



SALERO

Report on Postgraduate Research and Training Programme Development

SALERO Deliverable 11.2.2



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Author(s) and company: C. Pritchard, B. O'Neill, D. Campbell (DIT)

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1 Executive Summary

Based on the findings of SALERO deliverable D11.2.1, a more detailed approach to a DIT doctoral training framework has been defined. It has emerged that existing online learning environments and security measures in partner institutions are disparate in nature and would be difficult to integrate into a workable solution.

A further study of online learning tools has been undertaken in conjunction with the Technology Learning Team in DIT and suitable Web 2.0 tools have been implemented and tested to provide a solution which will be used to deliver pilot elements of a selected module from the transferable skills component of the proposed doctoral training framework.

It is proposed to develop, deliver and evaluate these elements in the course of 2009 and an implementation plan is outlined in 5.2 below.

2 Introduction

2.1 Purpose of this Document

Based on an analysis of European doctoral programmes, described in D11.2.1, the main focus of the current period is the construction of a framework model for a new doctoral programme, built upon the expertise of the consortium partners, since a collaborative environment will be implemented and tested with the SALERO academic partners.

This document outlines DIT's approach to building a doctoral training framework built around the doctoral thesis and a structured delivery programme consisting of: professional development plan, research methodologies, discipline-specific skills and transferable skills. It also considers how a module of the transferable skills component might be developed, delivered and tested in the context of the SALERO partnership.

2.2 Scope of this Document

The scope of this document is to outline a framework for doctoral training based on the European model outlined in SALERO deliverable D11.2.1.

Having established the framework, a review of current web tools is undertaken in order to identify suitable components for delivery of a transferable skills pilot module in Entrepreneurship and Commercialisation.

It is the ambition of this work package to develop an appropriate collaborative learning environment which is not constrained by the course management delivery systems which each partner institution has developed independently and which are adapted to suit local needs.

2.3 Status of this Document

This is the final version of D11.2.2

2.4 Related Documents

Before reading this document it is recommended to be familiar with the following documents:

- D11.2.1 Report on Postgraduate Research and Training Programme Development (June 2007)

3 Doctoral Training Model

3.1 Introduction

The SALERO project WP11 related to training involves three main tasks, researcher exchanges, professional training, and postgraduate research programme development. This report updates DIT's activities in the third aspect, namely postgraduate research programme development. The purpose of this report is fourfold: a) it reviews progress to date in the development of DIT's doctoral education framework; b) examines a number of models for implementing early stage researcher training in European research networks; c) the report reviews a number of different technology platforms for delivery of doctoral training; and d) proposes a pilot programme of doctoral training to take place in 2009.

3.2 DIT Doctoral Training Framework

Previous reports have outlined the policy framework and background to the development of structured doctoral training in Europe and initiatives on the part of Dublin Institute of Technology in relation to same. DIT has now sought to consolidate its institutional approach to doctoral and early stage researcher training, elements of which may be useful for deployment within SALERO for the purpose of developing new models of researcher training at a European level.

DIT in 2007 established a Graduate School to encompass all activities of researcher training and education. Following national policy and international trends, many higher education institutions (HEIs) are accepting that a graduate school mechanism is required in order to enrich the training of PhD candidates while simultaneously maintaining the quality of our awards. Ireland's *Strategy for Science, Technology and Innovation 2006 - 2013*¹ suggests that graduate schools can deliver:

- Quality-led training of early stage researchers in multi-disciplinary environments;
- Structured, relevant generic and transferable professional skills training enabling PhD students to produced to develop their careers in diverse sectors of the economy, including intellectual property management and commercialisation skills;
- Industrial placements and modular, transferable postgraduate courses, both practical and theory-based with built-in industrial expertise, and;
- Further training for industrial researchers requiring skills/knowledge upgrading.

