
Teaching Fellowships

Teaching Fellowships

2012

DIT Teaching Fellowship Reports 2011-2012

Jen Harvey
Jen.harvey@tudublin.ie

Follow this and additional works at: <https://arrow.tudublin.ie/fellow>



Part of the Educational Assessment, Evaluation, and Research Commons

Recommended Citation

Harvey, Jen, "DIT Teaching Fellowship Reports 2011-2012" (2012). *Teaching Fellowships*. 22.
<https://arrow.tudublin.ie/fellow/22>

This Report is brought to you for free and open access by the Teaching Fellowships at ARROW@TU Dublin. It has been accepted for inclusion in Teaching Fellowships by an authorized administrator of ARROW@TU Dublin. For more information, please contact yvonne.desmond@tudublin.ie, arrow.admin@tudublin.ie, brian.widdis@tudublin.ie.



This work is licensed under a [Creative Commons Attribution-Noncommercial-Share Alike 3.0 License](https://creativecommons.org/licenses/by-nc-sa/3.0/)



DIT Teaching Fellowship Reports 2011–2012

**Supporting the strategic themes of
Diversity, Modularisation and eLearning**



Contents

Foreword	2
Summary Overview of Projects	3
Teaching Fellowship Reports	5
College of Applied Arts and Tourism	
1 Developing a course in media entrepreneurship	6
<i>Kate Shanahan</i>	
2 Critical thinking, Critical Theory: cross-School first year module in critical analysis	11
<i>Tim Stott, Mary Ann Bolger, Niamh Ann Kelly and Noel Fitzpatrick</i>	
College of Business	
3 Exploring social media as a means of fostering student engagement and retention	14
<i>Rosie Hand</i>	
4 Oral communication apprehension: an exploration in addressing fear of public speaking	18
<i>Dan Shanahan</i>	
5 Research methodology at level 8 and 9: a web-enabled approach	22
<i>Daire Hooper</i>	
College of Engineering and the Built Environment	
6 An activity-based approach to the learning and teaching of research methods: measuring student engagement and learning	28
<i>Eimear Fallon, Terry Prendergast and Stephen Walsh</i>	
7 Developing a collaborative virtual learning environment between students in cross disciplines to meet the new college structure	32
<i>Ruairi Hayden and Fiacra McDonnell</i>	
College of Sciences and Health	
8 How much do our incoming first year students know? Diagnostic testing in mathematics at third level	40
<i>Blathnaid Sheridan</i>	
9 Scaffolding for cognitive overload using pre-lecture e-resources (SCOPE) for first year chemistry undergraduates	46
<i>Claire McDonnell, Christine O'Connor and Sarah Rawe</i>	
Teaching Fellowship 2011–2012 Dissemination Outputs	51
Appendices	53

Teaching Fellowships were generously funded through the HEA SIF 2 – DRHEA project



Foreword

This publication provides a collation of reports of research conducted as part of the 2011–2012 DIT Teaching Fellowship scheme. The DIT Annual Teaching Fellowships were established in 2009 as part of Cycle II of the HEA's Strategic Innovation Funded Enhancement of Learning (EoL) strand of the Dublin Region Higher Education Alliance (DRHEA). This partnership Alliance of eight universities and Institutes of Technology across the wider Dublin region was awarded funding for a range of collaborative activities, with the aim of sharing expertise and creating economies of scale in their efforts to address strategic needs in Teaching and Learning, Graduate Education, Internationalisation and Widening Participation.

The aim of the DIT Teaching Fellowships is to support key college based educational research projects linked to the wider Institute Enhancement of Learning strategy themes. The title of "Teaching Fellow" is awarded to an individual or a team, nominated by the college and who would undertake a research project to support the enhancement of learning and/or curriculum development at a programme, school or college level over a one academic year period. It is intended that evidence gathered from the studies will be utilised to inform relevant policy, practice or similar institutional research activities into the future.

Applications are invited for Fellowship projects that link to the DIT strategic themes related to Diversity, Modularisation and eLearning. (See Appendix A for the 2011/12 Teaching Fellowship Strategy Grid.) In September 2011, eight DIT Teaching Fellowships were launched, two from each of four DIT Colleges. Each Fellow was allocated two members of the Learning Teaching and Technology Centre (LTTTC) staff to help support their project work. A programme of four Fellowship workshops and project update sessions were scheduled throughout the year. An overview of each project is provided on the Fellowship website: <http://www.dit.ie/lttc/projects/institutionalprojects/>. In addition, the site includes presentations from the launch event on 29 September and the Showcase of teaching and learning Innovations held on 11 January 2012 in DIT Cathal Brugha St Campus. An evaluative review of the Fellowship process was conducted at the end of the Academic year (see Appendix B).

The establishment of Teaching Fellowships has been a very successful venture for the DIT and currently work is underway to sustain these awards into the future now that the current external funding has ceased. This initiative, however, would not have been possible without the generous support provided through the HEA Strategic Innovation Funded EoL strand of the DRHEA. This funding has enabled the successful completion of 29 Fellowship projects over the last three years with the resultant research outputs helping to inform both policy and practice across the Institute. This level of success is, in part, due to the enthusiasm and dedication of all the award recipients and the DIT staff who have supported the Fellowship projects throughout each academic year. In particular, I would like to thank the College Heads of Learning Development and/or local Awards Contacts, my LTTTC colleagues and Miriam Brosnan from the DIT Presidents Office for her excellent administrative support.

Dr Jen Harvey, Head of the DIT Learning, Teaching and Technology Centre

Summary Overview of 2011-2012 Projects

College of Applied Arts and Tourism

Kate Shanahan: **School of Media**



The research involved designing a course with accompanying materials, and learning outcomes which would enable final year students to obtain a skill set not currently available in their degree curriculum. Methods such as group mentoring, ideas incubation, liaison with industry, as well as case studies of new media start-ups were looked at in order to help students develop sustainable news and information services. Students on the pilot project were surveyed both before and after the course to ascertain whether the required learning outcomes had been met. This project aimed to ensure that the School of Media at DIT remains at the forefront of Irish media education by teaching students how to develop new media strategies and start-ups.

Tim Stott, Mary Ann Bolger, Niamh Ann Kelly and Noel Fitzpatrick: **School of Art, Design and Printing**



The objectives of the projects were to

- propose a first year module entitled "Developing Critical Skills", to be available across the Institute;
- promote, through the analysis of cultural artefacts, the analytical and rhetorical skills of students across different disciplines;
- test/evaluate appropriate assessment procedures for such a module;
- explore innovative methods of curriculum design process for interdisciplinary practice.



The anticipated benefits of such a module were originally imagined to be the development of students who would possess critical competences with broad application, who would be reflective and analytical, and who would develop awareness of the public responsibilities of knowledge. Further to this, we hoped to encourage a greater understanding among students of the value and complexity of culture, cross-discipline cooperation among staff teaching the module, and to consolidate the benefits of the modular system within the DIT.

College of Business

Rosie Hand: **School of Marketing**



The overall aim of this proposed research project was to explore the use of social media as a key component in fostering student engagement and retention. The specific objectives were to:

- assess the potential uses of social media as a means to foster student engagement and retention;
- assist programme directors and lecturers in identifying opportunities where social media may be utilised to enhance module and programme delivery;
- explore creative methods of leveraging existing and new social media technologies to enhance the overall student experience.

It was anticipated that this project would create an awareness among lecturers and programme directors as to the potential for using social media as a means of student engagement and retention. This project would also provide insights as to how social media can be leveraged to improve the quality of the student experience for both traditional and non traditional students.

Dan Shanahan: **School of Accounting and Finance**



The objectives of the project were to establish the levels of oral communication apprehension (OCA) among accounting and business students, certificate, undergraduate and post-graduate, in the School of Accounting and Finance and to explore any correlation between OCA levels and academic grade. The benefits of the project work and the rationale for this study were also to raise awareness of OCA with a view to introducing a module to help students with high levels of OCA to overcome this debilitating phenomenon.

Daire Hooper: **School of Management**



The project aimed to examine students' perceptions of webinars as an alternative to the traditional lecture. Through the implementation of webinars it was hoped that students would become more engaged with the course content as well as increase peer-to-peer interaction. The project was to be piloted with post-graduate students taking a core module in Research Methods and would provide students with step-by-step instructions on how to perform various statistical analyses. As webinars can be viewed live or pre-recorded, it is advantageous in that it allows the students to return to the material at a time that is convenient to them.

College of Engineering and the Built Environment

Eimear Fallon, Terry Prendergast and Stephen Walsh: **School of Real Estate and Construction Economics**



The anticipated benefits of the project were:

- the development of students who possess critical competences with broad application, who are reflective and analytical, and who are aware of the public responsibilities of knowledge;
- a greater understanding among students of the value and complexity of culture;
- the encouragement of cross-discipline cooperation among staff;
- to consolidate the benefits of the modular system within DIT.

Ruairi Hayden and Fiacra McDonnell: **School of Construction**



This was a collaborative project between the department of Construction Management and Technology and the department of Construction Economics. The term "collaborative learning" refers to an instruction method in which students at various performance levels work together in small groups toward a common goal. The students are responsible for one another's learning as well as their own. The objectives of this collaborative project were to

- promote interaction between students from different but related courses (e.g. Construction Management and Quantity Surveying Students);
- enhance students' ability to think creatively, solve problems, and make decisions as a team;
- evaluate the benefits of using web as a virtual learning environment;
- examine the benefits of modern technology as a tool in feedback.

College of Sciences and Health

Blathnaid Sheridan: **School of Mathematical Sciences**



The mathematical under-preparedness of first year students' entry into DIT has become a concern for many DIT Colleges. A huge number of modules on many different programmes in the institution have mathematical content or involve quantitative analysis. As the school of Mathematical Sciences is heavily involved in service teaching, staff now encounter more and more students who are unable to deal with basic mathematical skills and thus are unable to understand the more high-end mathematical content of their programmes. This is having a knock-on effect on grades and ultimately on retention rates. The aim of the project was to develop a diagnostic test which will help to profile the mathematical strengths and weaknesses of incoming first years. In conjunction with this, a peer-assisted learning network in mathematics was established with the aim of improving achievement in first year mathematics through provision of student-centred mentoring programmes.

Claire McDonnell, Christine O'Connor and Sarah Rawe: **School of Chemical and Pharmaceutical Sciences**



The aims of this project were to develop additional online pre-lecture resources for first year chemistry undergraduates and to evaluate the effect of implementing these resources by analysing quantitative (test and exam results) and qualitative (pre- and post-implementation surveys and focus group interviews) data.

The e-resources were designed to; reduce cognitive load by introducing some new terms and threshold concepts before the lecture, incorporate worked examples to scaffold students' learning and to provide short test questions with immediate and targeted feedback so that students can identify areas of difficulty. The anticipated benefit is that the gap in performance observed in first year between learners who have and have not studied chemistry at Leaving Certificate level will be removed. This was shown to occur last year in the module that Dr Michael Seery teaches and we anticipated that we could extend this positive effect to our first year teaching.

College of Applied Arts and Tourism



1 Developing a course in media entrepreneurship

Kate Shanahan: School of Media

Contact: catherine.shanahan@dit.ie

Abstract

The objective of this teaching fellowship was to develop a module in Digital Media Entrepreneurship for the fourth year BA Journalism students in Dublin Institute of Technology (DIT), the pilot to run in the Semester beginning September 2012. Part 1 of the research involved a survey of the students prior to the pilot to ascertain their attitudes to, and expectations of a module in media entrepreneurship, as well as their skill sets. Part 2 will take place after the pilot to see whether these expectations have been met and whether the students' skill sets have improved. Unlike other modules on the undergraduate programme which are practice based or have a mainly academic component, this module aims to be at the forefront of new developments in the media industry. The objective of the project is to embed in the curriculum a cross-disciplinary module with accompanying materials, and learning outcomes which will give the final year students a skill set not currently available in their degree curriculum, and enable them to be at the forefront of new media. After the pilot project the module will be assessed and will be introduced into the curriculum on a permanent basis.

Keywords: *creative digital media, gaming, journalism, media entrepreneurship, new media*

Introduction

In its 2009 report on "Entrepreneurship education in Ireland", the Accelerating Campus Entrepreneurship (ACE) Initiative Committee called for

an entrepreneurship education that is "fit-for-purpose" today. That is, an entrepreneurship education (for and about entrepreneurship) for all students that will not only provide theoretical knowledge but ensure graduates develop an entrepreneurial mindset, through developing entrepreneurial skills, behaviours and attitudes and equipping them with the key competencies to enable them to enjoy an entrepreneurial/intrapreneurial career or engage in new venture creation.

The ACE report (2009: 8) concluded that "This can only be achieved through student-centred teaching and learning that employs innovative, experiential learning methodologies".

Journalism educators worldwide are aware that if they do not change their curriculum, then changes in media will make that curriculum redundant. Analysing this Mark Deuze (2006) contends "a journalism studies that fails to acknowledge the evolutionary change expressed in tomorrow's new media ecology will become a zombie journalism studies – alive but dead at the same time."

Looking at the media landscape from 2012 onwards some journalism faculties have decided to lead rather than follow. They have set up digital media entrepreneurship courses in order to allow students to gain the skills which will see them negotiating the changing media landscape by setting up their own start-ups. Some have concentrated just on up-skilling their journalism students. Others have gone a step further and are running cross-disciplinary courses where programmers, gamers, business students and journalists incubate new ideas and then seek funding from internal and external sources. The latter is the model which the author has chosen as the model for her teaching fellowship project module development. DIT School of Media plans to pilot this module in the Semester beginning September 2012.

Project Work

The project involved a number of complementary strands. First it looked at students and entrepreneurship and the academic research in the area, in order to best assess what teaching entrepreneurship at third level should involve. Then it involved carrying out Part 1 of a survey on the students who would be involved in the pilot to assess both their attitudes towards entrepreneurship in general and then media entrepreneurship in particular. Part 2 of the survey will take place when they have finished the course, thus allowing comparison of the changes in skill sets and attitudes after the pilot. The survey will also allow for feedback which will help the future development of the course.

The project also involved researching best practice in the area worldwide in order to design a course which would both aim high, and best suit the needs of journalism students within DIT.

Students and Entrepreneurship

Various studies of students and entrepreneurship have examined the role of entrepreneurship in education at third level (Vesper and Gartner 1997; Charney and Libecap 2000). Others have posited the tension between those who believe that entrepreneurs are born, and not made. For example in their survey of engineering students at MIT, Luthje and Franke (2003) found that as well as personality traits, would-be entrepreneurs are affected by the perceived support they have for entrepreneurial endeavours at college level.

The question may be asked therefore can universities and other third level institutions really create entrepreneurs? In their ten year literature review of enterprise education, (Gorman, Hanlon and King 1997: 63) found that "most of the empirical studies surveyed indicated that entrepreneurship can be taught or at least encouraged by entrepreneurship education".

In his literature survey Kuratko (2004) summarised many of the areas identified as being important in academic research into entrepreneurial education including skill-building courses (McMullen and Long 1987; Vesper and McMullan 1988), sources of venture capital (Vesper and McMullen 1988; Zeithaml and Rice 1987), experiential learning (Solomon, Weaver and Fernald 1994), learning tools including business plans (Hills 1988; Vesper and McMullan 1988; Gartner and Vesper 1994; Gorman, Hanlon and King 1997), consultation with practising entrepreneurs (Klatt 1988; Solomon, Weaver and Fernald 1994), and "live cases" (Gartner and Vesper 1994).

Student Survey Part 1

Using the Red C National Third Level student survey on entrepreneurship Education/Teaching(2011) as a partial model, third year BA Journalism students – who will be the core group for the September 2012 pilot media entrepreneurship course for final year journalism students – were surveyed in order to ascertain their attitudes and expectations towards a course in media entrepreneurship. Part 1 of the survey was a series of questions which attempted to ascertain student's skills sets, attitudes to and expectations of a course in media entrepreneurship. Part 2 will be carried out after the course is finished in order to survey how attitudes/skills have changed as a result of participation in the pilot course. The class is evenly divided between males (14) and females (13). The age levels of the participants range between 19 to 25 (77.7%), 26 to 30 (11.1%) and over 30 (11.1%). It is interest to note that of the more than 50% who answered the question on relatives who were self-employed, 58.3% had a parent (father) and/or uncle (58.3%) who was self-employed.

Attitudes to a course on media entrepreneurship

Out of the total group of 27 students who participated in Part 1 of the survey, when asked whether they had any "entrepreneurial skills teaching" as part of their course all (100%) answered in the negative. A total of 25 students said that they believed that an entrepreneurship module should be part of their course while two said they did not want one. More than two thirds (74.5%) wanted a dedicated entrepreneurship class while the rest preferred it to be a minor part of another course (25.9%). See Figure 1.1 below.

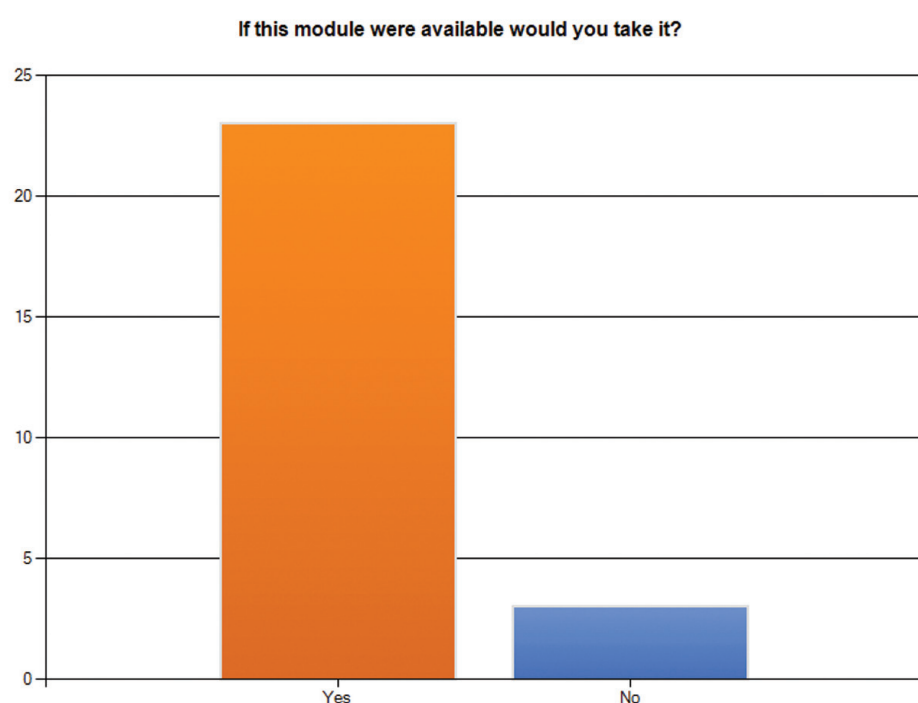


Figure 1.1

Asked whether they would take this module if it were available over 88% said that they would.

Attitude to course content

When attitudes to course content were broken down by subject area interesting patterns emerged. Topics such as creative thinking, product innovation, project work, mentoring from real life entrepreneurs, and how to generate a business idea scored highly, with an average of between 80% and 90% of students being very interested and/or fairly interested in all of these. Topics which did not rate as highly, averaging a score of 60–70%, included how to write a business plan, and what entrepreneurship means. Though it is extremely important in terms of entrepreneurship, learning how to deal with banks saw only 37.1% of students giving a response of being "very interested", with a higher level, 58.3% being interested in monetising content, and 54.2% being interested in global media opportunities. Again managing intellectual property is a huge part of digital media entrepreneurship but a little over 30% of students were interested in learning about this (see Fig 1.2 below).

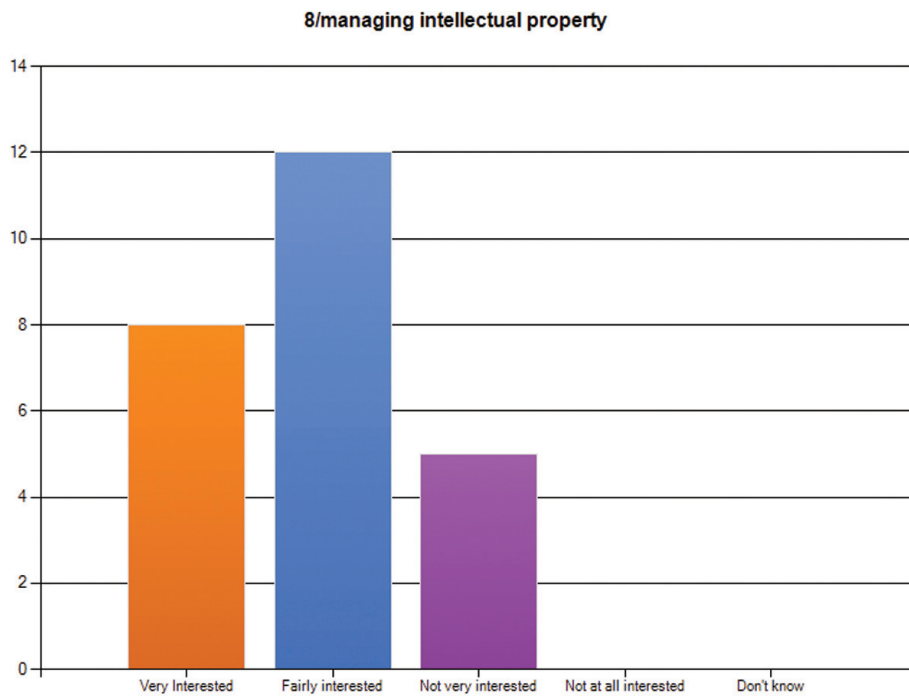


Figure 1.2

Over two-thirds of students (66.7%), however, were interested in having advertising and public relations covered on the course. The highest score in terms of levels of interest was conversely for the topic of the future of media (see Fig 1.3 below).

