courses for as broad a cross-section of people as possible. The Library's own *Strategic Plan* (National University of Ireland Maynooth Library, 2007) has specific objectives in relation to developing information literacy in our curriculum. Our institutional *Teaching and Learning Strategy* (National University of Ireland Maynooth, 2007) also seeks to broaden access to more students, and pledges to support students' development as autonomous learners. Set in the context of these mission statements, the importance of this module and of measuring its effectiveness is brought into clearer focus. As has been discussed earlier, the strategic goals proposed in such documents may also signify challenges and changes for staff involved in delivering them, and support for these staff is essential if the changes are to succeed.

Conclusion

In this chapter, we have sought to examine the part played by a VLE in a relatively new area of teaching with a non-traditional group of students. This in turn has led us to consider the available e-learning evaluation frameworks, and how these fit with teaching newly accredited courses in new VLEs.

Our findings indicate that this module, which is now in its third year, has proved popular with students and received very positive feedback. It is important to note that some of the participants are in the final stages of their degree programmes when they come to this module, and are preparing their minor theses. Approximately 60 people have completed the module to date, and indeed it is now being offered to those at earlier stages of the BA programme. This is one response to the students' feedback that has been made in the short term.

The Moodle VLE has provided an important additional component to the module: it included the resources used on a week-by-week basis, as well as allowing interaction with the module content. Students discussed the module in the Moodle Forum, and also completed quizzes throughout the module. The resources made available through Moodle include lecture presentations, links to the library catalogue, databases and electronic content. These continue to expand: the acquisition of Irish Newspapers Online and the development of the Irish History Online website have meant that the range of electronic sources available to those who do Local Studies rather than Community Studies has increased significantly. The introduction and development of e-books – many of which are relevant to both strands of the programme – has necessitated new input into the module and will trigger further development of the Moodle space. The evaluation findings suggest that students will welcome these further developments of the online space, provided that their skills are adequate to access the space. We might also suggest on the basis of the evaluation that they will find support from their tutors invaluable, in tandem with whatever online resources are available to them.

Student feedback, the Moodle usage data, and the comments of the external examiner have therefore already begun to inform the further development of this module. This is true of both its online and "offline" components.

This formative evaluation has however also articulated wider issues associated with the introduction of new accredited modules such as this one, and institutional issues that need to be addressed in the longer term. The tutors' professional and personal development in the role of librarian/lecturer marks a change for the university, which may need further support or, at a minimum, needs to be shared with the institution as a learning organisation. It will

also no doubt inform the development of what we see as a very exciting and innovative module.

The evaluation frameworks we have drawn upon here have offered us the means to analyse and interpret the student and tutor experience in this module, both online and offline. It remains very difficult, however, to comment on the real impact of technology on students' learning (Oliver and Harvey, 2002) and a further outcome of this process for us has been the realisation that evaluation needs to continue. We need to continue to examine the student feedback year on year, and to design evaluation strategies for the longer term in order to draw more definitive and defensible conclusions about the impact the VLE has had on the teaching of this module. This remains a significant challenge to researchers in e-learning, and to all of us using technology as part of our teaching.

References

Harvey, J. (ed.) (1999) *The Evaluation Cookbook* [online]. Edinburgh: Learning Technology Dissemination Initiative. Available from: http://www.icbl.hw.ac.uk/ltdi/cookbook/contents.html [accessed 3 July 2008].

Harvey, J., Oliver, M. and Smith, J. (2002) "Towards effective practitioner evaluation: an exploration of issues relating to skills, motivation and evidence", *Journal of Educational Technology & Society*, vol. 5, no. 3, pp. 3–10 [online]. Available from: http://www.ifets.info/journals/5_3/harvey.html [accessed 2 July 2008].

Moodle (2007) *Moodle Community* [online]. Available from: http://moodle.org/ [accessed 2 July 2008].

National University of Ireland Maynooth (2005) *NUI Maynooth Strategic Plan 2006–2011* [online]. Maynooth: NUIM. Available from: http://planning.nuim.ie/documents/NUIMplanEnglish.pdf [accessed 3 July 2008].

National University of Ireland Maynooth (2006) Moodle Evaluation: Year One. Unpublished report, available on request from claire.macavinia@nuim.ie

National University of Ireland Maynooth Library (2007) *NUI Maynooth Library Strategic Plan*. Maynooth: NUIM.

National University of Ireland Maynooth (2007) Teaching and Learning Strategy. [online]. Available from: http://academiccouncil.nuim.ie/documents/NUI_Maynooth_Teaching_and_Learning_Strategy_000.pdf [accessed 15 July 2008].

Oliver, M. and Harvey, J. (2002) "What does 'impact' mean in the evaluation of learning technology?" *Journal of Educational Technology & Society*, vol. 5, no. 3, pp. 18–26 [online]. Available from: http://www.ifets.info/journals/5_3/oliver.html [accessed 2 July 2008].

Oliver, M., MacBean, J., Conole, G. and Harvey J. (2002) "Using a toolkit to support the evaluation of learning", *Journal of Computer Assisted Learning*, vol. 18, no. 2, pp. 199–208.

Oliver M. (2000) "Evaluating online teaching and learning", *Information Services and Use*, vol. 20, nos 2–3, pp. 83–94.

Scanlon, E., Jones, A., Barnard, J., Thompson, J. and Calder, J. (2000) "Evaluating information and communication technologies for learning", *Journal of Educational Technology & Society*, vol. 3, no. 4, pp. 101–107 [online]. Available from: http://www.ifets.info/journals/3_4/scanlon.html [accessed 2 July 2008]

Scanlon, E., Tosonoglu, C., Jones, A., Butcher, P., Ross, S., Greenberg, J., Taylor, J. and Murphy, P. (1998) "Learning with computers: experiences of evaluation", *Computers and Education*, vol. 30, nos 1–2, pp. 9–14.

APPENDIX: LIBRARIANS' REFLECTIONS

While both of us have had experience of delivering information literacy sessions, we found the experience of designing and delivering an accredited module presented challenges we had not encountered in situations where there is no formal accreditation. One challenge is to make academics and others aware of the difference between information and IT skills. The fact that one of us is a member of the course board for the programme helped in this.

Another challenge is navigating new relationships. Now instead of being the helpful librarian at the end of the telephone/e-mail or engaged in the reference query, we are lecturers and examiners imposing deadlines and standards. We ourselves have had to acquire new knowledge about how the academic system works including marking/grading systems, exam boards, external examiners, repeat submissions and so forth. Part of the process is providing individual feedback on results. We both have had to deal with disappointed students who questioned the fairness of their marks. We quickly became aware that marking systems need to be very explicit and the process completely transparent. While an external examiner reviews marks, we are ultimately responsible and accountable. In effect we moved from being librarians to becoming lecturers, examiners, mentors and advisors without the real knowledge of where to draw the line in each role.

Increasingly working in a Moodle environment, students expect to have virtually 24-hour contact with us, anticipating instant feedback on their queries, which were submitted either via e-mail or through the Moodle forum. We have had to deal with and manage these expectations.

The marking/grading system in place in the university is, in our opinion, somewhat vague and possibly open to interpretation. Perhaps it is designed for a more standard essay/examination type environment. For this particular module we feel that a more explicit marking structure allocating specific marks to each section of the bibliography with deductions for incorrect or absent elements of citations would provide a useful tool when correcting students' assignments. This would also provide the students with a clear indication of where they lost marks and why. We hope to have this marking structure in place before the module is next presented.