Ireland's Higher Education Authority (HEA) has endorsed the Salzburg Declaration of ten basic principles underpinning best practice in doctoral education as developed by the European University Association (EUA). Under the auspices of its Graduate School, DIT is in the process of validating an Institute-wide graduate research education programme (GREP) which will address the principles of the Salzburg Declaration. The aim is to develop holistic programmes to broaden and create depth in the education and training of doctoral students such that each graduate will:

- complete their specialised research project and obtain quality postgraduate awards
- simultaneously develop a range of technical and transferable skills
- develop competencies in interdisciplinary research environments utilizable by industry and the professions

¹ <http://www.entemp.ie/science/technology/sciencestrategy.htm>

Graduate Research Education Programme (GREP)

The GREP programme will typically take a maximum of 4 years to complete and the model proposed for DIT is shown in Figure 1.

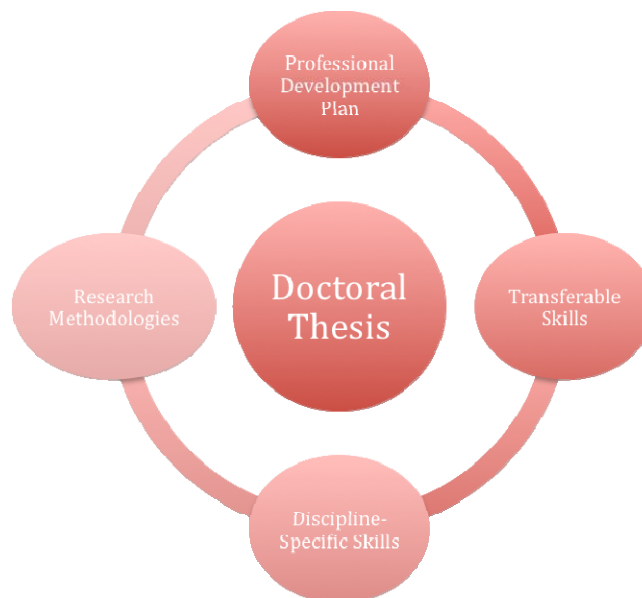


Figure 1: Proposed DIT GREP Model

The distinct elements of the programme include the following:

- a) *Doctoral Thesis* – The doctoral thesis remains the cornerstone of the programme and the principal focus of activity for the early stage researcher and the supervising team. Examination of the thesis also remains the principle basis on which the doctorate is awarded. Where students avail of or may be required to take specific training modules, these do not form part of the assessment or the basis for the award.
- b) *Professional Development Plans* – In order to ensure that the provision of skills training modules reflect the needs of individual early stage researchers, a Professional Development Plan is integrated within the programme and acts as an annual learning contract completed by the researcher and the supervising team to identify training needs, and establish targets and proposed outcomes.
- c) *Discipline-Specific Skills* – Doctoral awards encompass breadth and depth of knowledge and discipline specific skills. While doctoral education schemes vary in terms of how training within the discipline is provided, it is assumed that a high level of expertise in the area of research is attained. The National Qualifications Authority of Ireland (NQA) in its National Framework of Qualifications defines the doctoral award (Level 10) in the following way:
 - Knowledge – breadth: A systematic acquisition and understanding of a substantial body of knowledge which is at the forefront of a field of learning.
 - Knowledge – kind: The creation and interpretation of new knowledge, through original research, or other advanced scholarship, of a quality to satisfy review by peers.
 - Know-how and skill range: Demonstrate a significant range of the principal skills, techniques, tools, practices and/or materials which are associated with a field of learning; develop new skills, techniques, tools, practices and/or materials.
 - Know-how and skill-selectivity: Respond to abstract problems that expand and redefine existing procedural knowledge.
 - Competence – context: Exercise personal responsibility and work in a largely autonomous fashion
 - Initiative in complex and unpredictable situations, in professional or equivalent contexts.
 - Competence – role: Communicate results of research and innovation to peers engage in critical dialogue, lead and originate complex social processes.
 - Competence – learning to learn: Learn to critique the broader implications of applying knowledge to particular contexts.