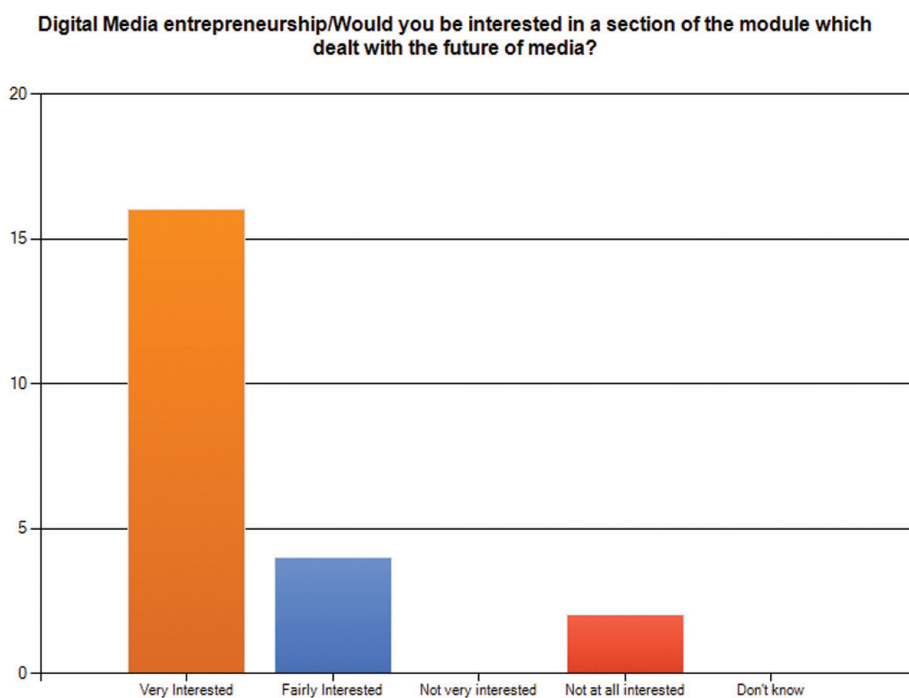


Figure 1.3

Attitudes to own skill sets

Part of the survey also questioned student beliefs about their own skills. When asked to agree or disagree with the statement "I have a good understanding of what it takes to start and run a business", only 40% agreed strongly or slightly, the rest disagreed or did not know. They were much more positive about the issue of creative skills however with over 80% agreeing strongly or slightly with the statement "I often think outside the box, get ideas that other people do not get." While most agreed with the statement in relation to team work, "I often inspire other people", they were more ambivalent when asked whether they preferred working in a team or alone, with 38% agreeing with the statement "I prefer to work alone rather than in a team", but 46% saying "neither". More than 80% believed that a class in media entrepreneurship would make them more likely to start up their own business.

Attitudes to future employment

Although the students had different aspirations as to where they would work in the future, the breakdown showed a majority (over 60%) opted to work online. The rest divided equally across magazines, radio and television. Traditional print journalism, for example newspapers, was the least favoured option.

Conclusions

From its original template, where the course would have been solely for the BA Journalism fourth years my research concluded that it should be expanded to a cross-disciplinary course as per the University of Stanford digital media entrepreneurship course. The support of Hugh McAtamney, (Head of Digital Media), and Barbara O'Shea (Head of the School of Media) has been key to this project. The course will be taught to both the fourth year BA Journalism students and the M.Sc. in Creative Digital Media and Digital Games students. This involved extensive negotiations and consultations across disciplines as well as liaising with colleagues and Heads of Department in the School of Media in order to fit the course into the existing academic schedule, and seek academic council approval for the same. (See course outline in Appendix C.) Students on the course will be expected to incubate and later showcase new media ideas to an industry panel.

Convergence in media is being met with convergence in journalism practice. But as Bob Giles (2007) pointed out when sounding a warning note about these changes: "journalism educators should be wary of using grafting tools to solve their curriculum problems, grafting a course on here, or there, they might instead head for the plough, and indulge in a little creative destruction".

Creating a cross-discipline course where journalists and practitioners of creative digital technologies can collaborate and come up with digital media start-ups – which is the model this project opted for in DIT – is part of that "creative destruction". It should also lead to new research which will add to our theoretical understanding about what is happening as media evolves.

Analysing this, Stephens (2006: 151) posits: "If our future journalists are encouraged to experiment and stretch conventions they will either come up with a more relevant and more interesting form of journalism or they will have a better understanding of its traditional form".

The DIT students surveyed about this pilot project want to learn the skills needed to become a media entrepreneur and are positive that such a course will benefit them. Many of those changes involved developments in digital media technologies; therefore allowing our students to collaborate with fellow-students from creative technology disciplines should benefit both cohorts.

Recommendations to DIT

This project has shown both the need for entrepreneurial education among journalism students and the benefits of adopting an interdisciplinary approach in order to maximise the learning outcomes. It could be a model for future collaborations within DIT. Our graduates when they leave DIT will work in increasingly complex environments. Allowing students to work in small cross-disciplinary teams as part of their undergraduate or post-graduate courses could drive both entrepreneurship and innovation across DIT.

Evaluation/Proposed Future Work

The students involved in the pilot project will be surveyed again after they have done the course in order to see how their skill sets have changed/improved and how being on a cross-disciplinary course has affected learning outcomes. This research will form the basis of future entrepreneurial courses in journalism.

References

- Accelerating Campus Entrepreneurship (ACE) (2009) "Entrepreneurship education in Ireland: Towards creating the entrepreneurial graduate"; available online at <http://www.cit.ie/contentfiles/File/entrepreneurship%20education%20in%20ireland%20research%20report2.pdf?uid=1272470117769>
- Charney, A. and Libecap, G.D. (2000) "Impact of entrepreneurship education", Insights: A Kauffman Research Series (Kauffman Center for Entrepreneurial Leadership); available online at http://www.unm.edu/~asalazar/Kauffman/Entrep_research/e_ed_grow.pdf
- Deuze, M. (2006) "Liquid and Zombie journalism studies"; available online at <http://deuze.blogspot.ie/2006/05/liquid-and-zombie-journalism-studies.html#!/2006/05/liquid-and-zombie-journalism-studies.html>
- Gartner, W.B. and Vesper, K.H. (1994) "Executive forum. Experiments in entrepreneurship education: Successes and failures", Journal of Business Venturing, 9: 179–187.
- Giles, B. (2007) "Ploughing new ground in journalism education"; available online at <http://www.nieman.harvard.edu/reports/article/100198/Plowing-New-Ground-in-Journalism-Education.aspx>
- Gorman, G., Hanlon, D. and King, W. (1997) "Some research perspectives on entrepreneurship education, enterprise education, and education for small business management: A ten year literature review", International Small Business Journal, 15(3): 56–77.
- Hills, G.E. (1988) "Variations in university entrepreneurship education: An empirical study of an evolving field", Journal of Business Venturing, 3: 109–122.
- Klatt, L.A. (1988) "A study of small business/entrepreneurial education in colleges and universities", The Journal of Private Enterprise, 4: 103–108.
- Kuratko, Donald F. (2004) "Entrepreneurship education in the 21st century: from legitimization to leadership", Coleman White Paper, US Association for Small Business and Entrepreneurship National Conference.
- Luthje, C. and Franke, N. (2003) "The 'making' of an entrepreneur: Testing a model of entrepreneurial intent among engineering students at MIT", R&D Management, 33(2): 135–147.
- McMullen, W.E. and Long, W.A. (1987) "Entrepreneurship education in the nineties", Journal of Business Venturing, 2(3): 261–275.
- National Third Level Student Survey Ireland Entrepreneurship Education/Teaching Survey (April 2012) REDC Polling Company. Commissioned by the South Eastern Regional Authority (Waterford Ireland) and financed by the European Regional Development Fund under the Interreg./IVC programme.
- Solomon, G.T., Weaver, K.M. and Fernald, L.W. Jr. (1994) "Pedagogical methods of teaching entrepreneurship: An historical perspective", Gaming and Simulation, 25(3): 338–253.
- Stephens, M. (2006) "Rethinking journalism education", Journalism Studies, 7(1): 150–153.
- Vesper, K.H. and Gartner, W.B. (1997) "Measuring progress in entrepreneurship education", Journal of Business Venturing, 12(5): 403–421.
- Vesper, K.H. and McMullen, W.E. (1988) "Entrepreneurship: today courses, tomorrow degrees?", Entrepreneurship Theory and Practice, 13(1): 7–13.
- Zeithaml, C.P. and Rice, G.H. (1987) "Entrepreneurship/small business education in American Universities", Journal of Small Business Management, 25(1): 44–50.

2 Critical thinking, Critical Theory: cross-School first year module in critical analysis

Tim Stott, Mary-Ann Bolger, Niamh-Ann Kelly and Noel Fitzpatrick: **School of Art, Design and Printing**
Contact: tim.stott@dit.ie, maryann.bolger@dit.ie, noel.fitzpatrick@dit.ie, niamhann.kelly@dit.ie

Abstract

The objective of the project was threefold. Firstly, to propose a first year module entitled “Developing Critical Skills”, to be available across Dublin Institute of Technology (DIT), which would promote, through the analysis of cultural artefacts, the analytical and rhetorical skills of first year students across different disciplines. Secondly, to test and evaluate appropriate assessment procedures for such a module. Thirdly, to explore innovative methods of curriculum design process for interdisciplinary learning. The anticipated benefits of such a module were originally imagined to be the development of students who would possess critical competences with broad application, who would be reflective and analytical, and who would develop awareness of the public responsibilities of knowledge. Further to this, the authors hoped to encourage a greater understanding among students of the value and complexity of culture, cross-disciplinary cooperation among staff teaching the module, and to consolidate the benefits of the modular system within the DIT.

Keywords: *Critical Theory, critical thinking, interdisciplinarity*

Project Outline

In the authors' experience as lecturers in Critical Theory in the School of Art, Design and Printing, our courses make up only 20% of the programmes on which we teach. While all staff teaching in third level education can certainly provide evidence of the lack of core literacy skills among school leavers, we would argue that the problem is more acute among Art and Design students. One of the principal difficulties that we face is the longstanding but often false dichotomy of theory and practice in Art and Design. Students expect to “do” art rather than engage in criticism and analysis. Our students demonstrate skills in criticism and analysis, but they are not necessarily aware that is what they do. In addition, by prioritising practice, their respective disciplines often obstruct any explicit formalisation of these skills and how they might be taught.

In light of this situation, we believe it is no longer sufficient for students to develop only single discipline expertise. What is more, further skills are needed than those orientated to the demands of the labour market, if a student is to take on the responsibilities of active citizenship and reflective practice in the world. To confidently meet problems and opportunities presented by the latter, a student must have knowledge of the methods of logical enquiry, argumentation and reasoning, and must develop competence in applying these methods. There is an urgent requirement to develop integrated curricula that forcefully promote these methods.

We have already begun to teach these methods diffusively and often informally. The purpose of this project is to assess the feasibility of an explicit formalised delivery of these competences.

In interviews and discussions with first year students across all the disciplines that include Critical Theory in their programmes in the School of Art, Design and Printing, we asked the following questions.

- What is, in your opinion, Critical Theory?
- What were your expectations of Critical Theory, if any, prior to college?
- What preparation is necessary for a first year student beginning Critical Theory?
- What preparation is provided, if any, by Leaving Certificate syllabi?
- What skills have you learnt in Critical Theory? What do you want to learn more?
- Are the evaluation criteria for Critical Theory legible and apt?
- How do you see the overlap of practical and theoretical skills?

In order to formulate these questions, roundtable discussions were held with colleagues from Critical Theory and from the various studios of the School. These discussions indicated in particular a belief among studio staff that first year students were unaware of the requirements of Critical Theory or of its relevance to their development as a practitioner. Our discussion with the students confirmed this view.

In more detail, we found that almost all students identified Critical Theory as a set of specific, transferable skills. As one student put it: “the basic skills you need for being in college as opposed to school, ... you're not like fed all the information, you're not given everything, you have to work a lot of it out for yourself.”

The majority of first year students mentioned that they had not expected to do Critical Theory as part of their practical course, whether in design or fine art. Some had expected to “do art history”, but were prepared to “learn things off and then be tested on them”. All felt that the prospectus and open days did not indicate the style of learning that they would encounter in college. They suggested that it would be helpful for prospective applicants to see samples of first year work in Critical Theory.

Their experience of learning by rote in secondary school proved problematic when it came to attendance; “some people” relied on notes on webcourses rather than coming to class where they would benefit from discussion and explanation, which then led to problems when attempting to do assignments.

Students frequently used the metaphor of language to explain how they came to understand Critical Theory over the course of the first year. Describing the process of unpacking an essay brief one student said: “It’s like when you go to a different country where they speak the same language, but they have different expressions – like when people come here they might not understand what ‘grand’ means – there’s things that they phrase that you might not understand at first.” This alerted us to the assumptions we make when using words like “critique” and “analyse”.

Students were clear that they did not think there was room in the current first year timetable for another stand-alone module. Instead, they would prefer to have more time in the existing modules to be dedicated to “learning the language” of Critical Theory.

They were acutely aware of the different understanding of “knowledge” in second and third level essay writing. One student summarised the difference thus: “In school it’s just your opinion. Here it’s more interesting; it’s your opinion of other people’s opinions!”

Our findings have forced us to re-evaluate the scope of the project, insofar as the problem of a lack of knowledge or misunderstanding of Critical Theory is more widespread than first believed and a good deal of basic education is needed before attempting anything so sophisticated as a cross-School module. We need first to explain Critical Theory – its rationale, its vocabulary, and its application. Once these foundations have been laid, we hope that a cross-School module in Critical Theory will make more sense to students.

Recommendations

The authors would like to make the following recommendations.

1. During the applications process it must be made clear to students that Critical Theory forms a central requirement of all programmes.
2. An introduction to Critical Theory ought to be included in Induction week.
3. As Critical Theory staff have to teach both the content of their modules and fundamental skills necessary to complete them – grammar and spelling; skills of presentation, oral and written; reasoning and argumentation; analytical skills; and even the ethics of their respective disciplines – the allocation of teaching hours should be increased from one hour per week to at least two.
4. Fundamental skills training is most effective in small group workshops, and must be timetabled accordingly.
5. Since a great deal of Critical Theory modules are available as optional modules, adequate and effective technology must be available in order to facilitate selection.

For the future, our priority is to develop a pilot programme for Induction week. This will form the basis of the full cross-School module to be developed and implemented in Autumn 2013.

Select Bibliography

- Abu ElDahab, M., Vidokle, A. and Waldvogel, F. (eds) (2006) *Notes for an Art School*, Amsterdam: International Foundation Manifesta.
- Burbules, N.C. and Berk, R. (1999) “*Critical thinking and critical pedagogy: Relations, differences, and limits*”, in Thomas S. Popkewitz and Lynn Fendler (eds) *Critical Theories in Education*, New York: Routledge.
- Elkins, J. (2001) *Why Art Cannot be Taught: A Handbook for Art Students*, Urbana, IL: University of Illinois Press.
- Elkins, J. (2008) “*Art education is radically undertheorized*”. Interview with C. Sollfrank, Dundee Contemporary Arts, Visual Research Centre, 17 May; available online at <http://www.thing-hamburg.de/index.php?id=796>
- Ennis, R.H. (2011a) “*Critical thinking: Reflection and perspective. Part I*”, *Inquiry: Critical Thinking across the Disciplines*, 26(1) Spring: 4–18.
- Ennis, R.H. (2011b) “*Critical thinking: Reflection and perspective. Part II*”, *Inquiry: Critical Thinking across the Disciplines*, 26(2) Summer: 5–19.
- Godson, L. (1999) “*Past imperfect: Design history in Ireland*”, Circa 89: Art Education Supplement, Autumn.
- Holert, T. (2009) “*Art in the knowledge-based polis*”, *E-flux Journal*, No. 3, February; available online at <http://www.e-flux.com/journal/art-in-the-knowledge-based-polis>
- Kjørup, S. (2006) *Another Way of Knowing: Baumgarten, Aesthetics, and the Concept of Sensuous Cognition*, Bergen: Bergen National Academy of the Arts/Roskilde University.
- Madoff, S.H. (ed.) (2009) *Art School: Propositions for the 21st Century*, Cambridge, MA: MIT Press.

College of Business



3 Exploring social media as a means of fostering student engagement

Rosie Hand: School of Marketing

Contact: rosie.hand@dit.ie

Abstract

The overall aim of this project was to explore the emerging potential of social media as a tool to engage students and enhance their learning. The specific objectives were:

- To assess the potential uses of social media as a means to foster student engagement.
- To explore creative methods of leveraging existing and new social media technologies to enhance the overall student experience.
- To assist programme directors and lecturers in identifying opportunities where social media may be utilised to enhance module and programme delivery.

Google+ was identified as an appropriate social media platform to engage with students for formal teaching purposes. The platform was leveraged to help students overcome some of the barriers they had encountered in engaging with academic literature, collaborating in groups and presenting their work in front of their peers. Focus groups were conducted to evaluate the research project. Students were generally very positive about the use of Google+ to enhance their learning and made a number of suggestions for future reiterations of the project.

Key words: Google+, social media, student engagement, teaching/learning strategies

Introduction

This generation of students have been raised in an environment where their relationship with the internet is deeply embedded within their daily lives and routines. These students are “always on” and they engage online to satisfy many of their functional and social needs. Social network platforms, in particular, are used to take social interaction to deeper levels. Indeed, Pelling and White (2009) contend that social media has become the most popular channel of communication for college students.

Students have therefore developed certain expectations with regard to their learning. The phenomenon is best described by Baird and Fischer (2005–2006: 5) who suggest “This net-centric generation values their ability to use the Web to create a self-paced, customized, on-demand learning path that includes multiple forms of interactive, social and self-publishing media tools”. Students, therefore, would appear to relish the opportunity to engage with and shape their learning outside the traditional confines of the lecture room. Given that social networking encourages social bonds to be strengthened it is unsurprising that Baird and Fisher (2005–2006) also found that using social networking technologies has a positive influence on student retention.

Dublin Institute of Technology (DIT) students do not buck the trend in relation to their use of social networking sites, particularly Facebook. According to the “DIT IT Strategy Report 2011–2014”, a recent DITSU survey indicated that 66% of DIT students spend over five hours per week on Facebook. The researcher believes that this is an underestimation. A recent poll by Behaviour & Attitudes (Silicon Republic 2011) indicates that while the average Irish internet user spends eight hours per week on social media sites, those in the 18–24 years age bracket are spending 11 hours per week on Facebook and Twitter.

Consideration was given to whether Facebook would be a suitable platform to use for the purposes of this project. However, academic literature supports anecdotal evidence that students are generally reluctant to engage with formal learning on Facebook. Madge et al. (2009) contend that Facebook is regarded by students to be primarily a tool for social engagement. It is secondly considered a channel for informal student-to-student interactions. However, students did not consider Facebook a platform for formal teaching purposes. The researcher’s own teaching experience would concur with these findings. Students are reluctant to engage with lecturers on Facebook and are not comfortable “sharing” with them.

Google+ was identified as an appropriate social media platform to engage with students for formal teaching purposes for the following reasons. Firstly it is positioned as a privacy-centred approach to social networking. Secondly its focus is about sharing content and information rather than life events and thirdly, the platform is built around targeted sharing. Students were therefore reassured that personal information and/or discussion could remain firmly out of the realm of the project. Google+ is a relatively new platform having launched in June 2011; it now has over 250 million users. One of its major advantages is that all of google’s products are integrated across the platform. Therefore users can access google search, gmail, googledocs, youtube etc. with ease. Google+ has a “hangout” feature which was incorporated into the project as it provided an ideal opportunity for blended learning.

