

Handbook of Enquiry and Problem-based Learning: Irish Case Studies and International Perspectives

Terry Barrett
Iain Mac Labhrainn
Helen Fallon (Editors)

AISHE READINGS
Number 2
2005

AISHE


National University of Ireland, Galway
Ollscoil na bÉireann, Gaillimh

HEA
Higher Education Authority
An tÚdarás um Ard-Oideachas

Editors: Barrett, T., Mac Labhrainn, I., Fallon, H.

Publisher: CELT, NUI Galway
Centre for Excellence in Learning and Teaching
NUI, Galway
Galway
Ireland

In association with the All Ireland Society for Higher Education (AISHE)

Email: celt@nuigalway.ie

Website: www.nuigalway.ie/celt/pblbook

(cc) 2005 Released under Creative Commons Attribution-Non-Commercial-Share-Alike 2.0 licence

ISBN-10: 0-9551698-0-1

ISBN-13: 978-0-9551698-0-9

Recommended citation: Barrett, T., Mac Labhrainn, I., Fallon, H. (Eds) *Handbook of Enquiry and Problem-based Learning*. Galway: AISHE and CELT, NUI Galway

Funded by: Higher Education Authority (HEA) *Strategic Initiatives*

Cover design by: Brenda Dermody.

A C K N O W L E D G M E N T S

The twenty-eight authors for their time, energy, commitment and willingness to share their work in enquiry and Problem-based Learning.

The Centre for Excellence in Learning and Teaching (CELT), NUI Galway for managing this publication.

The Higher Education Authority (HEA) for funding the PPEBL project on which this publication is based.

Dr. Ivan Gibson of NUI, Galway for initiating the project with his original funding application in 2002 and Michelle Bradley for organising the Conference on PPEBL in 2003 in which this community of practitioners was first able to share ideas and best practice.

Brenda Dermody for her creativity and professionalism with the book cover design and Jacinta McLoughlin, Dublin Dental School & Hospital, T.C.D, Martin McCabe and Helen Lamb, Dublin Institute of Technology for their photographs.

Christina McDonald Legg for her extraordinary skills in proof-reading, layout and diplomacy.

E D I T O R S

Terry Barrett, terry.barrett@ucd.ie, TerryBarrett500@hotmail.com

Terry Barrett works as a Lecturer in Education Development at the Centre for Teaching and Learning, School of Education and Lifelong Learning, University College Dublin. She also works as a consultant education developer and researcher specialising in Problem-based Learning. Previously she was Programme Leader of the Postgraduate Diploma in Third Level Learning and Teaching at the Dublin Institute of Technology, and Lecturer in Education Studies at Dublin City University. She is currently finishing her doctoral thesis entitled “Lecturers as problem-based learners: illuminative concepts for understanding the lived experience of PBL.” Her experience of PBL is as a student, a tutor, a course designer, a programme leader, an education developer and a researcher. She has given keynote papers on Problem-based Learning at conferences in Ireland, England and Finland. She is particularly interested in PBL as a way of combining academic rigour with enjoyment in learning.

Iain Mac Labhrainn, iain.maclaren@nuigalway.ie

Iain Mac Labhrainn is the Director of NUI, Galway's Centre for Excellence in Learning and Teaching (CELT), which was established in 2002/2003. He is originally an astrophysicist and lectured in Physics for 15 years before moving completely over to educational development. He has a particular interest in the educational evaluation of learning technologies. In his current post he has supported a wide range of learning innovations, including Enquiry and Problem-based Learning. This handbook is part of the PPEBL (Project, Problem and Enquiry-Based Learning) initiative funded by the HEA (Targeted initiatives) that he and colleagues co-ordinated.

Helen Fallon, helen.b.fallon@nuim.ie

Helen Fallon is Deputy Librarian at the National University of Ireland Maynooth. Her MA thesis on gender and the internet was published as *WOW: Women on the Web*, by Women's Education Research and Resources Centre (WERRC), UCD. She has contributed chapters to a number of books and published papers on library-related topics in both library and adult education journals. She developed a keen interest in African literature, during a two-year period lecturing at the University of Sierra Leone and has written extensively on this topic. She has published short stories and has had other creative writing broadcast on BBC Radio 4, BBC World Service and Irish national radio. She is interested in supporting enquiry and Problem-based Learning initiatives through the development of students' information literacy and the potential of these initiatives for developing student creativity.