- Competence – insight: Scrutinise and reflect on social norms and relationships and lead action to change them.²
- d) *Transferable Skills* – A significant benefit of structured doctoral training programmes is the ability to provide early stage researchers with a broad range of transferable skills that enhance career preparation and management in addition to performance within the PhD programme. Typically, the skillsets include the following range:
- Research Skills and Awareness
 - Ethics and Social Understanding
 - Communication Skills (including inter-cultural)
 - Personal effectiveness and development
 - Team-working and leadership
 - Career Management
 - Entrepreneurship and Research Commercialisation

ECTS Framework

It should be noted that, as a further development from D11.2.1, Ireland is in the process of implementing a structured doctoral programme framework based on four years of research effort and credit accumulation to a total of 360 ECTS for the award of PhD. This equates to an average of 90 ECTS per annum and therefore represents a change to the previous framework proposal in D11.2.1.

Since the PhD thesis remains the basis on which the award is made, 270 ECTS are obtained on successfully completing the PhD viva voce examination. 90 ECTS are accumulated through successful completion of a range of modules involving discipline-specific, generic and transferable skills. A suggested breakdown of 90 ECTS with the DIT programme for skills training is as follows:

10 ECTS	Research and Professional Development Planning
20 ECTS	Successful Annual Evaluations and progress in research, conference presentations, publications.
30 ECTS	Discipline Specific skills training
30 ECTS	Transferable and Generic skills training (6 x 5 ECTS)

Transferable skills modules comprise units totalling 5 ECTS each and are offered in a block, intensive form during different stages of the academic year. Choices of modules are governed by the researcher's needs, the training needs analysis conducted as part of Research and Professional Development Planning, and as advised by the researcher's supervisory team.

² <http://www.nqai.ie/>

Indicative Modules are presented below:

Year	Transferable Skills (30 ECTS - 5 ECTS each)	Discipline-Specific Skills training (30 ECTS)	Research and Professional Development Planning + Annual Evaluation (30 ECTS)
Year 1	Research Skills and Awareness Ethics and Social Understanding Communication Skills		Research and Professional Development Planning Annual Presentation
Year 2	Personal effectiveness and development Team-working and leadership Entrepreneurship and Innovation		Conference Presentations Annual Presentation
Year 3	Career Management		Publications
Year 4	Submission and Examination of PhD thesis (total of 270 ECTS)		

4 eLearning and Blended Learning Delivery of Training Modules

4.1 Computer-Assisted and Blended Learning Approaches

Blended learning refers to learning and teaching approaches which contain a mixture of online activities and face-to-face activities. VLEs, virtual learning environments, are typically used to support blended learning.

A number of different approaches exist for adapting blended learning techniques which may prove useful for consideration of delivery of researcher training material in the context of the SALERO network. Some of the typical approaches include:

a) Blending of course components: A course of study is likely to be made up of a mixture of face-to-face sessions and online activities. The proportion of each varies tremendously from course to course. In this form of blending, individual activities are either entirely face-to-face or entirely online. So there may be a lecture, followed by an online discussion, followed by a practical, followed by use of online materials.

b) Blending of physical and virtual (location blending): An online activity is traditionally thought to be designed for individual use off-campus, at home. However, online activities are sometimes used within a class session with the tutor present. Some online activities are carried out by groups of students in campus study areas ("learning spaces"). The educational activity can therefore itself be a mixture of face-to-face communication and discussion and use of online materials, information and communication. The learning activity is in itself blended. It can mix location, both physical and virtual.

c) Blending of resources: E-learning offers unique opportunities to bring together resources from different sources. Access to external resources and to those created locally by the tutor can be integrated; course tutors can work as teams and share resources more readily using learning technologies. Students use each other as resources, asking for help; this is of course done face-to-face but also online; probably both.

The range and variety of learning resources available to students carrying out study tasks is a mixture of digital, physical and human resources, accessed by face-to-face or online methods or a mixture of both. The benefits of adopting a blended learning approach include the fact that on-line learning allows students to learn at their own pace and in their own time, that students assume responsibility for their own learning, and importantly in this context, that communities of learners in dispersed locations and networks can access and undergo a common learning experience, using technology to exchange experience and learn from each other.