The Google “hangout” function allows up to ten users to video chat online.

Consumer engagement is a key objective for most brands and social media is invariably used by brands to proactively enhance engagement. Porter et al. (2011) recommend the following to foster and sustain engagement in virtual communities.

- a shift from a dialogue to a triologue
- understanding that personal needs are at the centre of social media engagement
- promoting member participation within the community
- sustaining engagement by motivating members to work cooperatively with one another and the brand.

The researcher was cognisant of these recommendations from industry and endeavoured to integrate them into the design and format of this project.

Outline of Project

The project was conducted as part of the Marketing Communication Module with a group of third year undergraduate students on the B.Sc. Marketing degree (DT341). The cohort of 98 students was enhanced by the presence of over 15 visiting Erasmus students from France, The Netherlands, Argentina and Canada. The cohort was divided into two groups, each receiving two hours teaching per week. The learning outcomes of the marketing communication module are as follows:

- to provide students with a thorough understanding of the theoretical foundations of marketing communications;
- to explore in depth the thinking behind marketing communications’ activities;
- to evaluate the role of branding within marketing communications;
- to examine and evaluate traditional marketing communication strategies;
- to examine the role of digital communications and emergent technologies/platforms in challenging the vision and scope of marketing communications.

Students are assessed on this module through individual and group continuous assessment weighted at 50% and also through an examination weighted at 50%. As part of the group assessment students are required to engage with the academic literature and collaborate as a team to present a critical analysis of the literature related to a specific marketing communications topic to their cohort. Over five years of teaching this module, the researcher has identified a number of barriers for the student in relation to this type of assessment.

- Students often find it very difficult to understand and engage with academic literature. In particular, they struggle to see the relevance of the literature in the commercial world.
- Students find group work challenging and are often concerned that the workload is not evenly distributed and that their contribution is unacknowledged.
- Students are generally self-conscious and nervous about presenting their work to their peers

One of the key aims of this project, therefore, was to leverage the chosen social media platform, Google+ to overcome the identified barriers to student learning and engagement.

At the first lecture, the parameters of this research project were explained to the cohort. Many students did not have experience of Google+ and were directed to links where they could gain information on the various features of the product. Each student was invited to set up a Google+ profile and to place the researcher and the other members of their team in a circle. This ensured the researcher could observe the interaction between team members and could mentor each group individually. Students could also invite other members of the cohort to be in their circle. Each team interacted within its own team but also had the ability to “share” with chosen members of the wider group.

The academic literature was made available to the cohort and a date was set for each team to present its work. Students were invited to contribute by posting to Google+, comments, videos, links or any content pertinent to any topic covered within the module syllabus. The importance of quality and relevant content was emphasised to students.

The use of social media to support this module was intended to address some of the barriers which students have encountered in this type of continuous assessment. Google+ afforded students an online opportunity to discuss the literature and find and post examples or applications of prescribed theory in industry. The collaboration among team members could be demonstrated through online discussion of issues arising from the assessment and the uploading of photo evidence of team collaboration. Some of the concerns of students regarding unfair distribution of workload should have been alleviated as all team member contributions are transparent online. Finally, the Google+ hangout was utilised to mentor groups before their presentation. Students were given the opportunity to have a Google+ hangout at an agreed time in the week before their presentation. They could then discuss or question points of theory and share any of their concerns regarding their forthcoming presentation.

Marks were distributed across the social media element of the assessment as follows:

Participation	5%	Setting up a Google+ profile; agreeing to participate in project and the dissemination of its findings; participation in focus groups; use of +1 to show engagement with content
Collaboration	10%	Uploading photo album to show team at work; sharing content with other teams
Content creation	10%	Quality and relevance of posts, uploads
Presentation and report	25%	n/a
Examination	50%	n/a

Table 3.1 Breakdown of assessment marks

Evaluation

Three focus groups were conducted to evaluate the students' perspective on this fellowship project. The focus groups were facilitated by the Head of the Learning, Teaching and Technology Centre who had prior experience in leading such discussions. Each focus group had 7–8 students and all three were audio recorded. A theme sheet was designed by the researcher in order to allow the facilitator to guide the discussion.

The key findings of the focus group are summarised below:

Use of Google+ as a learning support/driver of engagement on module

Students were positive about the use of social media to support their learning. They agreed that it had been a beneficial exercise and that they had discussed more advertising and marketing communications issues and had been more engaged than on other modules.

An initial problem however, was that many students were not familiar with Google+ as a platform. This lack of familiarity caused confusion at the beginning of the project. Students said they were unsure which circles they belonged in and were uncomfortable about sharing/posting. Many students agreed that Facebook would not have been the appropriate platform to use for this project as the space is too personal. The social media platform LinkedIn was perceived as "too formal". Most students agreed, however, as they became familiar with the features of the platform that Google+ was the correct choice for this project as it was perceived as "professional" rather than personal. Therefore, students tended to post content related only to the module and maintained a relatively formal tone in their comments.

To overcome student's lack of knowledge of Google+, it was suggested that lab sessions should be integrated into the module to familiarise students with the platform. This would ensure that they became confident at an earlier stage when creating content. It was also suggested that students might be more inclined to participate in online discussions on Google+ if the class were divided into smaller groups as they would be posting content to smaller numbers.

While it was agreed among students that using Google+ had given them access to more resources and industry examples than they would have had otherwise, students felt that the stream of information was just "too rich". Many students did not log on to Google+ on a daily basis and felt when they did log on, they were faced with an overwhelming volume of content, which was posted by a number of students who uploaded content on a daily basis. It was recommended that students should be given more detailed guidelines as to what constitutes a quality post, how often they should log on, and how often should they post content.

Use of Google+ as a tool for team collaboration

A certain level of resistance to using social media platforms other than Facebook would appear to exist. Students uniformly stated that although they all had set up Google+ profiles, they immediately set up a Facebook page when the time came to collaborate on their work for the presentation. Students were not clear on how they could have collaborated more effectively and suggested that more detailed guidelines could be introduced to ensure more collaboration.

Students were very positive about the potential of the Google+ hangout feature. They noted that there were a number of technological issues, some of which were related to Google+ but most of which were related to wifi issues within the college. It was perceived that the hangout function was particularly useful at the beginning of the semester when students were unfamiliar with what the presentations entailed and unused to presenting in front of their peers. Students welcomed the opportunity to participate in an online mentoring session with their lecturer.

Conclusions

Students welcomed the idea of using technology to support and enhance their learning. It was felt by them that the project explored a novel way for them to engage with the module, their lecturer and each other. They suggested a number of adjustments to tweak the project for future years such as:

- lab sessions to familiarise students with the platform;
- stricter guidelines on volume, timing and quality of contributions/content creation;
- promotion of the use of Google+ hangout as a means to mentor individuals/groups of students.

Overall students found that Google+ did enhance interactivity among their group and they benefited as a result of the bank of resources and discussion created by their cohort.

Recommendations to DIT

This project has provided a better understanding of the uses of social media as a key component in fostering student engagement. It has also provided insight as to how social media can be leveraged to improve the quality of the student experience.

Findings of the study indicate that students are receptive to using technology/social media platforms to support and facilitate their learning.

Students, however, when unfamiliar with new platforms, require tuition to ensure that they understand and can use the technology available. This is particularly important now, in the context of the integration of webcourses across all colleges in the coming academic year.

It is hoped that this project has also assisted programme directors and lecturers in identifying opportunities where social media may be utilised to enhance module and programme delivery.

Proposed Future Work

The use of the social media platform Google+ to enhance learning and student engagement will continue in the academic year 2012–2013. The project will be refined based on student recommendations and suggestions.

Acknowledgments

The author would like to acknowledge the support and advice of everybody at the DIT Learning, Teaching and Technology Centre, especially Jen Harvey who kindly facilitated the focus groups. In addition the students are thanked for their participation in this project.

References

- Baird, D. and Fischer, M. (2005–2006) *“Neomillennial user experience design strategies: Utilizing social networking media to support ‘always on’ learning styles”*, *Journal of Educational Technology Systems*, 34(1): 5–32.
- Madge, C., Meek, J., Wellens, J. and Hooley, T. (2009) *“Facebook, social integration and informal learning at university: It is more for socialising and talking to friends about work than for actually doing work”*, *Learning, Media and Technology*, 34(2): 141–155.
- Pelling, E. and White, M. (2009) *“The theory of planned behaviour applied to young people’s use of social networking websites”*, *Cyberpsychology and Behaviour*, 12(6): 755–759.
- Porter, C., Donthu, N., MacElroy, W. and Wydra, D. (2011) *“How to foster and sustain engagement in virtual communities”*, *California Management Review*, 53(4): 80–111.
- Silicon Republic (2011) *“Irish internet users spend eight hours a week each on social media – poll”*; available online at <http://www.siliconrepublic.com/new-media/item/22511-irish-internet-users-spend>

4 Oral communication apprehension: an exploration in addressing fear of public speaking

Dan Shanahan: **School of Accounting and Finance**

Contact: dan.shanahan@dit.ie

Abstract

Several research studies have identified oral communication as a skill employers desire of their workforce, and so, accounting and business education programmes place considerable emphasis on the development of communication competencies among students. However, not all students appear to benefit as desired from communication skills development. Prior research indicates this may arise from a fear of communicating, commonly known as oral communication apprehension, a factor which inhibits an individual's willingness to communicate in a number of contexts – one-to-one, groups, meetings and public speaking – and may inhibit his/her capability to develop effective communication skills.

Many prior studies have measured oral communication apprehension of students in different disciplines, and there has been some qualitative exploration of the phenomenon. This paper reports on a study conducted in the School of Accounting and Finance, DIT. Levels of apprehension were measured for 291 students. A small group of students who indicated that they found presenting extremely difficult were identified and two approaches to assisting them were adopted – individual tutoring over a number of months, and group work on a specially designed communications module. The views and fears of students are reported and demonstrate the pain that many suffer when called on to present.

Keywords: *communication skills, oral communication apprehension, PRCA-24*

Introduction

Irish employers, like those elsewhere in the world, demand that business and accounting graduates possess effective oral and written communication skills and it is now recognised that communication skills are among the most important competencies for graduates to possess upon their entry to careers in accounting. However, despite the considerable efforts made by higher education institutions over the past 20 years to prioritise the development of communication competence, many students do not develop the appropriate skills. There is increasing awareness that an individual may experience a range of fears concerning communication tasks or situations which may inhibit the development of the requisite communication skills. These fears or anxieties are commonly referred to as "oral communication apprehension" (OCA).

When a person suffers from high OCA a number of mainly negative consequences may ensue. It can have a negative effect on how an individual learns to communicate, on learning or knowing appropriate communication behaviours, on developing the necessary communication skills to communicate effectively when required, and on developing a positive attitude towards communication (McCroskey 1997: 101). The consequences for many students suffering from high OCA are that they do not ask questions in class, make themselves inconspicuous, skip class, drop needed programmes, experience depression, achieve less than their aptitudes would justify, and, as a consequence, fail to learn needed information and thus, receive lower evaluation by instructors (Bowers 1986; O'Mara et al. 1996).

The aims of the study are twofold. Firstly, it seeks to measure the levels of OCA among business and accounting students in the School of Accounting and Finance in Dublin Institute of Technology (DIT), Aungier St. Secondly, it aims to qualitatively explore appropriate interventions with a small group of highly apprehensive students, both undergraduate and post-graduate, and concentrates on accounting students given the explicit emphasis placed on communication competence by the accounting profession (more so than other business disciplines); also a substantial number of prior studies exist which have focused on accounting students.

Outline

The project involved two phases. The quantitative work involved distributing an instrument, which was developed in the USA to measure a person's level of oral communication in a number of contexts. Many studies use McCroskey's PRCA-24, to measure levels of OCA. The instrument consists of 24 statements concerning the student's feelings about communicating orally across the four contexts (six statements for each context). The students are asked to indicate their initial impressions by replying to each statement using a score of 1 up to 5, 1 indicating "strongly agree" and 5 indicating "strongly disagree". The scores for all four sub-constructs are then added together to indicate the overall OCA score for the respondent. The range of overall OCA scores on the instrument is 24 to 120 and from 6 to 30 in each of the four contexts. Prior research has provided substantial evidence to support both the reliability and the construct validity of the PRCA-24 in the USA and elsewhere (McCroskey et al. 1985; Levine and McCroskey 1990; Gardner et al. 2005). The validity and reliability of the PRCA-24 was rigorously tested by this researcher in a prior study (Byrne, Flood and

Shanahan 2009) and found suitable for use in an Irish context.

The instrument was distributed to 291 students in all courses in the School of Accounting and Finance in the DIT in Ireland in Semester 1, 2011. Each completed questionnaire was numbered and the responses were scored. Unsurprisingly, public speaking is the oral communication context with the highest score, and students are typically most comfortable in the one-to-one context. Analysis of the data showed a high level of consistency across degree programmes and within degree programmes. This pattern is consistent with the findings of most other studies (Stanga and Ladd 1990; Simons, Higgins and Lowe 1995; Gardner et al. 2005; Arquero et al. 2007; Byrne, Flood and Shanahan 2009).

Analysis of the data, as shown below, also reveals that in the entire sample of 291 students, 22% or 63 students had high levels of OCA, that is, scored 85 or higher. This is much higher than the 16/17% which would be the norm. It is not within the scope of this study to explain why the figure is so high and perhaps a longitudinal study could reveal whether this is a trend which is explained by factors such as changes in society or in the economy.

Level of apprehension	High	Average	Low
Score	= or >85	85 < >51	= or < 50
Number of students	63	173	55
Percentage	22%	59%	19%

Table 4.1 Analysis of levels of apprehension

Whereas the overall figure of the number of high apprehensives is of interest and relevance, analysis of some of the very high individual scores provides a clue to identifying students who may find communication debilitating. Ten students scored 98 or over, which is a very high score, and it is noted that all ten students scored well in excess of the mean in all contexts. Eleven students scored a maximum in the public speaking context, which would indicate that for them making a presentation would either extremely difficult or probably impossible, leaving them no option but to forgo the relevant marks.

Qualitative Data Collection and Analysis

In the second phase of this study, five students, who were identified as highly apprehensive in the public speaking context – they scored 29 or 30 and also this researcher was aware from meeting them that they found making a presentation very difficult – agreed to undertake a training programme. Two students were assisted on an individual basis and the other three agreed to undergo a six-week course on a group basis. To protect the anonymity of the students, they are given pseudonyms in the study.

Some of the anxieties expressed by the students show the utter fear that some students have if called on to present in class.

While waiting my turn to read aloud in sixth class, my heart pounded, body shook, and palms sweated as I waited and waited, willing the ground to open up and swallow me whole. "Amy, take over please." I don't remember much after that; it's a blur. All I could see were the shocked, pitiful faces of my classmates, peering at me from every angle of the classroom. I was shaking, and I had broken out in a cold sweat. I looked down at my hands, and they were purple; it was as if the blood had been sucked from my body.

(Amy)

Most people will say that the more you do it, the better and more confident you will become. But for me, it is the opposite. For the more I do it, the worse I become. This is because each time I have to face my fear I have a truly horrifying experience which in turn, causes me to be in a worse state for the next time.

(Amy)

The whole week before my first presentation, I kept telling myself it was ok. However as soon as I reached the college that morning, my stomach started to have butterflies; chest was getting tighter and tighter. My heart was racing on and off, palms sweating and felt weak all over like I was going to fall down. When I sat down to speak about presentations my hands and legs were shaking, a few times I thought I was going to be sick across the table.

(Bernie)

The type of communication I have a huge amount of anxiety towards is presenting. Although I may know what I am going to say and have extra topics to cover if all else fails but just before and during the presentation is a completely different situation. Beforehand I genuinely feel very weak and the sound of my heart throbbing is so overwhelming that I cannot think properly. When I am up presenting it is just as bad as I anticipate. Looking up and seeing everyone and the thoughts of their judgement terrifies me. My voice shakes and my legs and hands become very agitated which I am very aware of throughout. I end up not saying half of the presentation, just so it can be done and finished. I am more than willing to give the marks away to avoid doing any more presentations and putting myself through such horrible experiences.

(Cora)

The five students took part in communication training. Two of the students had one-to-one sessions with a counsellor, a speech therapist and practical presentations with this researcher. At all times a positive, supportive approach was used. The other three students took part in a six-week course as part of a group. The course consisted of three one-hour individual sessions with a counsellor who tried to relax the students in a supportive way. The group had one session with a speech therapist/drama teacher who did some relaxation and breathing exercises with the group. They then had two sessions doing informal presentations with this researcher.

Evaluation of the Project

The students had a mixed response to the training. Of the two students who had individual tuition, one succeeded in completing a class presentation by doing a group video which was acceptable to the lecturers. However, the post-hoc oral apprehension score for the student actually increased; the student's final reflection expresses satisfaction tinged with a little hope:

Overall, I was extremely grateful for having been given the chance to finally take part in the presentation process without having to actually go through the trauma of having to present in front of the entire class. On reflection of this year, I believe I have achieved the skills of presenting as much as anyone else. The only difference is confidence; that is, the confidence to replicate what I did on camera in front of a group of people. Hopefully that will come in time...

The second student felt defeated and unable to overcome this obstacle, as the reflection points out:

At this point my plan is to forfeit all marks for presentations and work hard on other subjects to make up for that. If I cannot do this then I will not be attending college but will find some other way of getting further education. While typing this, my chest feels tight. I have knots in my stomach and sweaty and shaking hands.

For the three students who completed the group training, presenting was not as daunting a task. Their scores remained the same for one and showed a decrease for two. However, their reflections reveal that they are now less nervous but their scores still remain high.

Conclusion

The quantitative study reveals that one in four, five or maybe six students in a class may be highly apprehensive which means that for them, doing a presentation may be extremely difficult. In addition, up to 3% of a class may have a maximum oral apprehension score in this context and those students may be unable to complete a presentation, and putting them through that ordeal may be extremely stressful. Very apprehensive students may be helped by individual and group training, by assistance from a counsellor and a speech therapist and by doing short presentations in a very supportive atmosphere where positive feedback is stressed. Other methods available to help students include giving students the choice to do presentations by video, an option which may be availed of by only one or at most two groups.

The overall conclusion is that each class will contain a number of high oral apprehensive students who need a supportive atmosphere to help them to learn and to communicate with others.

Recommendations

The mission statement of the Dublin Institute of Technology states that "the DIT provides an innovative, responsive and caring learning environment for a diverse range and level of programmes to students of all ages and backgrounds". The findings of this study may be useful for shaping institutional policy in creating a "responsive and caring learning environment" by addressing the issue of high oral communication apprehension which affects more than one in six of each third level cohort. Therefore the following recommendations are made:

1. All students entering the School of Accounting and Finance each year should be offered the opportunity to complete the oral communication apprehension questionnaire and asked to agree to take part in research in this area.
2. Lecturers should be informed of the number of high apprehensives in their classes and be aware of the difficulties that students have when called on to communicate, especially making a presentation.
3. Selected highly apprehensive students should be interviewed and offered individual or group communication training to assist them reduce their levels of apprehension.

Proposed Future Research

This study has focused on identifying levels of oral communication apprehension in the School of Accounting and Finance in DIT Aungier St. However, the study relates only to the students in 2011. Also, the group training consisted of just six weeks, which is a very short period. The proposed future work is to carry out a longitudinal quantitative study over three years and also to develop the communication training offered to the high apprehensives.

Acknowledgements

I would like to express thanks to the students who took part in the study, to Ms C. Rooney, DIT, who is a lecturer in Communications in DIT, for providing the speech therapy to the students, to Ms B. Fitzsimons, a counsellor in DIT for the counselling to the students, and to Sr M. Flanagan, chaplain in DIT for counselling one of the students.

References

- Arquero, J., Hassall, T., Joyce, J. and Donoso, J. (2007) "Accounting students and communication apprehension: A study of Spanish and UK students", *European Accounting Review*, 16(2): 299–322.
- Bowers, J.W. (1986) "Classroom communication apprehension: A survey", *Communication Education*, 35(1): 372–378.
- Byrne, M., Flood, B. and Shanahan, D. (2009) "Communication apprehension among business and accounting students in Ireland", *Irish Accounting Review*, 16(2): 1–19.
- Gardner, C.T., Milne, M.J., Stringer, C.P. and Whiting, R.H. (2005) "Oral and written communication apprehension in accounting students: Curriculum impacts and impacts on academic performance", *Accounting Education*, 14(3): 313–336.
- Levine, T. and McCroskey, J. (1990) "Measuring trait communication apprehension: A test of rival measurement models of the PRCA-24", *Communication Monograph*, 57: 62–72.
- McCroskey, J.C. (1997) "Willingness to communicate, communication apprehension, and self-perceived communication competence: conceptualisations and perspectives", in Daly, J.A. McCroskey, J.C. Ayres, J. Hopf, T. and Ayres, D.M. (eds) *Avoiding Communication: Shyness, Reticence and Communication Apprehension*, Beverly Hills, CA: Sage Publications, pp. 75–108.
- McCroskey, J.C., Beatty, M.J., Kearney, P. and Plax, T.G. (1985) "The content validity of the PRCA-24 as a measure of communication apprehension across communication contexts", *Communication Quarterly*, 33(3): 165–173.
- O'Mara, J., Allen, J.L., Long, K.M. and Judd, B. (1996) "Communication apprehension, nonverbal immediacy, and negative expectations for learning", *Communication Research Reports*, 13(1): 109–128.
- Simons, K., Higgins, M. and Lowe, D. (1995) "A profile of communication apprehension in accounting majors: Implications for teaching and curriculum revision", *Journal of Accounting Education*, 13(2): 159–176.
- Stanga, K.G. and Ladd, R.T. (1990) "Oral communication apprehension inn beginning accounting majors: an exploratory study", *Issues in Accounting Education*, 5(2): 180–194.

5 Research methodology at level 8 and 9: a web-enabled approach

Daire Hooper: **School of Management**

Contact: daire.hooper@dit.ie

Abstract

This research explored the potential use of webinars as a method of course delivery in the College of Business, Dublin Institute of Technology. In-depth interviews were conducted with a purposive sample of students to gain insights into their experience with webinars and to delve into how they interacted with the webinar, whether they would prefer this mode of delivery in the future and to assess their overall perceptions of webinars. Findings indicated that students found the webinar to be a novel and innovative way for delivering course content, however students reported having connectivity issues and at times encountered audio problems. Furthermore, all students described multi-tasking while taking part in the virtual classroom. The in-depth interviews also explored whether students believed webinars could wholly replace the traditional lecture and the sample of students interviewed here felt that webinars lack certain qualities that make this an unlikely possibility. Recommendations to the Institute include exploring the possibility of using webinars in situations where the traditional lecture is not possible (i.e. a contingency method of delivery), or to use webinars as part of a blended learning model, whereby webinars are not the sole method of course content delivery but are used in tandem with the traditional, face-to-face lectures.

Keywords: eLearning, blended learning, on-line learning, webinars

Introduction

In terms of pedagogic structure, the classic lecture relies on content to lead the learning design. In this situation, both the lecturer and students are present and often the lecture proceeds in a very linear and structured manner. This is the format that both lecturers and students are most familiar with; however, the advent of learning technologies has revolutionised education and has brought greater variety, access and interaction into the learning function. We now have sophisticated learning management systems, text tools, and wikis, which create an engaged and innovative learning environment and one such learning technology that will be used increasingly more frequently is the webinar.

A webinar is a communication tool that allows web video conferencing in real or recorded time. Webinars have moved on from the early text-dominant days of the Internet to a more inclusive engaged model that emphasises multi-way communication and collaboration across all parties (Ubell 2011). When webinars were first developed they were very basic with only one-way interactions (instructor → student) possible. Nowadays, they are much more sophisticated with an array of functions such as sub-groups, quizzes and instant messaging now standard features in most webinar technologies. They typically allow for students to participate in real-time or to learn asynchronously using recorded material; this is quite advantageous should a student miss a particular lecture. Webinars are used frequently in executive education. However, in Ireland, the vast majority of lectures are delivered using the traditional method, whereby both the lecturer and the student are physically present. As the Dublin Institute of Technology (DIT), College of Business is committed to embracing new technologies, this teaching fellowship sought to pilot the use of webinars to test their feasibility as a teaching method.

Outline of the Project

Prior to rolling out a course as a fully blended learning model, it was decided that a pilot would initially be undertaken. A pilot was run with Masters students taking a core module in Research Methods. Using notes and direction given by the author, students logged into the Institute's Learning Management System (LMS) (webcourses), which provides webinar facilities by Wimba. A sample screenshot of the webinar can be found in Figure 5.1 below. When using video as well as audio, the instructor will appear on the screen, however when using audio in isolation students will only hear the instructor but can communicate using the instant messaging function (shown bottom left) and voice (VoIP) if they wish.

For this research, the webinar took place during the snowstorms of December 2010, during which time the DIT buildings were closed due to travel difficulties throughout the city centre and beyond. As such, the webinar was used as a contingency method of course delivery. Students were given instruction on how to gain access to the webinar and information on how to test their browser before the class started. In order to use the webinar facility, students needed to install plug-ins and ensure their browser was enabled for the Wimba software to run.

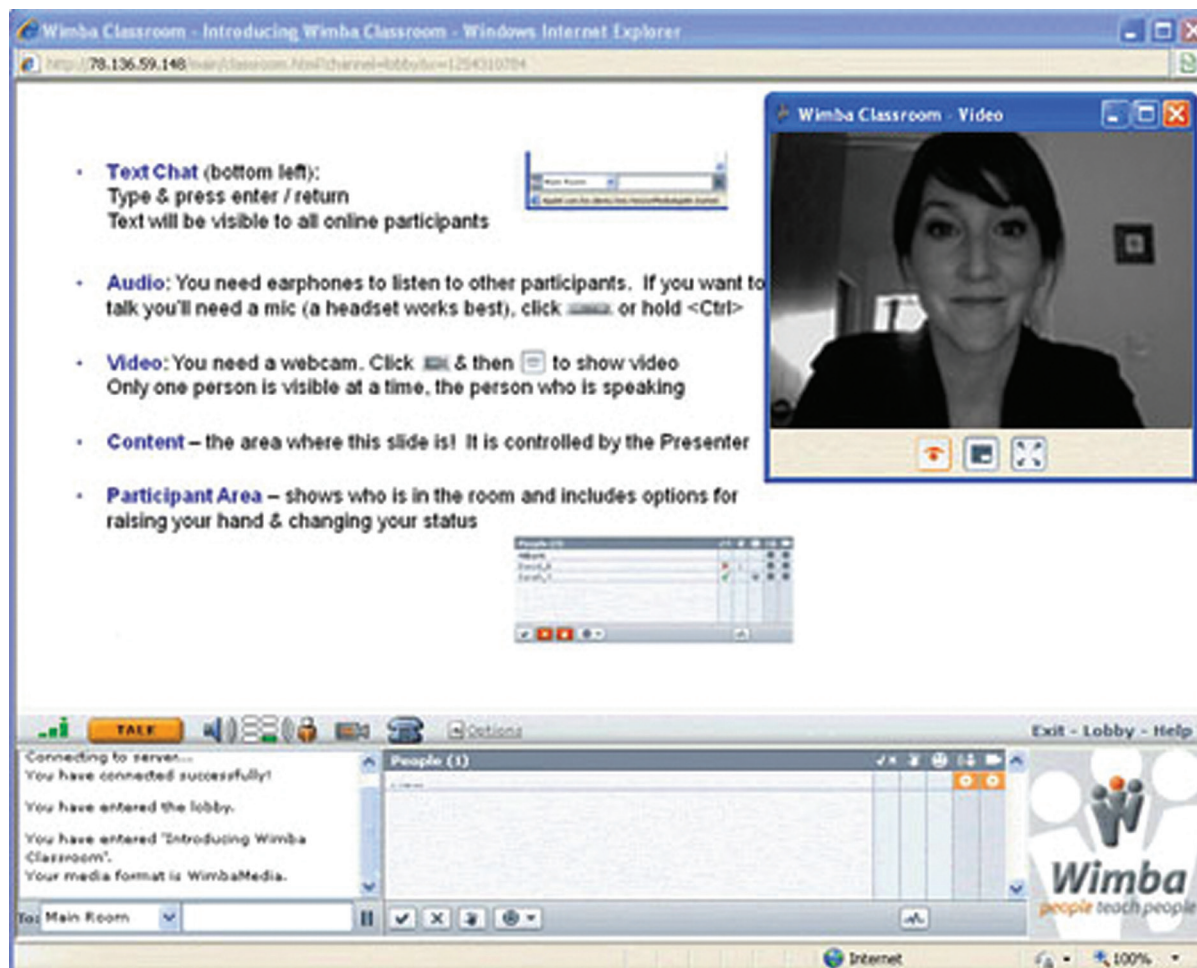


Figure 5.1 Sample screenshot of a webinar

The lesson on that particular day introduced students to the fundamentals of questionnaire administration and design. The theoretical nature of the class content made it ideally suited to a webinar format as there were ample opportunities for class discussion. During the course of the lesson, the material was delivered in the usual manner and attempts were made to engage students in discussion on a number of occasions. Students were hesitant to connect using voice communication and instead relied solely on the instant messaging function. Indeed, the majority of instant messaging communication was used to notify of sound quality issues and technical difficulties being experienced. As students were not willing to use voice or video, interaction during the class was quite limited which subsequently led to the class finishing in less time than it would in a traditional lecture setting. At the end of the class numerous students expressed their thanks and their satisfaction with the class.

A number of days following this, the author approached a purposive sample of students to see whether they would be willing to partake in a 30 minute in-depth interview on their webinar experience. The author briefly explained the purpose of the interview and of those contacted, four students agreed to take part in the interviews. All interviews took place in January 2011.

The following section will outline the major findings of the in-depth interviews

Research finding 1: Students have limited previous experience with webinars

Of the students interviewed, none had any previous experience with webinars. Despite their novice status, students found gaining access to the webinar very simple and found the instructions given both clear and informative. While they had not taken part in a webinar in the past, all students interviewed had a reasonable understanding of what a webinar entailed. They understood it would include discussing the course content in a "skype-like manner" and might also include video conferencing. Students were not aware that games such as polls and quizzes could be incorporated into webinars to make them more interactive. Finally, students also reported looking forward to the webinar experience and having a general interest in how it would play out.

Research finding 2: Students enjoyed the webinar experience

Of the students interviewed, all enjoyed the webinar experience. All those interviewed said they looked forward to participating in the webinar and were keen to know how it would play out. However, despite the fact that students enjoyed the experience, they stated it did not meet their expectations on a number of grounds. First, students expected better sound and voice quality. Second, they thought it would be more interactive, and third, they expected video conferencing in addition to audio communication.

Research finding 3: Students were more inclined to multi-task while taking part in the webinar than in a traditional lecture situation

Students were probed to see if they took notes during the webinar and of the four interviewed, none admitted to taking notes. When questioned whether they would take notes in a traditional class situation, they admitted they generally preferred not to take notes in class and preferred to listen and absorb the discussion. This then led to further probing to ascertain how students engaged

with the webinar and it appeared that all students interviewed were doing other things while listening to the lecture. Activities engaged in included: conducting research for other modules, downloading notes, texting and surfing the Internet. Indeed, one student admitted to preparing his dinner while listening to the webinar; thus emphasising the lack of control the lecturer has over the learning environment.

Research finding 4: Students were less inclined to participate in class discussion than in normal class situations

During the webinar, interactions with students were entirely limited to instant messaging with the nature of these messages relating almost entirely to sound quality issues. No student engaged in VoIP chat and why this was the case was explored with each of the informants. Interviews revealed that students were too shy to use voice chat, which seems to stem from their unfamiliarity with the medium. Students expressed they were not entirely sure how it would seem to their classmates if they were to actively engage in the lecture using VoIP and for that reason held back. Given that students were much more inclined to use the instant messaging function, it seems that this is seen as more acceptable, perhaps because it is less personal than voice-chat. In a way students are "baring less" of themselves which may mean that students are slightly self-conscious when participating in webinars.

Research finding 5: Students did not feel webinars could be used to wholly substitute traditional lectures

One of the key objectives of this research was to assess whether students would be willing to have an entire module delivered using webinars. This issue was broached with each informant and it appears that while students value webinars when traditional lectures are not possible (such as in the snowstorm example here), or as part of a blended learning model, they would not like to see webinars entirely replacing the traditional lecture. It seems that students recognise it is too easy to get distracted while taking part in a webinar and feel they might not have the self-discipline to stay engaged throughout.

Evaluation and Conclusion

From the above research it can be seen that despite having limited experience with webinars, students were open minded about their implementation and eagerly anticipated experiencing the new teaching method. Interviews with students indicate that they had a reasonable amount of knowledge about what a webinar entailed, however, they did not realise how dynamic webinars can be in terms of polls, quizzes and games.

In order for a webinar to be successful, it is essential that broadband width is sufficiently large. As the webinar was delivered during the snowstorms of December 2010, the lecture was delivered outside of DIT which meant the inclement weather may have effected connection speeds. Given the circumstances this was unavoidable. However, if webinars are to be adopted as a teaching method pre-tests should be run to assess whether there are any technical difficulties. Ideally, the webinar should be delivered from the DIT as larger bandwidth and support services are available. Furthermore, video conferencing should be used in addition to audio as this is likely to increase engagement during delivery.

The extent to which students engaged in multi-tasking during the webinar is quite worrisome. When delivering course content via webinar, the lecturer relinquishes a significant amount of control over the learning environment; to combat this, steps should be taken to ensure students are continually engaged. The Wimba software includes a number of functions such as games and quizzes which can be used during class and it is likely that punctuating the class with timely exercises may reduce multi-tasking behaviour during the class.

This research also found that students were reluctant to use instant messaging, using it only to notify of connection issues. Furthermore, students seem to find using VoIP intimidating, resulting in a complete absence of voice interaction during the class. It is unclear if this is due to inexperience with the medium or something that will persist over time. It is possible that as students become more accustomed to webinars they will become more likely to interact. Further research will need to investigate whether this is the case.

It is interesting to note that students do not wish for webinars to entirely replace traditional lectures as they feel their learning may suffer if this were to happen. Despite this, students recognise the advantages of webinars and would be open to taking a module that was delivered in a blended learning format.

Recommendations to DIT

Given the exploratory nature of the above research it is difficult to conclusively provide recommendations to the Institute. However, should a lecturer wish to use webinars as a mode of delivery, they should seek to integrate numerous activities throughout the lecture to engage students continuously. In addition, they should anticipate less in-class discussion and use these additional activities to ensure their class-time is filled. From the point of view of the lecturer, webinars are much more difficult to deliver than traditional classes as you cannot gauge atmosphere or whether students are grasping the material being covered. Using eye contact and body language, it is easy to "get a feel for things" in a normal class situation and as this is entirely absent in webinars it can feel slightly disconcerting for the lecturer.

Students interviewed here were apprehensive about taking a full module online, however they are open to taking a class that contains a selection of lectures in a virtual setting. Should the Institute wish to provide full-time students with modules that are delivered wholly online they should consider whether there is a demand for such a module design. As this research is limited to only

a small sample of students the results found here should be treated with caution. In addition, as the webinar was delivered to full-time students, it is possible that part-time or continuing professional development students may view webinars entirely differently. To establish whether this is the case, webinars should be rolled out to these students and their perceptions of the experience researched.

Proposed Future Work

The purpose of this research was to gain insights into how webinars could be implemented in the College of Business and also to explore students' perceptions of webinars as an alternative teaching method. Given the case-type approach taken here, and the small sample size, it is difficult to extrapolate the findings. Therefore, further research should develop the current study by extending the sample size and by conducting a series of webinars over a set period of time.

If webinars are to be considered as either a stand-alone teaching method or as part of a blended learning model, steps should be taken to ensure the class is highly interactive to ameliorate any problems associated with multi-tasking. Indeed, research by Hembrooke and Gay (2003) found that students who engaged in multitasking during a lecture could recall less content than those who were focused solely on the class. Future research could replicate Hembrooke and Gay's (2003) study in an online vs offline learning environment to determine whether differences exist in recall across the two teaching media. As the study focused only on full-time post-graduate students further research should also be conducted on part-time and executive education students as they may have more positive perceptions of webinars.

References

- Hembrooke, H. and Gay, G. (2003) *"The laptop and the lecture: The effects of multitasking in learning environments"*, Journal of Computing in Higher Education, 15(1): 46–64. doi: 10.1007/bf02940852.
- Ubell, R. (2011) *"How to run a virtual classroom"*, T&D, 65(10): 92–93.

College of Engineering and the Built Environment



6 An activity-based approach to the learning and teaching of research methods: measuring student engagement and learning

Eimear Fallon , Terry Prendergast, Stephen Walsh: **School of Real Estate and Construction Economics**
Contact: eimear.fallon@dit.ie, terry.prendergast@dit.ie, stephen.walsh@dit.ie

Abstract

The project had three separate, linked objectives: (a) the development of a module in Research Methods which embraces an activity-based approach to learning in a group environment; (b) to improve participation by all students and (c) to devise more rigorous and equitable assessment methods. This module was previously taught through a traditional lecture-based format. It was felt that student engagement was poor and learning was limited. It was believed that successful completion of the development of this module would equip students with a deeply learned battery of research skills to take into their further academic and professional careers. Student learning was achieved through completion of a series of tasks based on different research methods. In order to encourage student engagement, a wide variety of activities were used. Student engagement was measured through a survey based on National Survey of Student Engagement (2000). In terms of the three objectives set, two of these were met. The module was successfully developed and delivered and there was a significant level of student engagement in the module. The objective of devising equitable assessment methods was not satisfactorily addressed within the time available.

Key words: activity-based learning, research methods, engagement

Introduction

The project team members have been involved in supervising undergraduate and post-graduate theses/dissertations for a number of years, but have been unhappy with the quality of research skills evident in these. These skills had been acquired by students through a lecture-based Research Methods module. It was believed a number of features militated against deep learning of research methods. From a learning point of view the subject matter was perceived as boring and lacking context, attendance was poor, and there was little engagement with the material. From a teaching point of view, it was difficult to engage students and difficult to measure the extent to which the learning outcomes were achieved. Overall it was believed that activity-based learning was a more effective learning methodology than the traditional lecture format for the delivery of this module. The project was initially devised to address these issues.

In terms of the fit with Dublin Institute of Technology's Learning and Teaching strategy, the project focused on curriculum development. Specifically it aimed to devise a new method through which students learn, what is perceived by them, to be a very "dry" and unexciting set of skills, i.e. research methods. The module was designed to allow students to appreciate the value of research, the importance of undertaking it properly and the techniques necessary to achieve this.

It was believed that successful completion of the development of this module would equip students with a deeply learned battery of research skills to take into their further academic and professional careers. From an Institute point of view, the project team believed that this approach would have wide applicability and appeal across DIT.

The project had three separate, linked objectives:

1. to develop a module in research methods which embraces an activity-based approach to learning in a group environment;
2. to improve engagement by students;
3. and to devise more rigorous and equitable assessment methods.

Theoretical Framework

Following some desk-based research on innovative ways of teaching and learning and having tried some of the more accepted non-traditional practices like problem- and project-based, collaborative learning, some research was found on the benefits of activity-based learning.

Whilst elements of problem-, project- and collaborative-based learning are incorporated into activity-based learning, each are separate approaches in their own right. As explained in McGrath and MacEwan (2011: 263) and as is obvious from the name of the learning method in activity-based education the student becomes "more actively involved in the learning process through acts of 'doing', 'being' and 'critically reflecting' than in traditional, didactic education that is more centred around the passive act of 'knowing'". As noted in Johnson, Johnson and Smith (1998) (cited in Ahlfeldt, Mehta and Sellnow 2005: 5) "having the instructor provide all the materials to the passive student is the old paradigm. The new paradigm is to actively engage students with the material and one another". Activity-based learning therefore puts students directly in the experience of learning. As research

methods can be a dry subject to teach and learn in the absence of a context, it was agreed that this new approach would fit well with the nature of the content in a research methods and proposal writing course.

Once the learning and teaching approach had been decided upon, the next area of research was to find a way of establishing if, and how well, this new approach was working. As established in Hake (1998), the use of interactive strategies can increase course effectiveness.

It was decided that trying to establish how engaged students are during the activities would be an appropriate way of establishing whether students were responding to the activity-based approach. As noted in Ahlfeldt, Mehta and Sellnow (2005: 5) "engaging students in learning is one of the many goals that educators face". The USA has been leading the way in the measurement of student engagement. Through its student survey, the National Survey of Student Engagement annually collects information at hundreds of four-year colleges and universities about student participation in programmes and activities that institutions provide for their learning and personal development. The results provide an estimate of how undergraduates spend their time and what they gain from attending college. The primary purpose of the survey is "to query undergraduates directly about their educational experiences". (National Survey of Student Engagement 2011). The NSSE was designed to report on the frequency with which they engage in dozens of activities that represent good educational practice (Kuh 2009: 7). The survey used in this research was developed based on the NSSE (2000) and the survey developed in Ahlfeldt, Mehta and Sellnow (2005). Key areas of questioning revolved around the students' behaviour in the class activity, critical skills development and knowledge development.

Operation of the Module

The project had three distinct elements: designing activities/tasks, designing and undertaking an engagement survey and finally addressing the issue of assessing students in a group-based environment.