VLE (virtual learning environment) refers to the entire collection of e-learning tools and software available to staff and students. Much of the current use of e-learning has been driven and created in a rather staff-centered way. Indeed the popular packages (Blackboard and WebCT) are very much staff-centered in the way they operate. Everything is organised by courses and requires tutor input. Generally, there is very little scope for students to work on their own initiative across course boundaries, and set up discussions or post materials without having to ask a tutor to set this up for them.

4.2 Learning Technology Platforms

Members of the Salero team at DIT, in conjunction with the Learning Technology Team³ have investigated different modes of delivery and a variety of different platforms suitable for use in blended and distance modes of collaborative learning that may be suitable for use in the context of a pilot module for this project. A number of different methods and technology solutions have been considered including the *WebCT platform* widely in use in DIT and in other higher education institutions; *Live Classroom* which adds interactive and conferencing features to a virtual learning environment; and *Podcasting* as an accessible and low cost solution to make multimedia content widely available.

³ <http://ltt.dit.ie/>

There is now an extraordinary array of technology solutions available to higher education for enhancing learning delivery. Among the challenges faced by higher education providers is a wide range of new options to assist in learning delivery, augmented by a variety of communication and collaborative tools, as well as increasing demands from end users who are driving the technology use in higher education. As noted in the Gartner Industry Research review: 'Students are leading the change in many ways through the adoption of Internet-related phenomena such as social software, user-generated media and the continued use of consumer IT devices. Professors, too, are beginning to discover the benefits of this technology in teaching and learning.'⁴

Among the technologies currently gaining popularity within higher education and increasingly being adopted within traditional delivery systems are the following

a) Social learning platforms whereby traditional learning management systems (LMSs) and learning content management systems (LCMSs) are being augmented with social software features to support informal as well as structured learning activities. Social learning platforms give learners the ability to interact with peers in their social network and be able to reach beyond their network to reach other trusted sources of information; and engage in experience-based, learning exercises.

b) Virtual Environments/Virtual Worlds: online environments which allow participants to be immersed in a three-dimensional representation of a virtual space are also increasingly finding an application in higher education. While there are technical and cost limitations, there is strong potential to create rich learning experiences, particularly in dispersed collaborative situations.

c) Podcasting Learning Content – Using RSS for distribution of recorded content is a popular and accessible solution for building a repository of e-learning content and distributing that content in a low cost way. Podcasts are being incorporated into other technologies, including social software technologies and learning management tools with video, audio and other multimedia capabilities.

The use of podcasts in university settings have been a notable feature of extending access to e-learning content. Podcasts enable 'ubiquitous learning whereby students can access a variety of educational material anywhere, anytime on iPods, MP3 players or desktop computers.'⁵ Podcasts facilitate anytime, anywhere learning. Students can access material in their own time and typically listen to podcasts at home or while travelling. While in some instances, traditional lectures are being replaced by audio podcasts, the ability to incorporate video and multimedia content is a beneficial and important development of the technology but involves further production complications beyond the traditional audio podcast.

4.3 Proposed Collaborative Learning Model

The collaborative learning platform proposed for the pilot module will consist of two components:

- content delivery system
- virtual workshop tutorial environment

It was clear from discussions with partners that implementing a system that interfaced with local online learning environments would be extremely difficult, given the range of software used in the different institutions and the security systems employed.

In consultation with the DIT Learning Technology Team, a number of Web 2.0 tools were evaluated and the following combination was selected for a pilot module delivery, to be implemented in 2009. Podcasting was chosen as the content delivery vehicle because it does not rely on implementation into a VLE system and is easily accessible to all postgraduate students. In addition, it is easily delivered in both desktop and mobile versions. Apple's **Podcast Producer** was chosen because it provides a complete end-to-end solution for encoding, publishing and distributing high-quality podcasts, and a complete system has been installed and tested in the Digital Media Centre.