To encourage student participation, the module used a wide variety of activities, including workshops, brainstorming, mind-mapping, presentations, written submissions, peer critiquing, lecture/seminar, "speed dating" with more senior students, and self-reflection.

Students, working in small groups, were set a number of activity-based tasks and once each task was completed, feedback and formative assessment took place. The subject matter of the tasks focused on research methods and included tasks on quantitative versus qualitative research, criteria-based analysis, case study design, survey and questionnaire design and interview techniques. Student learning was achieved through completion of the tasks, critiquing the work of other students, receiving feedback from teaching staff and from other students, critiquing research proposals prepared by students in previous years, conception of a research topic, preparation of a draft research proposal and the derivation of an appropriate methodology through which to undertake the research.

Tasks were assessed through a range of outputs including hard copy submissions, presentations and self and peer critiques.

Findings

Engagement

Engagement was measured through a student questionnaire survey which was designed to get feedback on students' behaviour in the class activity, critical skills development and knowledge development. Key results of this survey were that students:

- felt that they had made a meaningful contribution to the group tasks
- considered that the approach adopted in the module created a positive learning environment
- found the approach and tasks set both interesting and challenging
- had fun during the module and regarded it as the learning highlight of their week.

Overall the results were very encouraging with between 63% and 96% of students answering positively to a range of questions concerning engagement.

In relation to specific survey questions

- 78% of students said that it was very characteristic or characteristic of them to contribute in class discussions
- 71% of students said that it was very characteristic or characteristic of them to ask a question of lecturers or class mates when they didn't understand something
- 63% of students said that it was very characteristic or characteristic of them to have fun during this module
- 96% of students said that it was very characteristic or characteristic of them to feel that lecturers created a positive environment for asking questions
- 70% of students said that it was very characteristic or characteristic of them to feel that they made a meaningful contribution to the tasks
- 70% of students said that it was very characteristic or characteristic of them to feel that they were challenged by the material and were interested in the material

In addition, feedback was sought on the operation of the module and on the specific tasks/activities and learning sessions. A selection is shown below.

Student feedback on module and activities

Overall operation of module

Overall this module was one of the highlights of my college week and a class I looked forward to.

I did learn a lot of useful information and techniques. I felt the time allotted was the right amount. It was a light and fun class which didn't not impact on other time consuming modules and it provided another opportunity to bond with other classmates.

I think overall that this module will help us greatly with our thesis next year. I hope that it will have taught us to think outside the box. I hope to use some of the research methods also in my future work.

I am very happy the PED course has brought in this type of module as it's very different to the other modules undertaken in third year, which makes things interesting, different as it is also a different type of teaching and extremely helpful in the long term.

I found the group work could be both helpful as you listened to other people's ideas and opinions and therefore gave a fuller view on a topic but it could also cause a hindrance as if people did not participate.

I felt that working in groups really helped me to get different perspectives on all aspects of the thesis. I thought that the group size was perfect and the time allocation with the groups was just right too.

I enjoyed the group interaction in the classes. They were a welcome change of scene from the usual two hour, sit and listen lectures that the rest of the course consists of.

Individual tasks

Interview activity

I felt this was an excellent task, we discussed how to conduct an interview and how to develop different types of questions. I had planned to undertake interviews (for my thesis) ... and this will help me develop my questions for the interviews.

Critiquing proposals

I found the proposal writing and peer critiquing very useful. It allowed me to share my thesis ideas and aims which helped me focus more on what I actually wanted to achieve in my thesis.

The constructive criticism enabled me to change aspects of my thesis idea that were too broad and enabled me to create a more focused idea with a clear aim.

Surveys and questionnaires

This was one of my favourite tasks of the module. It allowed us to take the idea which we were interested in and begin to understand the complexities of gathering data particularly through surveying. Before I had not realised the difference in question types and how to direct my questioning so as to acquire the information I need and now I feel I do.

Meet final years/speed-dating

The general consensus has to be the best aspect of the thesis was definitely that it was your own piece of work that you could be independent with and design yourself to a certain extent. They (the final years) said the autonomy was quite enjoyable.

Generating thesis idea

I think the less useful tasks were related to (generic) proposal generation. Although it was a good way of getting us to think about how to come up with a proposal I think it would have been more beneficial to focus it on areas people were actually considering.

Evaluation and Conclusions

In terms of the three objectives set, the project team believes that there have been varying degrees of success.

- *The development of a module in Research Methods which embraces an activity-based approach to learning in a group environment. This has been successfully achieved. The project team will reflect on any weaknesses and amend the module as appropriate in the future. A recommendation for further development is made below.*
- *To improve engagement by students. Results from the engagement survey indicate that this was achieved very satisfactorily.*
- *To devise more rigorous and equitable assessment methods in group projects. The project team do not believe that this was addressed satisfactorily in the time available.*

Other conclusions that were drawn from the project are as follows.

- Using an activity-based learning approach within a module enhances student participation and makes learning and teaching more enjoyable.
- Significant benefits accrue to teaching staff through team teaching. This was a definite and largely unforeseen benefit of the project. This came about by observing each others' teaching styles and interaction with students. It also arose from vigorous and animated debates about how to advance the project

- Recognising the varying abilities of students, the different levels of motivation and the social and educational dynamic that exist among different student groups, there is a need for in-built flexibility in both the manner in which teaching staff interact with learners, and in the challenge posed by each activity
- Management of the module was a significant challenge. This arose from the volume of assessments made. The project team intend to reflect on this with a view to streamlining the amount of assessment undertaken without compromising the integrity of the approach.
- Activity-based learning utilises more space compared to traditional lecture-based approaches and requires additional and flexible physical resources in order to be efficient and effective.
- For maximum impact, group size should be kept reasonably small. Our view is that three to four students is probably an ideal number for activity-based learning.

Recommendations to the DIT

The project team would recommend the following to the College of Engineering and the Built Environment, the Learning, Teaching and Technology Centre (LTTC) and the DIT generally.

1. The DIT might consider rolling-out this approach to learning Research Methods to relevant programmes in the College, initially and subsequently across the Institute. The team is aware that the module is framed in a social-science context and may need to be adapted to fit with more scientific type programmes.
2. The feasibility and desirability of an activity-based approach to learning across a wide variety of modules and subject areas should be investigated by the DIT.
3. DIT should develop and undertake an annual survey of student engagement similar to the National Survey of Student Engagement (2000). This could initially be piloted in one School.
4. The LTTC might investigate the feasibility and desirability of offering all staff supervising and/or assessing undergraduate and post-graduate theses a module in Research Methods, using an activity-based approach. This could possibly be developed as a short version of the Research Methods module offered by the LTTC. Alternatively, it could be offered as a series of half-day training programmes.
5. The DIT should encourage, where appropriate and where resources allow, team-teaching. This would be particularly appropriate to group-based projects with large classes.
6. The DIT might investigate the possibility of providing more user-friendly and flexible space to facilitate activity-based learning.

Proposed Future Work

The project team is considering

- developing an eLearning version of the module for wider dissemination throughout DIT
- developing a programme-wide student engagement survey.

References

- Ahlfeldt, S., Mehta S. and Sellnow T. (2005) *"Measurement and analysis of student engagement in university classes where varying levels of PBL methods of instruction are in use"*, Higher Education Research and Development, 24(1): 5–20.
- Hake, R.R. (1998) *"Interactive-engagement versus traditional methods: A six-thousand student survey of mechanics test data for introductory physics courses"*, American Journal of Physics, 66(1): 64–75.
- Johnson, D.W., Johnson, R. and Smith, K. (1998) *Active Learning: Co-operation in the College Classroom*, Edina, MB: Interaction Book Co.
- Kuh, G.D. (2009) *"The national survey of student engagement: Conceptual and empirical foundations"*, New Directions for Institutional Research, 141: 5–20.
- McGrath, J.R. and MacEwan G. (2011) *"Linking pedagogical practices of activity-based teaching"*, International Journal of Interdisciplinary Social Sciences, 6(3): 261–274.
- National Survey of Student Engagement (2000) *Improving the College Experience. National Benchmarks of Effective Educational Practice*, Bloomington, IN: Indiana University Centre for Postsecondary Research and Planning.
- National Survey of Student Engagement (2011) available online at <http://nsse.iub.edu/nsse2013> (accessed 7 September 2011).

7 Developing a collaborative virtual learning environment between students in cross disciplines to meet the new college structure

Ruairi Hayden¹, Fiacra McDonnell²: ¹School of Construction,

²School of Real Estate and Construction Economics

Contact: ruairi.hayden@dit.ie, fiacra.mcdonell@dit.ie

Abstract

Integrated project delivery is a rapidly developing approach to design and construction that uses business structures, new technologies, and newly developing practices to collaboratively use the talents and contributions of all participants in the design and construction process. This project replicates this approach by creating a collaborative project between the Department of Construction Management and Technology and the Department of Quantity Surveying. The term "collaborative learning" refers to an instruction method in which students at various performance levels work together in small groups toward a common goal. The students are responsible for one another's learning as well as their own (see Dillenbourg 1999). The objectives of this collaborative project are to

1. promote interaction between students from different but related courses
2. enhance students' ability to think creatively, solve problems, and make decisions as a team
3. evaluate the benefits of using a virtual learning environment for assessment
4. examine the benefits of BIM as a tool in feedback.

There are a number of benefits to this project with an emphasis being given to the interaction of the students. The collaborative learning approach provides a format for the students to interact including giving and receiving help, exchanging information and resources, giving and receiving feedback, challenging and encouraging each other, and jointly reflecting on progress. The other perceived benefit is in the use of a virtual learning environment and information communication tools.

Keywords: *assessment strategies, building information modelling, collaborative learning, group work, virtual learning*

Introduction

"Complications arising from poor collaboration are the source of a variety of the construction industry's biggest problems" (Bouchlaghem 2012). It is now widely recognised that an effective collaboration strategy based on the implementation of information systems and careful consideration of the wider organisational issues are the key to delivering construction projects successfully. Bouchlaghem (2012) defines collaboration in construction as "an activity in which a shared task is achievable only when the collective resources of a team are assembled. Contributions to the work are coordinated through communications and the sharing of information and knowledge." Our construction practices and procedures are subject to a rapidly evolving information technology sector, enhanced by worldwide advances in communications technology. These technologies are providing construction professionals with the tools to implement new collaborative strategies. Any given construction project involves the collaboration, at some level between architects, engineers, quantity surveyors, project managers, and many other construction professionals, depending on the magnitude and complexity of that project. Much of this process is based on a traditional sequential approach in which many of the participants often work independently, make decisions that inevitably affect others and then come together in face-to-face meetings. As educators, we must equip students with the skills and knowledge to prepare them for an industry so dependent on collaboration. Dublin Institute of Technology delivers a comprehensive list of construction-related courses, which are recognised worldwide for the quality of their graduates. Yet the authors have found very little evidence of interaction between these courses. This research aims to address this shortfall, and sets the stage for more elaborate collaboration in the future.

Collaborative Project Overview

The teaching delivery relating to both courses taking part on this project includes traditional lectures supplemented by tutorials. Blight (2000) reinforces that lecturing is still the most common method of delivery despite advances in new technologies. This paper does not advocate radical changes to our current modus operandi of delivery on these courses; however it does support enhancement of the traditional approach. This collaborative project intertwines collaboration with information technology. Bouchlaghem (2012) advises that much of the recent development on collaborative working in the construction industry has focused on the delivery of technological solutions, concentrating on the web. We have made this a central component of this project by tasking students with the creation of web platforms via PBworks on the internet. This facilitates a high level of interaction between students, who are already comfortable with using more socially based web platforms. It also familiarises students with current IT tools, and creates a spirit of innovation which is currently demanded by employers in industry. Macfarlane (2004) advises that our courses must endeavour to introduce real life situations or problems into our content, to prepare students with the challenges that await them in industry.

A common theme which runs through this project relates to common skills essential for both disciplines, and how students from each discipline can benefit from interaction with each other. Pickens and Jagger (2005) describe the function of measurement carried out by quantity surveyors as the process concerned with converting construction drawings into words and numbers in accordance with a strict set of rules. The exact same terminology could be used when describing the construction manager's role when producing a programme of works or schedule for any given project. Both disciplines require a number of holistic skills, which are not technical in nature such as: patience, accuracy and initiative. These skills can only be attained through practical project work, and the completed tasks have helped students become more proficient in these areas.

Project Assessment

Hamlin and Szorenyi-Reischl (2006) state that "development of assessment strategies that guide students towards desired approaches to learning and validly and reliably measure student performance". This was critical when developing the assessment strategy for this collaborative project. The assessment is designed to give Quantity Surveying students and Construction Management students a manageable set of tasks that will facilitate collaboration and promote critical thinking.

Students were furnished with a set of drawings of a real life project from which they were expected to complete a number of tasks; each task had been designed to ensure that the students interacted with each other and worked in a collaborative manner. This allowed the student to think critically about the design of the building and recommend any changes to the current design. The students were encouraged to examine the constructability of the project and were expected to propose alternative construction techniques that would improve the efficiency of the build process.

Once the students became familiar with all the drawings and the project specification, the tasks were agreed with the students with a number of submission dates spaced over the two semesters on which the project ran. The students were split into groups, with two students from the Construction Management Programme and two students from the Quantity Surveying Programme in each group. Once the students were familiar with each other and with the project drawings they were required to develop a virtual learning environment (VLE). All their work was submitted through this platform and feedback was given through the VLE also. For the Construction Management students the project assessment accounted for 50% of their AutoCAD module and 30% of their Construction Technology module; for the Quantity Surveying student it accounted for 50% of their AutoCAD module and 30% of their Quantity Surveying module. For this reason it was essential that the tasks assigned to the groups encompassed the learning outcomes of the modules included.

Virtual Learning Environment

Despite the enthusiasm for digital technologies, and the fact that wikis (blogs) have existed for over a decade, their use is relatively new in academia. It should however be noted that it is a very fast growing area within academia. On previous projects when blogs have been used for assessment the feedback from the students has been very positive. Students have tended to be very innovative in their use of blogs and have interfaced different software into their blogs. It has also been observed that the computer skills of students who were involved in the blogs were significantly improved on students from previous years who were not involved in the blogs.

The students will be given a tutorial on how to create and manage all the material through a virtual learning environment at the start of the semester. This will be the medium for the delivery of all assessment and feedback. The preferred platform of VLE for this project will be through the medium of PBworks (<http://pbworks.com/>). In deciding on the web tool to use for this project there were a number of considerations that needed to be taken into account such as accessibility, ability to upload documents, cost, ease of use, ability to create individual design and security. There are many different web tools available online that met many of our requirements such as Google Blogger, Dropbox and Google+, however, PBworks was selected as it allowed students to upload documents and to comment on the uploaded documents. It also allowed the tutor to create a section for feedback and to upload sample answers. PBworks also allowed the students to personalise their site and to create an online portfolio that could be useful in future career applications.

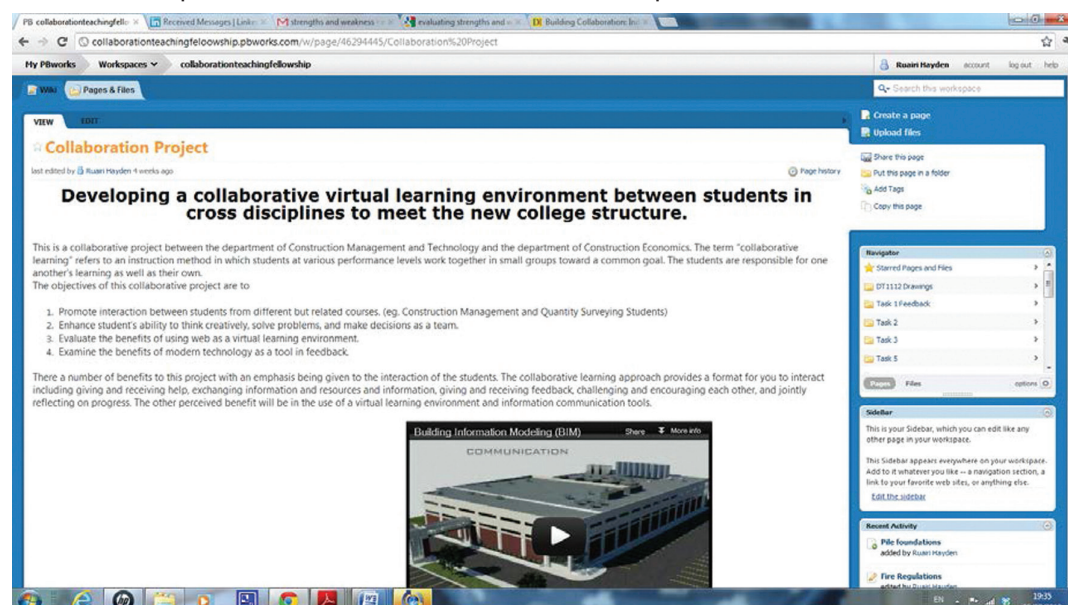


Figure 7.1
Tutor's PBworks wiki page



Figure 7.2
Revit model of project building used for feedback

Project Evaluation

The evaluation strategy for this project was twofold, the first element of the evaluation involved feedback from the students. To ensure that all students participated in this process the students were set a personal reflection task which accounted for 5% of the overall mark. Their personal reflection of the project was to include the following:

- their reaction to the collaboration project as a whole;
- how their interaction with students from other courses improved their learning;
- how they felt the use of a virtual learning environment improved their overall learning during this project;
- their thoughts on the use of a 3d model as a feedback tool;
- how they felt the project should be improved.

We compiled the data arising from the student feedback contained in their personal reflections into charts, representing the levels of their enthusiasm or criticism under the first four areas listed above.

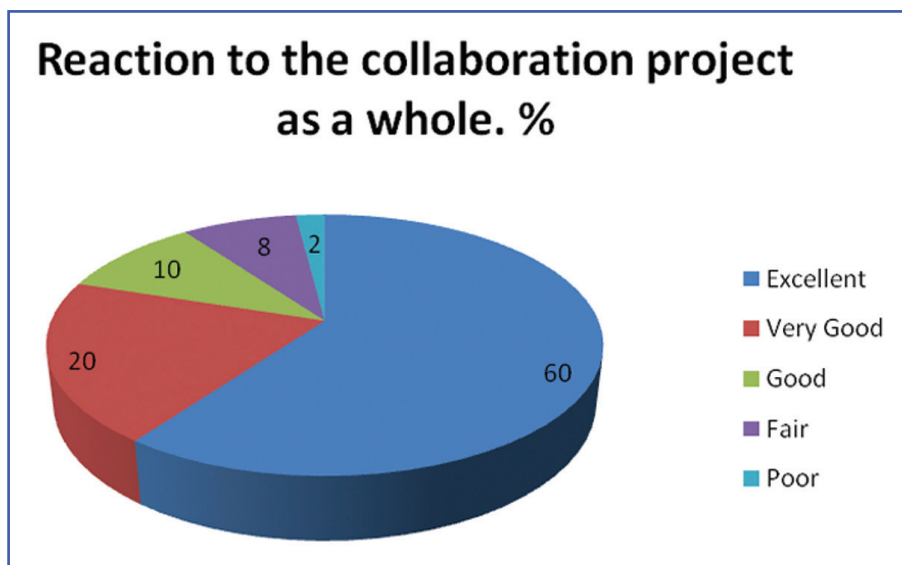


Figure 7.3

Figure 7.3 illustrates a very positive sentiment towards the project as a whole with only 10% of students finding the project only fair or weak. These findings strongly support the retention of this form of project for both courses in the coming year. Students enjoyed working with colleagues from other related courses. It gave them a taste of the collaborative environment which exists in industry where many different construction professionals work together on a daily basis. The only negative points were the logistical problems associated with organising meetings due to timetabling constraints. Many students were unwilling to be present in the college at times where no lectures were scheduled for their particular course

The Irish construction industry is currently experiencing major technological changes with the introduction of BIM (Building Information Modelling), which facilitates a collaborative approach to construction, with an impact on all construction professionals going forward.

How their interaction with students from other courses improved their learning %

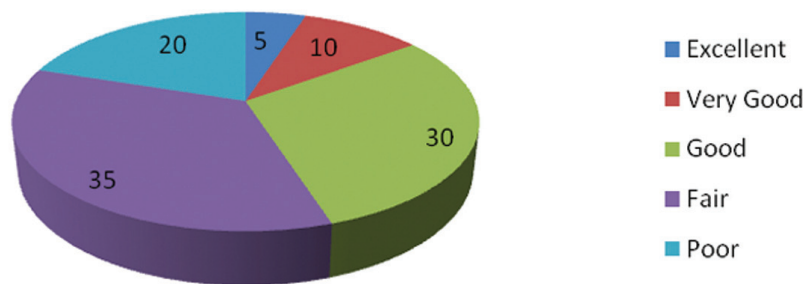


Figure 7.4

Figure 7.4 gives a breakdown of student opinion on how interaction actually worked on the ground. The students enjoyed the interactive concept, which they felt mirrored the construction workplace where many different professionals must work together as a team in order to deliver a completed project. They recognised the importance of group work, and that this would be a major part of their working life in the future. It was felt that there was no incentive for students to work on tasks outside their field which stunted interaction. Secondly, students complained that the project was not facilitated by coordinating timetables, i.e. common times scheduled for students from both courses to meet in the presence of lecturers. There were also complaints which are experienced on all projects where there is a group work element involved such as: certain students not completing a fair share of the workload, students not engaging, personality clashes, and other problems of that nature.

We feel that these criticisms can be easily addressed in the coming year. With the help of Department heads on both courses, timetables for these modules can be synchronized, which will facilitate interaction between students for meetings and assistance from lecturers. Many students also felt that lecturers should play a more pivotal role with regards to delegation of tasks.

Students were very positive with regards to pb works as an interactive platform. They enjoyed this aspect of the project, and were comfortable with regards to uploading work, and leaving comments on the open page forum. They felt that this was a novel approach to learning not present on any other modules.

How they felt the use of a virtual learning environment improved their overall learning during this project. %

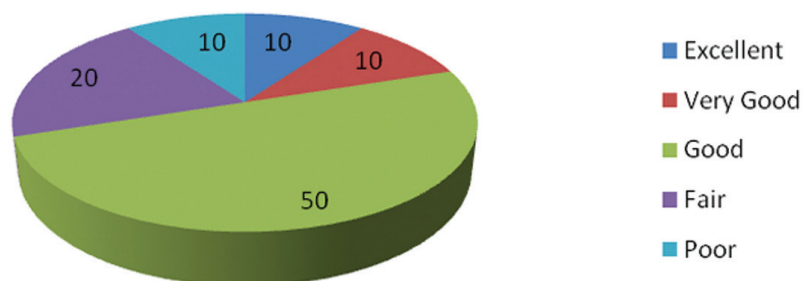


Figure 7.5

Figure 7.5 demonstrates how using a VLE improved the overall learning experience for students. This was generally well received by students, who are used to using Facebook, Twitter, blogs and so on in their social lives. Students were very supportive of this concept with 70% of responses in the good to excellent category. Some students expressed their concerns relating to posting negative comments on the web platform. Many students advised that texting or email was a more practical method of communication. There were also criticisms relating to lack of lecturer activity on the platform, with a deficiency on their part with regard to comments and advice.

Student reaction to the use of a 3d model as a feedback tool. %

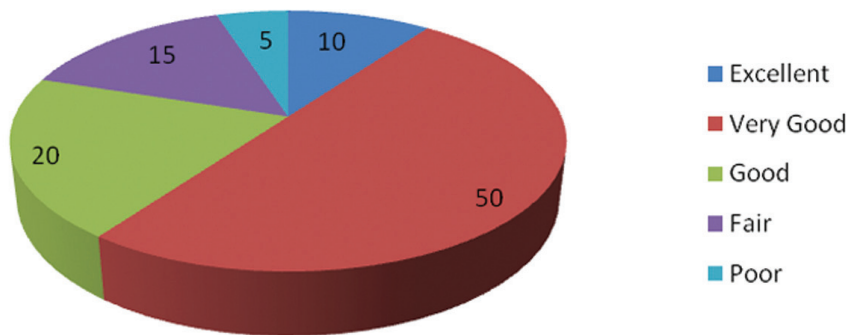


Figure 7.6

Figure 7.6 depicts a strong student sentiment towards the use of a 3d model as a feedback tool, and this was evident especially among the Quantity Surveying students who found the model very beneficial when reviewing measurement tasks. Students expressed many opinions relating to how the project could be improved, and these suggestions were generally in line with the responses illustrated in the above figures. We have summarised the student suggestions into four main points:

- Lecturers to provide more regular feedback as tasks are completed, offering advice on where improvements can be made.
- Timetables relating to modules on both courses to be synchronised in the future to facilitate meetings and face to face group work.
- The number of tasks to be reduced, and lecturer involvement included with regard to delegation of workload.
- Marking scheme to be more reflective of the work involved with each task.

The second evaluation strategy will examine future student's results with the students from this year's project and will examine what effect the future work and recommendations will have on the students learning.

Conclusion

With the advances in technology and the changing methods of communications, the research has shown that the use of information technology and the virtual learning environment has enhanced the student's experience. This would ensure that the methods being used are current and up to date. The use of a VLE and the creation of a portfolio have increased the skill level, confidence and productivity of the student and have allowed for a greater level of collaboration between group members. The VLE selected (PBworks) was deemed to be appropriate for a collaborative project and had benefits that other online recourses did not; however the new version of webcourses recently introduced in the DIT seems to meet all the requirements for future projects.

In an attempt to reflect the built environment in an academic setting, this project has developed a model for collaborative learning and teaching among students from different disciplines. This model is designed to help built environment academics develop programmes that will reflect real life projects. The model addresses the module delivery, the assessment method, group work and the benefits of a VLE in collaboration projects. The model may be used in any area of built environment education, and allows academics to analyse the benefits of using such a model. The introduction of a collaborative project will enhance the profile of the courses it is being delivered to and help attract the most competent and ambitious student and, this in turn should help in student retention.

Future Work and Recommendations

The collaboration project will run again for the next academic year with many of the developmental aspects of the evaluation being incorporated into the project. The students will be given more time at the start of the modules to familiarise themselves with the VLE and also with their fellow group members. It is also clear from the student feedback that time needs to be set aside for the students to meet under the guidance of the tutors. This will be implemented in 2013 and its benefits will be monitored on an on-going basis.

The emergence of BIM in the construction industry is an important development that needs to be recognised by the DIT. This project recognises this and will incorporate more BIM and the use of Autodesk Revit in future projects. This would encourage other disciplines within the DIT to become involved, with the potential to see all the construction disciplines working together on one model to deliver the different learning outcomes of their courses. This would ideally be coordinated through a project leader who would coordinate all the disciplines to achieve the final goal. The future will demand professionals with BIM skills, in order to achieve this. The DIT will require support and resources from industry in developing and implementing BIM-based education.

Bibliography

- Benckendorff, P. (2009) *"Using wikis to help first year students develop collaborative knowledge management skills for tomorrow"*, Proceedings of the 12th Pacific Rim First Year in Higher Education Conference, 29 June to 1 July 2009, Townsville, QLD, Australia.
- Blight, D. (2000) *What's the Use of Lectures?* Jossey-Bass Higher and Adult Education Series, New York: John Wiley & Sons.
- Bouchlaghem, D. (2012) *Collaborative Working in Construction*, London: Taylor & Francis.
- Brown, S. and Knight, P. (1994) *Assessing Learners in Higher Education*, London: Kogan Page.
- Dillenbourg, P. (1999) *Collaborative Learning: Cognitive and Computational Approaches*, New York: Elsevier Science.
- Hamlin, G. and Szorenyi-Reischl, N. (2006) *"Biting off more than you can chew! Can first year programs successfully meet the challenge of the current emphasis on education best practice?"*; available online at http://www.fyhe.com.au/past_papers/papers09/content/pdf/13d.pdf
- Marsh, H.W. and Roche, L.A. (1994) *The Use of Students' Evaluations of University Teaching to Improve Teaching Effectiveness*, Canberra, Australia: Australian Government Publishing Service.
- Macfarlane, B. (2004) *Teaching with Integrity*, London: Routledge Falmer.
- Pickens, D. and Jagger, D. (2005) *"Whither measurement"*, RICS Journal, 12(05): 45.
- Vygotski, L.S. (1978) *Mind in Society: The Development of Higher Psychological Processes*, Boston: Harvard University Press.

College of Sciences and Health



8 How much do our incoming first year students know? Diagnostic testing in mathematics at third level

Blathnaid Sheridan: **School of Mathematical Sciences**

Contact: blathnaid.sheridan@dit.ie

Abstract

A continuing cause for concern in higher education institutions is the poor core mathematical skills of incoming students. Many institutions now offer mathematics support services such as drop-in centres, online resources and short “refresher courses” in an attempt to alleviate the problem. The majority of third level institutions in Ireland and internationally now make use of diagnostic testing of incoming first year students that both predict subsequent success and select groups for remediation. This project was developed to explore the issues around diagnostic testing and follow-up support for incoming students in the College of Sciences and Health. A large cohort of first year science students was tested and those who failed to achieve 50% on the test were offered support. This support came in the form of peer-assisted student-led tutorials during which students had the opportunity to revise basic areas of mathematics. On comparison of the scores on the diagnostic test with the end of module results there is a correlation between students who scored poorly on the diagnostic test and students who failed the Semester 1 mathematics module.

Keywords: *first year curriculum, mathematics, peer learning*

Introduction

Over the past decade comprehensive concerns over student difficulties with mathematics, statistics and general numeracy have been expressed by many governments, employers and higher education providers. Abundant supplies of reports and articles have been produced to highlight these concerns (Hawkes and Savage 2000; Savage 2003; Smith 2004). Furthermore, these issues are not exclusive to the UK and Ireland alone; reports of this kind are being produced worldwide. For example, an Australian article (McGillivray 2008) studied the experiences of first year undergraduate students and attempted to identify the weaknesses in mathematical skills and confidence that act as a barrier for success for many students. This gap between the level of preparedness either expected or required upon entry to third level and the mathematical capabilities acquired at school/college has become known as “the mathematics problem” (Savage 2003).

More recent studies into the changing nature of the mathematical skills which our undergraduates have acquired, have led to many third level institutions organising some form of mathematics support including the provision of drop-in centres, individual consultation and access to special provisions. The main aim is to aid students to overcome their difficulties with mathematics but also to help students with different backgrounds and challenges, such as mature students and students with disabilities, to get an introduction to the mathematical thinking required at third level (Gill, Mac an Bhaird and Ni Fhloinn 2010). Indeed, the Student Maths Learning Centre (SMLC) was established in DIT in 2006, with this purpose in mind.

Diagnostic Testing

Many universities now use diagnostic testing in mathematics as a tool to assess their intake of students, in particular engineering students. Different third level institutions adopt different types of diagnostic tests. An extensive study carried out in 2002 showed that many institutions use multiple-choice questions, either paper-based or computer-based and most tests group questions together under a common heading such as algebra or calculus (LTSN 2002). In Loughborough University, a novel diagnostic test is in use, incorporating a paired question method with the idea that both questions in a pair should test the same topic. Such a structure is believed to allow easy identification and subsequent follow up of topics where the student needs extra help (Lee and Robinson 2004).

Diagnostic testing has helped to show that student performances have declined particularly in the areas of arithmetic and algebra (Atkinson 2004; Gillard, Levi and Wilson 2010). Moreover, the testing has indicated an increase in the variability of results. In terms of practical significance to the teaching and learning of mathematics at third level today, we are faced with the fact that the profiles of students entering mathematics lectures today are not the same as they were (Faulkner 2012). Neither are the mathematical backgrounds of first year undergraduate students as strong as they were as recently as ten years ago.

Ireland has a unique situation in terms of the mathematical homogeneity of its third level students; most students enter via the route of the Leaving Certificate, on completion of 13 years of formal mathematics education. With regards to the transition from second level to third level mathematics, the current complaints of educators at Irish third level institutions, including DIT (Russell 2005; Ni Fhloinn 2006), about the level of mathematical knowledge and skills of incoming students are much the same as those outlined 16 years ago by the London Mathematics Society in the report *Tackling the Mathematics Problem* (LMS 1995):

1. Students lack reliability and fluency in manipulating and simplifying numerical and algebraic problems

2. There is a marked decline in students' analytical powers when faced with simple two-step or multi-step problems
3. Many students no longer understand or appreciate that mathematics is a precise discipline in which exact, reliable calculation, logical exposition and proof play essential roles.

Outline of Project

Diagnostic Testing was carried out for the first time in the College of Sciences and Health in September 2011. Michael Carr in the School of Civil and Building Engineering Services has developed a test over the past number of years and, after discussion with him and consultation with the research, it was decided to use the same test in our own College of Sciences and Health. The test consists of a multiple-choice quiz on webcourses and is based on a large randomised question bank. Students are asked to answer 20 questions (ten paired questions) on basic topics such as algebra, fractions, indices, trigonometry, the equation of a line, logs, quadratic equations, simultaneous equations and basic differentiation; they are given a time constraint of 90 minutes.

Students were given immediate results when they submitted their test and any students receiving less than 50% were advised to take part in a revision initiative. This initiative involved student-led tutorials over the first 10 weeks of Semester 1. Two fourth year Mathematical Sciences students facilitated the tutorials and first year students revised basic mathematical concepts in each tutorial using specially prepared revision booklets (prepared by Sigma Centre for Excellence in Mathematics and Statistics support). Students were then asked to retake the Diagnostic Test again during Weeks 11 and 12 of Semester 1.

Evaluation of diagnostic testing

The pilot groups chosen for this study were first year Honours Degree students on eight different programmes in the College of Sciences and Health.

Course	Programme Code	Leaving Certificate Points*	
		Final	Mid point
Mathematical Sciences	DT205/DT220	255	340
Physics Technology	DT222	305	365
Physics with Nanotechnology	DT227	325	375
Clinical Measurement	DT229	410	450
Physics with Bioengineering	DT235	320	390
Optometry	DT224	495	515
Computing	DT211	320	335
Computer Science	DT228	350	370

Table 8.1 Programmes and Leaving Certificate points

Note: In the Irish Leaving Certificate, six subjects are included for the purpose of calculating points. A maximum of 100 points can be attained in any one subject. The final point column shows the lowest points score achieved by an applicant who received an offer of a place on the course. The mid point is the points score of an applicant in the middle of a list of offerees placed in points score order.

Building upon work already carried out in DIT (Michael Carr), the initiative was evaluated using a strategy devised to enhance the way in which the diagnostic test was implemented, and integrated, into programmes. Formative evaluation was also necessary to highlight areas where improvements could be made to the diagnostic test itself and its use within Science programmes. Both quantitative and qualitative research methods were implemented to ascertain the effectiveness of the diagnostic test, the follow-up revision tutorials and to determine where improvements could be made. The methods of data collection are diagnostic test results, attendance at revision tutorials, Leaving Certificate (LC) mathematics mark, diagnostic re-test mark, end of module maths mark and questionnaires.

Across all pilot groups, 329 students were eligible for consideration in the data. Some students had one or more pieces of data with missing values and so were excluded from some comparisons. Reasons for missing data include non-standard entry students, international students and a non-compulsory diagnostic test. Some 26% of students for whom data was collected had taken Higher Level Mathematics at Leaving Certificate and 69% had taken Ordinary Level Mathematics at Leaving Certificate. The response rate for the diagnostic test was 47% (156 responses) giving an overall average mark of 52%.

Programme	No. Eligible Students	Average Mark	Response Rate	Less than 50%
DT205/DT220 – Mathematical Sciences	44	53%	84% (37 responses)	16/37 (43%)
DT222 – Physics Technology	15	58%	52% (8 responses)	4/8 (50%)
DT227 – Physics with Nanotechnology	16	57%	81% (13 students)	4/13 (31%)
DT229 – Clinical Measurement	30	58%	37% (11 students)	4/11 (36%)
DT235 – Physics with Bioengineering	9	50%	67% (6 students)	3/6 (50%)
DT224 – Optometry	30	61%	20% (6 students)	1/6 (17%)
DT211 – Computing	73	42%	34% (25 responses)	16/25 (64%)
DT228 – Computer Science	112	49%	45% (50 students)	26/50 (52%)

Table 8.2 Results for diagnostic testing: average mark and response rate

Figure 8.1 Leaving Cert Math Level v Diagnostic Test

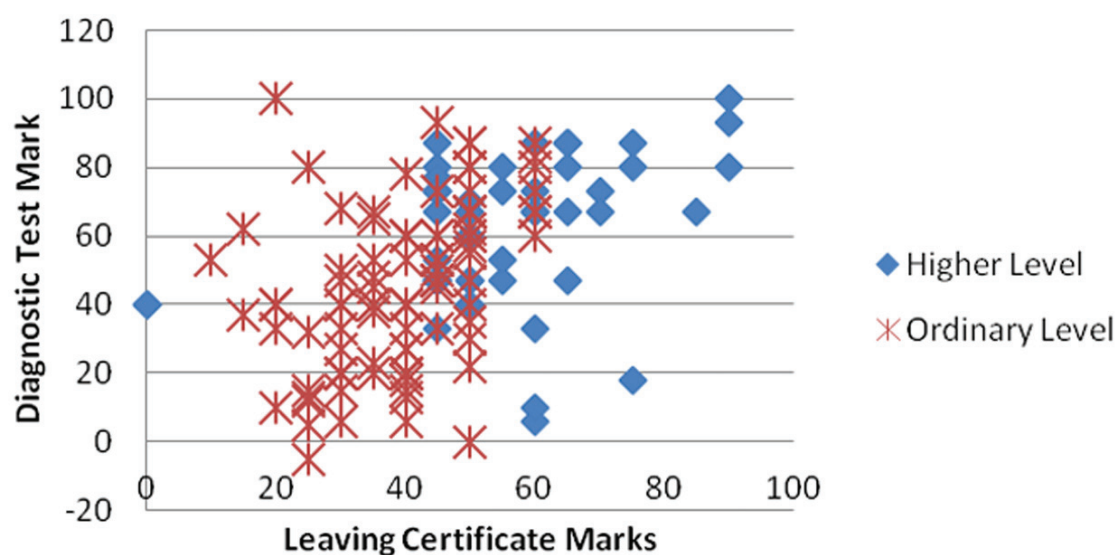


Figure 8.1 is a breakdown of diagnostic test marks versus whether a student sat Higher Level or Ordinary Level Mathematics at Leaving Certificate Level.

As can be seen from Figure 8.1, students who had higher level mathematics were much more likely to get over 50% on the diagnostic test. Some 30% of higher level students failed to achieve 50% on the diagnostic test whereas 56% of ordinary level students failed to achieve over 50% on the same test.

It is worrying that, given that the points requirements to all of the pilot courses are relatively high (to very high in the case of Optometry) and that the basic mathematics requirement is an OB3 (Ordinary Level B3) for all Physics and an OC3 for all Computing programmes, almost half of all respondents (47%) to the diagnostic test failed to achieve more than 50%. In particular, high proportions of students on both computing programmes failed to achieve higher than 50%.

Furthermore, results from the diagnostic test highlighted particular topics about which students had misconceptions or areas where students had little or no prior knowledge on which to base their answers. Algebra and arithmetic were the two main "problem areas" for these students and knowing this in advance of lectures allowed the author to change her style of teaching and allow slightly more time allocation to these topics. Giving the students advance notice and materials to revise these topics and to go over the keywords which they would meet again in lectures, gave the weaker students in particular space to "get their head around the basic concepts" and a direction in which to point themselves mathematically.

Student-assisted tutorials initiative

Students who received less than 50% on the diagnostic test were advised to attend revision tutorials to help them to improve their understanding of basic mathematical concepts. These tutorials were held twice weekly for the first 10 weeks of Semester 1 and were facilitated by two fourth year Mathematical Science students. The average weekly student attendance was 11 students with the majority of attendees being mature students, particularly from the two computing programmes. Attendance was not compulsory nor did it account for any continuous assessment mark and it is for this reason, the author feels, that many students were not motivated enough to attend.

Each tutorial had a separate revision booklet prepared for it with each booklet covering a different basic mathematical topic; for example Booklet 3 – Algebra, Booklet 5 – Factorising. Students were seated in small groups and were given a short introduction to the topic by the tutors. Each group was then given time to work on and discuss some questions together and their solutions were checked by the tutors. If a question was consistently incorrectly answered, the tutors worked through this on the board. Booklets also contained extra questions and worked solutions for students to work through after each tutorial. The group work aspect of the tutorials allowed students to work together on problems and also to meet other learners in the same situation as themselves.

Student feedback about the initiative was very positive. More than 50% of original respondents (regardless of their mark on the diagnostic test) attended some revision tutorials.