For the virtual workshop environment, Horizon-WIMBA's **Live Classroom** (web-conferencing software) was selected and a license for 25 seats is currently supported by the Learning Technology Team. Features supported include:

⁴ Gartner Industry Research *Hype Cycle for Higher Education, 2008*, p.4 <http://www.gartner.com/DisplayDocument?id=709014>

⁵ Laurel Evelyn Dyson, 'The Role of Podcasts in Students' Learning', *International Journal of Interactive Mobile Technologies (IJIM)*, Vol 2, No 3 (2008)

- Multi-way audio and video
- Whiteboarding
- Application sharing
- Classroom archiving (podcasts)

These two products will allow a full archive of the module content and subsequent discussion/tutorial sessions for subsequent retrieval by any of the participants.

5 Pilot for Entrepreneurship and Research Commercialisation

5.1 Module Description

A proposal highlighted in deliverable D11.2.1 was the intention to implement a pilot module within the SALERO network for the purposes of developing researcher training as part of a graduate skills programme and to use the opportunity to test different approaches and technology platforms for the delivery of transferable skills.

The pilot module proposed is provisionally titled “Entrepreneurship and Research Commercialisation.” It draws on DIT’s experience of providing training and mentoring to researchers in the areas of commercialization, advice on start up companies, innovation, IP policy, and bringing research outcomes to market. The objective of this pilot module will be to provide researcher participants with a foundation in the principles of entrepreneurship and an appreciation of the issues involved in processes of commercialization. The module introduces key concepts and strategies, draw on case studies and provide learners with an opportunity to develop test cases based on their own experience. It will provide participants with best practices in protecting IP, preparing marketing materials, finding licensees, negotiating licences and/or planning to start a business to profit from research. The module will be offered to a community of learners drawn from the doctoral programme in DIT and partners interested in participating within SALERO. It will be offered as a series of small pilot sessions in the course of 2009, using the collaborative environment discussed in the previous section.

Indicative content of the module is as follows:

1. Collaborative Research Agreements – Agreeing who owns what, how to protect and commercialise the IP before you start.
2. Research Outputs – Influencing beyond the academic community. Have you really got something to commercialise? So What? Who Cares?
3. Market Research – Sources? Finding First Clients?
4. Is it Patentable? Patenting strategies: What’s New – What is the real invention? How big a territory: national, European, world-wide?
5. Marketing Scientific Research – Explain your invention so it gets noticed - Create an exciting Flyer.
6. The YouTube Generation – How to create an exciting video for your invention.
7. Commercialisation Routes? Contract Research, Consulting, Licence, Start-up or Joint Venture?
8. Plan to commercialisation

5.2 Proposed Implementation Plan

The work to be undertaken in the final year of the project is as follows:

- test collaborative environment platform with partners
- specify module structure and pilot content
- develop content and produce podcasts
- test internally and test with partners
- seminars/workshops using Live Classroom
- evaluation and reporting

6 Conclusion

A collaborative environment based on Web 2.0 tools has been implemented and tested and will provide the basis for the delivery and evaluation of components of a pilot module in Entrepreneurship and Research Commercialisation to be tested by consortium partners.

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8 Glossary

Partner Acronyms

AM	Activa Multimedia, ES
BLITZ	Blitz Games, UK
DIT	Dublin Institute of Technology, IE
DTS	Digital Theatre Systems, UK
FBM-UPF	Fundació Universitat Pompeu Fabra, ES
GVG	Grass Valley Germany, DE
JRS	JOANNEUM RESEARCH Forschungsgesellschaft mbH, AT
LFUI	Leopold-Franzenz Universität Innsbruck, AT
PGP	Pepper's Ghost Productions Ltd., UK
TAIK	Taideteollinen Korkeakoulu, FI
UG	University of Glasgow, UK
UPF	Universitat Pompeu Fabra, ES
URL	Universitat Ramon Llull, ES