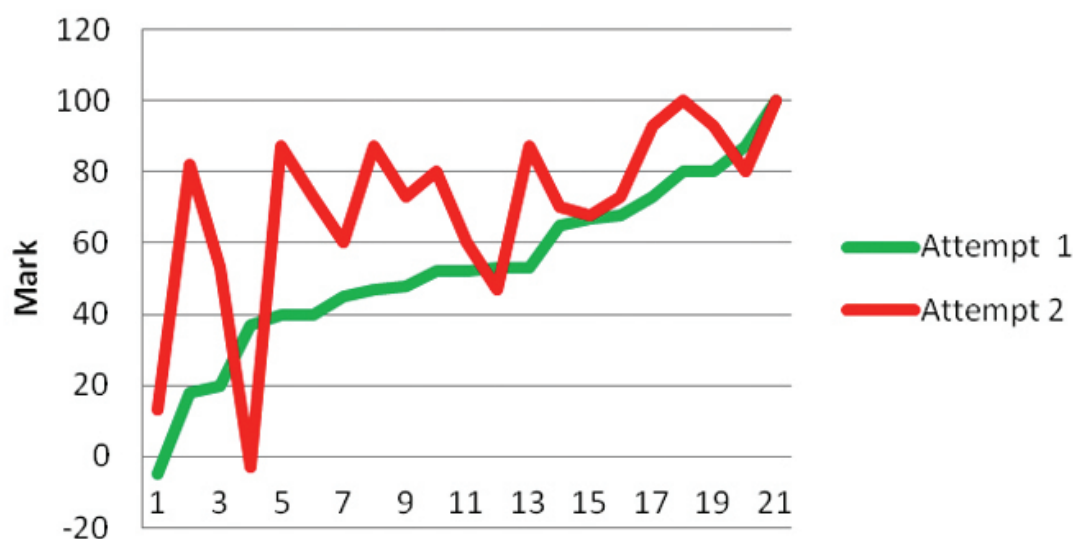
Percentage Agreement	Response
87%	Revision booklets were well-structured with good examples.
75%	Revision tutorials had improved their knowledge of basic mathematics.
88%	Revision tutorials had greatly improved their confidence with mathematics

Table 8.3 Student feedback about the initiative

Re-test

The diagnostic test was made available again during Weeks 11 and 12 of Semester 1 and students were reminded to attempt the test. 13% of students re-sat the test and again this figure may have been influenced by the non-compulsory nature of the initiative, coupled with a lack of motivation shown by many of the (especially weaker) students. The results however were more reassuring with 86% of respondents increasing their marks. The average increase in results was 62% which shows a significant improvement in understanding and competency in basic mathematical questions. These results also helped to improve students' confidence in their mathematical ability and keep them focused on the maths module.

Figure 8.2 Test Mark vs Retest Mark



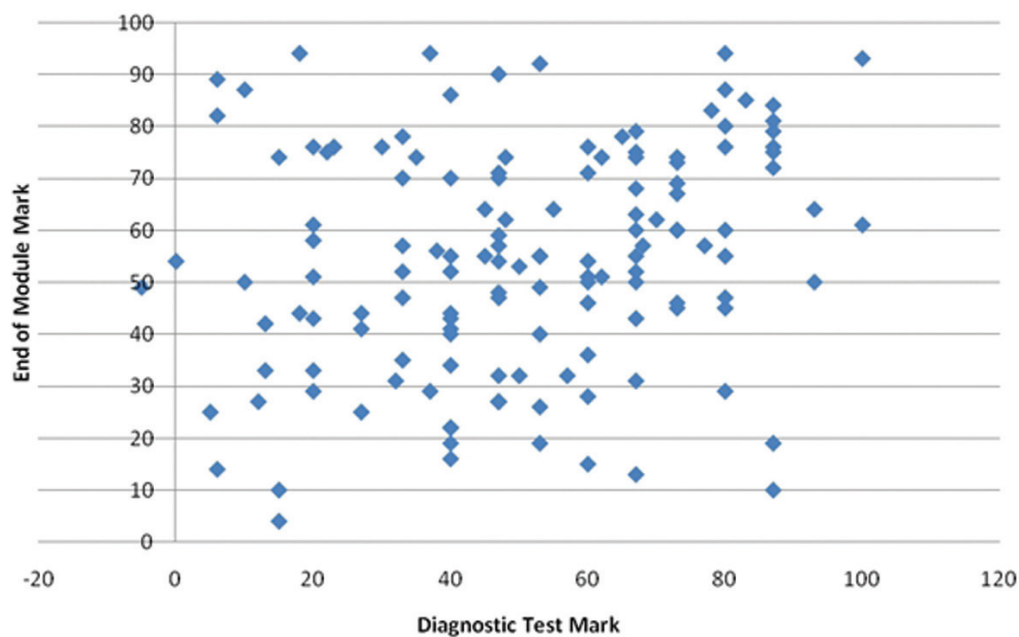
Correlation Analysis

To measure the strength of association (if any) between the diagnostic test mark and the end of module exam mark, we used the correlation coefficient. Any respondents who had either not taken the diagnostic test and/or had not taken the end of module exam mark were omitted from the analysis, leaving us with a sample size of 155. A non-compulsory submission of the diagnostic test was a major contributory factor to such omissions as well as students dropping out of their programme before the end of the semester.

Analysis of the data shows that there is a positive correlation between the diagnostic test mark and the end of module mark ($r = .390$) which is statistically significant ($p = 0.000$). This tells us that those students who achieved a poor score on the diagnostic test tended to also obtain a poor end of module mark.

A scatter diagram (see Figure 8.3) of the data shows a linear relationship between the variables.

Figure 8.3 Scatter Diagram of Diagnostic Test Mark vs End of Maths Module Mark



The regression equation is as follows:

$$\text{End of Maths Module mark} = 16.67 + 0.833 (\text{Diagnostic Test})$$

In conclusion, diagnostic testing provided a positive approach to a situation. For our students it provided a constructive method which led to ongoing support and for the author as an academic interested in this research, it provided an indication of "what is needed" in terms of teaching and possible changes in the curriculum. There was a systematic improvement in the basic mathematical skills of students who participated in the initiative and this is evident from the results on the re-test and also from student feedback. We hope that this initiative will become an integral part of mathematical education for first year students, as the number of students sitting the diagnostic test increases in future years.

Future Work

The diagnostic test will be introduced to additional cohorts of students from 2013. To ensure a better initial response rate, each group will now be given a dedicated time slot in a computer lab during their induction schedule. This will help to collect and analyse results in advance of the students beginning their first year mathematics modules and will allow discussion of how and where students can avail of maths support early in the semester.

Due to financial constraints, it is unlikely that the student-led revision tutorials will run again. In their place, an online resource will be made available to all students. This resource will be updated each week with a new tutorial. The revision booklets will again play a major role along with video links and dedicated quizzes for each topic.

This mathematics support initiative will feature in an upcoming edition of The Irish Mathematics Learning Support Network newsletter and it is hoped that there will be collaboration with other institutions running similar initiatives over the coming years so that recommendations can be discussed and improvements can be made.

Recommendations to DIT

1. Diagnostic Testing in mathematics should be extended to all incoming first year students in the College of Science and Health. Compulsory submission of the diagnostic test should be enforced by all first year maths lecturers as the results of the test can then inform how teaching strategies may need to be adapted.
2. A higher level of the first year maths diagnostic test should be developed for administration in the third year of degree programmes. Many of the degrees in the College of Sciences and Health require a Statistics module to be completed by students in their second or third year and so this higher level test should contain a mixture of numerical and statistical type questions.

References

- Atkinson, R. (2004) *"Don't just do it, do it right! Diagnostic tests"*, MSOR Connections, 4: 35–37.
- Faulkner, F. (2012) *"In terms of practical significance to teaching and learning of mathematics at third level today"*, Thesis submission, University of Limerick.
- Gill, O., Mac an Bhaird, C. and Ní Fhloinn, E. (2010) *"The origins, development and evaluation of mathematics support services"*, Irish Mathematical Society Bulletin, 66: 51–63.
- Gillard, J., Levi, M. and Wilson, R. (2010) *"Diagnostic testing at UK universities: An e-mail survey"*, Teaching Mathematics and its Applications, 29: 69–75.
- Hawkes, T. and Savage, M. (2000) *Measuring the Mathematics Problem*, London, Engineering Council.
- Lee, S. and Robinson, C. (2004) *"Diagnostic testing in mathematics: Paired questions"*, Teaching Mathematics and its Applications, 24(4): 154–163.
- LMS (1995) *Tackling the Mathematics Problem*, Joint report of the LMS, Institute for Mathematics and its Applications and the Royal Statistical Society.
- LTSN (2002) *Diagnostic Testing for Mathematics*, Learning and Teaching Support Network Maths Team Project.
- McGillivray, H. (2008) *"Learning support in mathematics and statistics in Australian universities: A guide for the university sector"*, Australian Teaching and Learning Council.
- Ní Fhloinn, E. (2006) *Maths Diagnostic Report*, Internal Report, Dublin Institute of Technology.
- Russell, M. (2005) *"Academic success, failure and withdrawal among first year engineering students: Was poor mathematical knowledge a critical factor?"*, Level 3, (3); http://level3.dit.ie/html/issue3_list.html
- Savage, M.D. (2003) *"Tackling the maths problem: Is it more extensive than we thought? Are solutions in sight?"* Mathematical Education of Engineers IV, IMA Conference.
- Smith, A. (2004) *Making Mathematics Count: The Report of Professor Adrian Smith's Inquiry into Post-14 Mathematics Education*, London, Stationery Office.

9 Scaffolding for cognitive overload using pre-lecture e-resources (SCOPE) for first year chemistry undergraduates

Claire McDonnell, Christine O'Connor and Sarah Rawe: **School of Chemical and Pharmaceutical Sciences**
Contact: claire.mcdonnell@dit.ie, christine.oconnor@dit.ie, sarah.rawe@dit.ie

Abstract

The aims of this project were: to develop additional online pre-lecture resources for first year chemistry undergraduates at level 7 and level 8 to complement those prepared in the 2010/2011 academic year for level 8 students by Dr Michael Seery as part of his teaching fellowship, and to evaluate the effect of implementing the resources this year by analysing quantitative (test and exam results) and qualitative (pre- and post-implementation surveys and focus group interviews) data. Ten pre-lecture activities on organic chemistry were prepared and used with 87 level 8 students in Semester 2 and ten more on general chemistry topics have been developed and will be implemented with level 7 students in September 2012. Analysis of the mid-semester test and examination results of the students with whom the resources were used in semester 2 showed that, among groups with similar CAO points levels, the gap in performance between those who had and had not studied chemistry at Leaving Certificate was eliminated. The surveys and focus groups undertaken revealed that learners felt more confident and that they could focus more in the lecture when they had completed a pre-lecture activity.

Keywords: *cognitive load, first year experience, pre-lecture resources, prior learning*

Introduction

How learners process information

Chemistry is accepted as being a conceptually difficult subject for a novice learner as well as one that requires that students build on prior knowledge they have acquired in order to progress (Childs and Sheehan 2009; Reid 2008; Seery 2009). As a result, it has been recommended that greater consideration should be given to cognitive load and to ensuring that learners are given the opportunity to embed knowledge in their long-term memory by means of processing new concepts in their working memory (Childs 2009; Johnstone 2010; Reid 2008). The way in which new information is assimilated has been studied by educational psychologists for some time and several reviews have been published (Artino 2008; Ayres and Paas 2009; Baddeley 2003; Sweller and Chandler 1991). This area of research has also informed science and chemistry education researchers and a model of how information is processed developed by Reid and Johnstone is presented in Figure 9.1 (Johnstone 1997; Reid 2008). It shows that new information must (i) first be perceived as such and can then (ii) be processed in the working memory, which has a limited capacity, and, (iii) under the correct conditions, will then be assimilated into long-term memory.

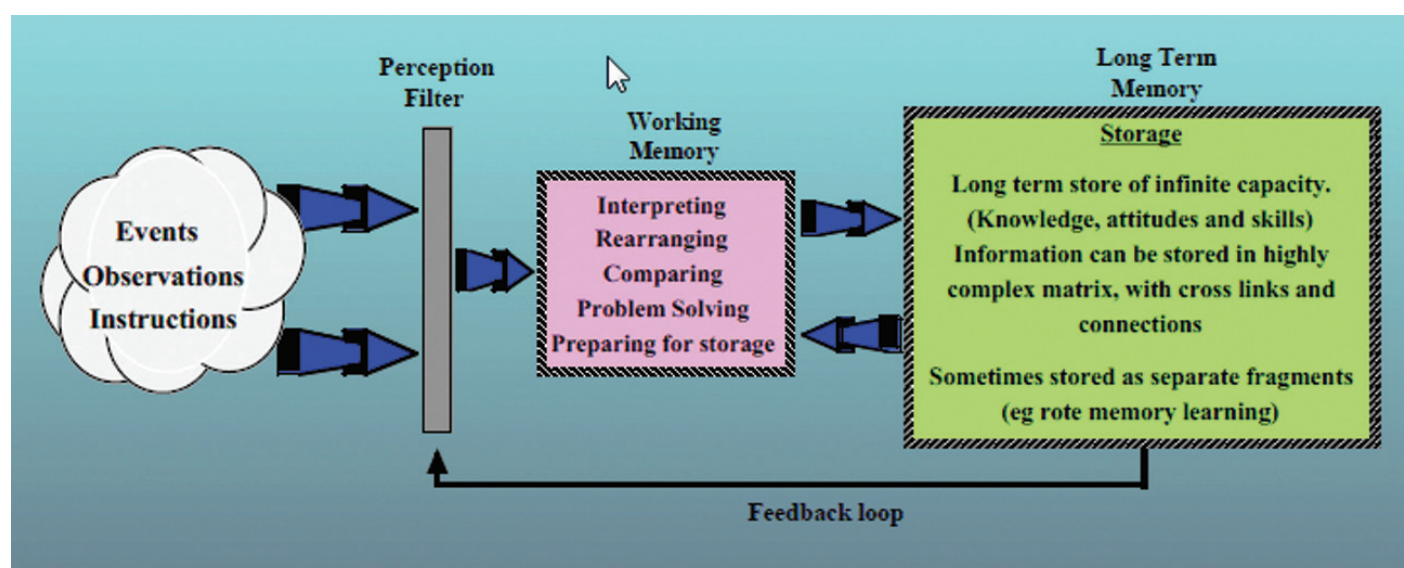


Figure 9.1 An Information Processing Model (reproduced from Reid 2008 and after Johnstone 1997)

Pre-lecture activities

As working memory capacity is finite, when it is exceeded, a situation described as cognitive overload results. Learners who enter third level science courses without having studied chemistry at second level often struggle to deal with the significant amount of new terminology, symbolism and concepts they are presented with (Childs and Sheehan 2009; Johnstone 2000; Seery 2009). One of the strategies that can be implemented to address this problem is to provide learning materials in advance of the lecture with the aim of then reducing the cognitive load experienced by students during their lecture. Substantial work in this area was carried out by Johnstone and Reid when they sought to address a situation where incoming students had a diverse range of prior knowledge of chemistry (Sirhan et al. 1999; Sirhan and Reid 2001). When paper-based pre-lecture resources were used with students who had little or no prior knowledge, no significant difference between the exam marks of this cohort of students and the group who had prior knowledge of chemistry was observed. When the pre-lecture resources were removed, there was a significant difference between the results. A previous study at Dublin Institute of Technology also demonstrated the effect of prior knowledge of chemistry as it was found that there was a significant difference between the examination achievement in first year of undergraduates who had and had not studied chemistry at second level (Seery 2009).

The development of electronic, rather than paper-based, pre-lecture resources incorporating the principles of cognitive load theory can be used to reduce the burden on the working memory of novice learners. Collard, Girardot and Deutsch (2002) have applied this method to chemistry as have Slunt and Giancarlo (2004). This approach has also been used recently and very effectively at Dublin Institute of Technology (Seery and Donnelly 2012).

Project aims

The aims of this project were:

1. To develop additional online pre-lecture resources for first year chemistry undergraduates at level 7 and level 8 to complement those produced last year for level 8 (Seery and Donnelly 2012).
2. To evaluate the effect of implementing these resources by analysing data quantitatively (test and exam results) and qualitatively (pre- and post-implementation surveys and focus group interviews).

The e-resources were designed to:

- reduce cognitive load by introducing some new terms and concepts before the lecture;
- incorporate worked examples to scaffold students' learning;
- provide short online test questions using the college virtual learning environment (VLE) with immediate feedback so that students could identify areas of difficulty.

The anticipated benefit was that that the gap in performance often observed in first year between learners who have and have not studied chemistry at Leaving Certificate would disappear. This was shown to occur last year in a level 8 first semester module (Seery and Donnelly 2012) and it was anticipated that this positive effect could be extended to our first year teaching.

Outline of Project

Student engagement

Ten online pre-lecture resources on introductory organic chemistry were developed and then used with 87 level 8 students in Semester 2. A small proportion of their continuous assessment mark was allocated to the associated online tests to encourage learners to participate. The average uptake across the ten resources employed was 92% and the average quiz mark was 73%. This relatively high average mark reflects the intention that the questions would be at a suitable level to probe a basic comprehension of the terms and concepts introduced. The design of the resources produced followed the principles established by Michael Seery the previous year and differed only in that an audio commentary was not added and the pre-lecture information was distributed in a paper format as well as electronically. Ten online pre-lecture resources have also been developed on general chemistry for use with level 7 students and they will be implemented in September 2012.

Test and examination performance

Analysis was performed on the mid-semester test and examination results for the relevant level 8 module and their relationship to the prior chemistry knowledge of these students. The cohort of level 8 students who used the resources this year was somewhat different to previous years in that the uptake for a chemistry programme (DT299) that was launched in 2010 had increased significantly and, compared to the rest of the class, the 24 students on that course had a higher average performance at second level (397 CAO points) and a higher proportion of them had studied chemistry at Leaving Certificate (84%). The remaining 56 students were drawn from three different programmes and were more representative of the type of students who were usually taught on this module as they had an average of 367 CAO points (30 points lower than the DT299 group) and only 50% of them had studied chemistry at second level.

It was found that a significant difference in module test and examination performance between those who had and had not studied chemistry at Leaving Certificate did occur when the 24 students from DT299 with the uncharacteristic profile (higher points and 84% with prior chemistry knowledge) were included in the analysis. The average test marks were 56% and 41% respectively for those who had and had not prior knowledge while examination marks were 58% and 37%.

Average CAO points were 372 and 359 for those with and without prior knowledge respectively, but the difference was not found to be significant. However, it did seem reasonable to perform an analysis when the DT299 group had been excluded for comparison. In this case, it was found that the difference in average CAO points between those who had (355 points) and had not (350 points) studied chemistry at second level was much lower and the variation in performance for the organic chemistry sections of the module mid-semester test and examination for those with and without prior chemistry knowledge were found to no longer be significant (49% and 42% respectively in the test and 49% and 36% in the examination).

Although there are some qualifications related to this analysis, it has been demonstrated that performance at second level is an important consideration (the difference in CAO points between the DT299 students and the others was found to be significant) and that the pre-lecture resources for organic chemistry employed in semester 2 reduced the difference in semester test and examination marks achieved to a level that was not statistically significant among students with similar CAO points who had and had not prior chemistry knowledge.

Data have been collected to allow an analysis of the relationship between the prior chemistry knowledge of level 7 students and their Year 1 chemistry test and examination results to provide a baseline for comparison for next year when pre-lecture resources are introduced.

Qualitative analysis – by means of student attitude surveys at the beginning and end of the academic year and two focus group interviews with the level 8 students who used the pre-lecture resources – has taken place and is discussed in the following section..

Evaluation and Conclusions

Attitudes survey

The student attitude surveys conducted were comprised of 38 statements about learning chemistry including some on pre-lecture information. Some of them had been sourced from the Colorado Learning Attitudes About Science Survey (Barbera et al. 2008). Some of the main findings are presented below in Table 9.1. It can be seen that, in most cases, similar attitudes applied at the beginning and end of the semester. The first three statements relate specifically to the provision of pre-lecture information and it can be seen that there is an increase from 83% to 92% agreement with the statement that it is helpful to have had some of the terms explained in advance of a chemistry lecture. This is taken as evidence that learners found the pre-lecture approach useful. The responses in relation to a preference for using textbooks or multimedia tools are also interesting and the authors feel that the area of student textbook use merits further study.

Statement on Attitude to Learning Chemistry from Survey	Responses: Week 2, Semester 1 (57 level 8 and 79 level 7 students)	Responses: Week 11, Semester 2 (65 level 8 students)
I find that if too many new terms and concepts are introduced in one lecture, I struggle to understand	54% agree 20% neutral	54% agree 18% neutral
It is helpful to know in advance what topics each chemistry lecture will be about	90% agree 9% neutral	91% agree 5% neutral
It is helpful to have had some of the terms explained in advance of a chemistry lecture	83% agree 15% neutral	92% agree 6% neutral
It is important to know how a new chemistry topic relates to what I already know	89% agree 8% neutral	92% agree 6% neutral
I like to use multimedia tools to help me to study chemistry	58% agree 27% neutral	52% agree 32% neutral 12% disagree
I like to use textbooks to help me to study chemistry	64% agree 27% neutral	35% agree 45% neutral 22% disagree
I can access the internet easily when I need to	86% agree 8% neutral	91% agree 5% neutral 3% disagree

Table 9.1 Main findings from the attitudes survey administered at the beginning and end of the academic year

Focus groups

Two focus group interviews were carried out with the level 8 students who had used the organic chemistry pre-lecture resources towards the end of semester 2. The questions asked dealt with experiences of using the pre-lecture resources and of the learning environment for chemistry. One focus group was made up of learners with prior chemistry knowledge and the other group only included students who did not have prior knowledge. Participants were selected based on their course of study, prior knowledge, test performance and sex and each focus group had 6 participants. Some of the main outcomes from the interviews are listed in Table 9.2 below.

Area Discussed	Responses: Students with prior chemistry knowledge	Responses: Students without prior chemistry knowledge
Experience when pre-lecture resources provided	Found them very useful for topics that had not been covered at Leaving Certificate. Did not always refer to the pre-lecture material before taking the quiz for topics they were familiar with.	Were at an appropriate level and provided an introduction to a topic. The lecture was a reinforcement and they could listen more in class. Felt more confident in the lecture.
Experience when pre-lecture resources not provided	Felt less prepared for the lecture and often overwhelmed during it.	Felt unprepared and lost and did not understand new terms being used.
Is it important to associate an assessment mark with the resources?	Yes, it provides an incentive and is not very time consuming to do.	Yes, it is an incentive but all students said they would still do it if there was no mark.
Positive experiences	Gives confidence and a "feel good" factor when do well on quiz. Helpful to have terms explained in advance.	Allows active learning. Improves confidence as knowledge being built up is tracked.
Negative experiences	Some multiple choice questions on the quiz needed to be read carefully to get them correct.	Forgetting to do the pre-lecture resource and feeling lost in the lecture as a result.
Suggestions for improvements	Use bullet points more for clarity. Add audio commentary to the electronic version.	Include one animation with each resource, not just some of them. Add audio commentary to the electronic version.
Other comments	Quizzes provide evidence of understanding.	The quizzes promoted discussion among students, particularly if someone got an answer incorrect.

Table 9.2 Main findings from the focus group interviews conducted with level 8 students

As had been hoped, students reported that they felt they could listen more during lectures and were more confident about their knowledge on a topic when pre-lecture resources were used. The group who had prior chemistry knowledge did not always review the pre-lecture material when they were familiar with a topic but they were very appreciative of it when they encountered new material. All students who participated expressed a preference to have an audio commentary added to the resources.

Recommendations to the DIT

On the basis of their fellowship research, the authors would like to make the following recommendations:

1. The use of pre-lecture or pre-laboratory activities should be encouraged as an effective means of bridging the gap between those with and without prior knowledge in a subject, and as a means to improve the first year experience.
2. The Respondus software used to prepare and administer the quizzes operated within the college VLE and this made administration quite easy, and automated the compilation of marks. This considerably reduced the workload associated with this mode of continuous assessment, and continued promotion of software such as this to staff is recommended.
3. Consideration should be given to encouraging the approach employed in this project of extending and further evaluating a novel pedagogic approach developed a year previously by a colleague. We have found that it has provided a very effective means of ensuring sustainability of the two fellowship projects concerned and has promoted collegiality.
4. Statistical analysis of student performance in relation to factors such as prior subject knowledge, CAO points, programme of study and performance in Leaving Certificate mathematics can provide valuable information about first year undergraduates (and indeed subsequent years). Consideration could be given to providing incentives to staff who are interested in undertaking this work, such as small grants to allow a research assistant to be paid for a couple of days or assistance from students who are enrolled on relevant courses which feature data analysis and statistics.

Proposed Future Work

As requested by the students interviewed, audio commentaries will be added to the 10 pre-lecture resources in organic chemistry that were used this year.

The general chemistry resources developed will be implemented with level 7 students in 2012–2013 and it is also intended to modify the organic chemistry resources used with level 8 students so that they can be extended to level 7 next year.

Further analysis of the data obtained on the level 7 and level 8 cohorts of students will be performed to investigate whether performance in Leaving Certificate mathematics has a bearing on their first year chemistry results at third level.

It is also hoped to probe whether learners' metacognitive skills relate to their performance at third level. This is likely to require individual interviews with students, and student attitudes to using textbooks can also be examined.

Acknowledgements

The authors would like to thank Dr Michael Seery for his very significant contribution to this project, Dr Roisin Donnelly and Dr Martina Crehan for their guidance, Mark Russell for student data and all of our students who participated in surveys and interviews.

References

- Artino, A.R., Jr. (2008) "Cognitive load theory and the role of learner experience: An abbreviated review for educational practitioners", *AACE Journal*, 16(4): 425–439.
- Ayres, P. and Paas, F. (2009) "Interdisciplinary perspectives inspiring a new generation of cognitive load research", *Educational Psychology Review*, 21(1): 1–9.
- Baddeley, A. (2003) "Working memory: Looking back and looking forward", *Nature Reviews Neuroscience*, 4(10): 829–839.
- Barbera, J., Adams, W.K., Wieman, C.E. and Perkins, K.K. (2008) "Modifying and validating the Colorado learning attitudes about science survey for use in chemistry", *Journal of Chemical Education*, 85(10): 1435–1439.
- Childs, P.E. (2009) "Improving chemical education: Turning research into effective practice", *Chemistry Education Research and Practice*, 10(3): 189–203.
- Childs, P.E. and Sheehan, M. (2009) "What's difficult about chemistry? An Irish perspective", *Chemistry Education Research and Practice*, 10(3): 204–218.
- Collard, D.M., Girardot, S.P. and Deutsch, H.M. (2002) "From the textbook to the lecture: Improving prelecture preparation in organic chemistry", *Journal of Chemical Education*, 79(4): 520–523.
- Johnstone, A.H. (1997) "Chemistry teaching: Science or alchemy?" 1996 Brasted Lecture, *Journal of Chemical Education*, 74(3): 262–268.
- Johnstone, A.H. (2000) "Chemical education research: Where from here?" *University Chemistry Education*, 4(1): 34–38.
- Johnstone, A.H. (2010) "You can't get there from here", *Journal of Chemical Education*, 87(1): 22–29.
- Reid, N. (2008) "A scientific approach to the teaching of chemistry", *Chemistry Education Research and Practice*, 9(1): 51–59.
- Seery, M.K. (2009) "The role of prior knowledge in undergraduate performance in chemistry: A correlation-prediction study", *Chemistry Education Research and Practice*, 10: 227–232.
- Seery M.K. and Donnelly, R. (2012) "The implementation of pre-lecture resources to reduce in-class cognitive load: A case study for higher education chemistry", *British Journal of Educational Technology*, 43(4): 667–677.
- Sirhan, G., Gray, C., Johnstone, A.H. and Reid, N. (1999) "Preparing the mind of the learner", *University Chemistry Education*, 3(2): 43–46.
- Sirhan, G. and Reid, N. (2001) "Preparing the mind of the learner: Part 2", *University Chemistry Education*, 5: 52–58.
- Slunt, K.M. and Giancarlo, L.C. (2004) "Student-centered learning: a comparison of two different methods of instruction", *Journal of Chemical Education*, 81(7): 985–988.
- Sweller, J. and Chandler, P. (1991) "Evidence for cognitive load theory", *Cognition and Instruction*, 8(4): 351–362.

Teaching Fellowship 2011–2012 Dissemination

Outputs, Papers, Presentations

See also <http://www.dit.ie/lttc/projects/institutionalprojects/teachingfellowships/>

Kate Shanahan: School of Media

As part of the DIT Fellowship programme, an overview of the project was provided at the Teaching Fellowships Launch on 29 September 2011 at DIT Mount Street. Updates of work in progress were also given through the LTTTC website, at the Showcase in DIT Cathal Brugha St on 11 January 2012 and as part of a College presentation on 6 March 2012 in DIT Kevin St.

Tim Stott, Mary Ann Bolger, Niamh Ann Kelly and Noel Fitzpatrick: School of Art Design and Printing

As part of the DIT Fellowship programme, an overview of the project was provided at the Teaching Fellowships Launch on 29 September 2011 at DIT Mount Street. Updates of work in progress were also given through the LTTTC website and at the Showcase on 11 January 2012.

Rosie Hand: School of Marketing

As part of the DIT Fellowship programme, an update of work in progress was given through the LTTTC website, at the Showcase in DIT Cathal Brugha St on 11 January 2012 and as part of a College presentation on 8 December in Aungier St.

Dan Shanahan: School of Accounting and Finance

As part of the DIT Fellowship programme, an overview of the project was provided at the Teaching Fellowships Launch on 29 September 2011 at DIT Mount Street. Updates of work in progress were also given through the LTTTC website, at the Showcase in DIT Cathal Brugha St on 11 January 2012 and as part of a College presentation on 8 December in Aungier St.

Daire Hooper: School of Management

As part of the DIT Fellowship programme, an overview of the project was given in Aungier St on 23 September 2010. Updates of work in progress were also given through the LTTTC website, at the Showcase on 12 January 2011 and as part of a College presentation on 24 November 2011. Recommendations based on the research work were provided at the DIT Management Forum on 10 May 2011.

Eimear Fallon, Terry Prendergast and Stephen Walsh: School of Real Estate and Construction Economics

As part of the DIT Fellowship programme, an overview of the project was provided at the Teaching Fellowships Launch on 29 September 2011 at DIT Mount Street. Updates of work in progress were also given through the LTTTC website, at the Showcase in DIT Cathal Brugha St on 11 January 2012 and on, as part of a College presentation on 3 November in DIT Bolton St.

The preliminary results of the project research were presented at the Special Session on Innovation in Learning and Teaching Practice, Council of Heads of Built Environment (CHOBE) Annual Conference Birmingham, England, April 2012. This was part of the international Association of Schools of Construction Annual Conference.

The project team has submitted an abstract of the research for consideration by the Learning Innovation Network (LIN) for presentation at its Annual Conference in October 2012.

Ruairi Hayden and Fiacra McDonnell: School of Construction

As part of the DIT Fellowship programme, an overview of the project was provided at the Teaching Fellowships Launch on 29 September 2011 at DIT Mount Street. Updates of work in progress were also given through the LTTTC website, at the Showcase in DIT Cathal Brugha St on 11 January 2012 and as part of a College presentation on 3 November in DIT Bolton St

Blathnaid Sheridan: School of Mathematical Sciences – WIP 6 March

As part of the DIT Fellowship programme, an overview of the project was provided at the Teaching Fellowships Launch on 29 September 2012 at DIT Mount Street. Updates of work in progress were also given through the LTTTC website, at the Showcase in DIT Cathal Brugha St on 11 January 2012 and as part of a College presentation on 6 March in DIT Kevin St.

Claire McDonnell, Christine O'Connor and Sarah Rawe: School of Chemical and Pharmaceutical Sciences

As part of the DIT Fellowship programme, an overview of the project was provided at the Teaching Fellowships Launch on 29 September 2011 at DIT Mount Street. The presentation "*Scaffolding for cognitive overload using pre-lecture e-resources (SCOPE) for first year chemistry undergraduates*", was given at the DIT Annual Showcase of Teaching and Learning Innovations on 11 January 2012.

Updates of work in progress were also given through the LTTTC website and as part of a College presentation on 6 March in DIT Kevin St. The presentation "Learner experiences of online pre-lecture resources for an introductory undergraduate chemistry course", was also given at the Biennial Conference on Chemistry Education, Pennsylvania State University, 29 July to 2 August 2012.

Appendices



Appendix A

EoL Strategic Fellowship Projects 2011/12

- drawing upon and contributing to the findings from the DIT's own data and national and international data and best practice as appropriate. During 2011/2012 it is expected that at least one Teaching Fellowship in each College would focus upon Broadening the Curriculum

	First Year Curriculum	Assessment and Feedback	Student Engagement and Retention	Curriculum Development
Modularisation	Projects in this cell would focus on curriculum reform – facilitated by our modular structure – to assist commencing students change their learning strategies to meet the expectations of HE.	Projects in this cell would consider the impact and potential of modularisation on assessment with particular attention to with the pedagogical potential of formative assessment as a way to limit the overall summative assessment load and to provide feedback to students on their learning.	Projects in this cell would address the way in which the DIT modular structure could be used to redesign delivery of programmes and/or curriculum design in a way that would be responsive to those factors contributing to retention.	Projects in this cell would use the modular structure to design programmes and to use teaching and assessment methods that would encourage student participation and engagement in their learning.
Diversity	Projects in this cell would explore and compare different strategies to support learner engagement within the first year of undergraduate programmes.	Projects in this cell would focus upon the diversification of assessments and the use of "non-traditional" assessments as a way to provide effective feedback to students on their learning.	Projects in this cell would focus upon the use of strategies to include, engage and retain non-traditional students within existing programmes	Projects in this cell would develop creative ways to use the DIT modular structure to address the needs of non-traditional students.
eLearning	Projects in this cell would make use of online resources to encourage active learning and information literacy among first year students.	Projects in this cell would leverage technology to support innovative assessment practices and to provide timely and appropriate feedback to students.	Projects in this cell would aim to improve student retention through the use of eLearning technologies.	Projects in this cell would focus on the use of eLearning technologies to engage students and motivate them to more active learning.

Appendix B

DRHEA Enhancement of Learning Teaching Fellowship Projects 2011/2012

Evaluation and Feedback

1. How did you first become aware that the DIT was establishing Faculty Teaching Fellowships in each Faculty, e.g. did you see them advertised, word of mouth, etc.?

- word of mouth: 2
- by e-mail/advert: 1
- both email/WoM: 2

2. How did you become a Teaching Fellow for your College, e.g. were you nominated to apply, did you submit the application form when you saw the call, etc? Please indicate how.

- nominated: 0
- Applied when saw call: 5

3. How did you feel this application process worked for you? How might it be improved if there is another call for College Teaching Fellowships next year?

- It has been a productive and useful process. Notification of award was late with regards to commencement of teaching for that semester. Hence organising the students with regards to our particular project was rushed as a result. Overall, the application process worked well enough for me in terms of submission of the form. However, I do feel that I must make the point that the announcements of Teaching Fellows came quite late in the day for me personally. My initiative was a Semester 1 project which needed to have begun before Week 1 of term and I feel that I could have better prepared for the project if I had been told about the fellowship well in advance of the beginning of term – even during the Supplemental exams would have given more time to prepare. However, I can understand the time constraints involved and also that this would only be an issue for fellows who had a Semester 1 project.
- The application form was clear but the time it took to receive notification of the decision of the panel considering the applications caused some difficulties. My colleagues and I had committed to another project in the intervening period and that meant that we had to postpone most of the teaching fellowship work until Semester 2.
- The process worked wonderfully well for me and I received full cooperation and support from L & T and the School of Ac and fin. The application process worked well. I was well prepared in that I have a strong area of pedagogical research which I wanted to extend and this was the perfect vehicle for that.
- The process was so complex/long that I nearly did not complete it.
- Very good. An interview process might be good also, as the word count was limiting on the written application. Worked well for me.

4a. How important was the money in you being able to undertake your fellowship research?

- 4 very important
- 0 quite important
- 0 not important but it helped
- 0 didn't make any difference
- 0 don't know

4b. What of the following best describes how you used your Fellowship money? (tick all that apply)

- 3 Buy out of hours
- 3 Buy equipment/resources for the project, etc.
- 2 Disseminate findings at a conference, etc.
- 1 Other please specify

Part of my research was introduction of student-assisted tutorials. The tutors were paid for using Fellowship money and, as the initiative was rolled out for three different Schools in the College (and hence payment would be needed from three different areas), it would have been very difficult to run the project without funding from this source.

5a. A Teaching Fellowship launch, the DIT Showcase event, a series of three lunchtime College sessions and a slot in the management forum session have been organised as a way to support and promote your Fellowship work within the DIT. Have you attended these sessions? Yes/No. If yes, which ones?

Yes: 5 No: 0

- I attended all of the sessions.
- I attended the Showcase and the lunchtime session in my own college.
- I attended three of the four initial presentations. Bolton St Interim Presentation. Showcase in Cathal Brugha St, the launch, showcase, and lunchtime sessions in Aungier St and Kevin St,

5b. How useful have these been to you and how might they be improved in any subsequent years?

- Found all sessions most useful. I did find that they were useful in terms of finding out where everyone else was with their project.
- Times and dates for these sessions often (very often) clashed with my teaching timetable and so I was unable to attend many others.
- I found them very useful. In particular I found the supportive atmosphere of the L & T most helpful.
- The launch and showcase were very useful – to prompt us to plan/reflect on progress and find out about the other projects.
- The lunchtime sessions provided some useful feedback from those who attended but were not well-attended. This could be addressed by shortening the session time to one hour and letting people know that they are welcome to come for 30 minutes and then leave.

5c. Have seminars, workshops, presentations been organised in your dept as a way to also promote the work? Yes/No. If yes, please outline here.

Yes: 1 No: 4

- I have organised a course of communication training for a small group of highly apprehensive students. Our School organises lunchtime seminars for visiting lecturers, industry experts, etc. ... I could have presented my material here and it would have been a great way to outline my project to others in my area who are unaware of it at present. However, due to a clash with the Teaching Fellowship sessions, this did not come to fruition. However, I hope to present early next year!

6. Support from the LTTC staff has been made available to help you plan/implement your Fellowship project write up your report. What kind of support have you found most useful so far and what kind of additional support would you like for the next stage of your work?

- I felt the support from LTTC staff was available whenever I wished to call on it. Initial feedback on our implementation plan was very helpful as was the feedback from LTTC staff at the lunchtime session. Some support with dissemination would be helpful in the coming months – advice on suitable journals/conferences and some feedback on draft papers if LTTC staff had time to read them.
- The most useful support was the facilitation of focus groups for which I was very grateful.
- We sought advice on web platforms and found LTTC staff very helpful. Web support via Ken Lacey was great! He was always on the end of the phone with a happy voice! Also, having completed the MA in Higher Ed. in the LTTC, I feel better prepared to carry out this kind of project to enhance my own teaching and to reflect appropriately upon it.

7a. Has being a teaching fellow for your College been as you expected? Yes/no

Yes: 5 No: 0

7b. if no, in what way?

8. Any other comments you would like to make about the continuation of the Fellowships, or the Fellowships more generally?

- I found it a very positive experience both from a personal and professional point of view.
- I'd suggest one Fellowship per college once external funding has ceased. The HOLD position in my college has not been held by anyone since last September. This makes administering Fellowship applications locally, etc., difficult.
- Overall a great experience to have been involved with. The staff involved are excellent, give great advice and are always on hand to with good ideas for where your research can go.
- We experienced major problems accessing agreed funding (for expenses already incurred and signed off.) which cast a shadow over the entire experience.

Appendix C

The Digital Media Entrepreneurship Pilot: Course Outline

Pre-Requisite Modules Code(s)	Co-Requisite Modules Code(s)	ECTS Credits	Module Code	Module Title	NQAI Level
	NONE	5		Media Entrepreneurship	

Module Author: Kate Shanahan

Module Description

This cross-disciplinary course will introduce students to both entrepreneurship and new business models for media. Topics covered will include entrepreneurship, how new technologies are changing the media landscape, case-study analysis of news, communication, and digital start-ups, multi-media story-telling, finding a niche, monetising content, preparing a business plan, marketing advertising and PR, changing role of media marketing, looking for finance, pitching to investors.

Module Aim

The aim is to introduce students to models of digital media entrepreneurship and by using a cross-disciplinary approach to help them combine skill sets which would enable them to understand and develop new media start-ups.

Learning Outcomes

On successful completion of the module, the students will be able to:

- identify, analyse and evaluate the changes in the digital media industry
- compare and contrast the characteristics of the various technologies underpinning these changes
- demonstrate how to tap into the entrepreneurial mindset
- learn how to conceptualise and pitch ideas
- distinguish between the various roles within an interdisciplinary digital media team
- become aware of where they can place themselves in the cross-over between journalism, gaming and entertainment.

Learning and Teaching Methods

Students will work in small interdisciplinary teams to develop and pitch ideas for sustainable digital media ventures. They will look at case-studies, work with business mentors and do a series of pitches as their ideas/prototypes are developed. Students will be expected to develop independence in, and responsibility for, their own learning.

Module Content

- Digital Skill-building
- Journalism
- Games
- PR
- Social and Digital Media Technologies
- Media Production
- Multi-media Story-telling
- Developing and Prototyping Ideas
- Setting up a Business in Ireland
- Developing a Business Plan, Marketing, PR and Financing
- Copyright Issues
- Pitching Ideas
- Showcasing to Industry

Module Assessment

Continuous assessment will comprise 100% of the marks for this module. Assessment will be made in the form of a group project where students generate and develop an idea to solve a media-related problem. Deliverables will include a development log, presentation and a reflective analysis and report.