F O R E W O R D

The purpose of this handbook is fourfold. Firstly, drawing on Irish case studies and international perspectives, it seeks to encourage the enhancement of the student experience of learning, through the development of problem and Enquiry-based Learning. Secondly, it aims to share success stories while painting a realistic picture of the processes involved:

“Thought flows in terms of stories - stories about events, stories about people, and stories about intentions and achievements. The best teachers are the best storytellers. We learn in the form of stories.” *Frank Smith*

It does this by discussing progress with initiatives and exploring difficulties, barriers, “mistakes,” improvements, alongside the strategies used to tackle these real emerging challenges. Thirdly, by drawing on many contributions from Ireland, it places Irish problem and enquiry-based practice in the international context. There are case studies from the seven Irish universities and the Dublin Institute of Technology. These case studies make links with international practice and there are also contributing chapters from England and Finland. These case studies are from a range of disciplines including; science (biology, physics and earth sciences), health sciences (occupational therapy, speech and language therapy and dentistry), engineering, business, law, education, arts (English literature and visual communications). Finally, this handbook aims to strengthen collegiality and help develop a collective approach to tackling common educational issues across Ireland and beyond.

The handbook is aimed at academic staff, both those who are considering introducing problem or Enquiry-based Learning strategies for the first time and those who are developing these initiatives on an on-going basis. Researchers and students on postgraduate courses in learning and teaching will also find the handbook informative, as will librarians supporting information skills training programmes for problem and Enquiry-based Learning.

Our focus is on *students learning* rather than *teachers teaching*. As Oscar Wilde reminds us:

“It is well to remember from time to time that nothing that is worth knowing can be taught.”

Problem and Enquiry-based Learning are multifaceted in nature. Problem-based Learning and Enquiry-based Learning are not mere teaching techniques but rather total educational strategies. Thus, this handbook is presented in eight sections, each of which deals with different aspects:

- Section 1 - Understanding Enquiry and Problem-based Learning
- Section 2 - Designing Enquiry and Problem-based Learning
- Section 3 - Tutoring Enquiry and Problem-based Learning
- Section 4 - Assessing Student Learning
- Section 5 - Listening to Students’ Experiences
- Section 6 - Bridging Education and the World of Work
- Section 7 - Developing, Supporting and Managing Learning Initiatives
- Section 8 - Reviewing and Researching Learning Initiatives

This publication arose from the PPEBL (Project, Problem and Enquiry-Based Learning) initiative at NUI, Galway that was funded under the HEA’s Targeted Initiatives scheme and by the Centre for Excellence in Learning & Teaching (CELT). PPEBL has, by many measures, been a great success, providing the basis for new learning initiatives across a range of academic disciplines, an international conference and video-based training materials. We are very

grateful to the HEA for their support and hope that we have added significant value to the original proposal by widely disseminating our experience and materials across the entire Irish HE sector. We have also benefited greatly from the recent development of the Education Developers' Network (EDIN) and its strengthening of collegiality and cooperation.

It is hoped that this handbook will contribute to the development of high-quality, engaging, challenging, and enjoyable problem and Enquiry-based Learning opportunities for our students.

Terry Barrett,
University College Dublin and Education Development Consultant

Iain Mac Labhrainn,
Director of the Centre for Excellence in Learning & Teaching (CELT)
NUI, Galway

Helen Fallon,
Deputy Librarian
NUI, Maynooth

(Editors)

C O P Y R I G H T

Original Works

The separate and original works comprising this collection are subject to copyright by their individual authors. The aggregation of the works into the collection and all ancillary original works are copyright by the editors. All these original works are made available under the Creative Commons ¹Attribution-Non-Commercial-Share Alike 2.0 licence.

Informally, this means that you are free:

- to copy, distribute, display, and perform the work
- to make derivative works

under the following conditions:

Attribution

You must give the original author(s) credit.

Noncommercial

You may not use this work for commercial purposes.

Share Alike

If you alter, transform, or build upon this work, you may distribute the resulting work only under a licence identical to this one.

Note:

- All other rights are reserved by the copyright holders.
- For any reuse or distribution, you must make clear to others the licence terms of the work(s).
- Any of these conditions can be waived if you get permission from the relevant copyright holder(s).
- Your fair dealing and other rights are in no way affected by the above.
- This is an *informal*, human-readable summary of the licence terms, which has no force in its own right. The legal terms of the licence are determined solely by the Legal Code (the full licence).²

Third Party Copyright Works

All usage of third party copyright works in this collection, by way of quotation or otherwise, is done in good faith under the “fair dealing” and/or “incidental inclusion” provisions of the Irish Copyrights Act 2000³, sections 51 and 52. Any specific query in relation to such usage should be referred to the individual author(s).

¹ <http://creativecommons.org/>

² <http://creativecommons.org/licenses/by-nc-sa/2.0/legalcode>

³ <http://www.irishstatutebook.ie/ZZA28Y2000.html>

C O N T E N T S

Section 1: Understanding Enquiry and Problem-based Learning

- 1. Understanding Enquiry-based Learning (EBL)**
Peter Kahn and Karen O'Rourke 1
- 2. Understanding Problem-based Learning (PBL)**
Terry Barrett 13

Section 2: Designing Enquiry and Problem-based Learning

- 3. Designing Projects for Learning**
Ivan Gibson 27
- 4. The Evolution from Problem Solving to Problem-based Learning: A Case Study of Earth Sciences at University College Cork**
Bettie Higgs 37
- 5. Designing a Hybrid PBL course: A Case study of First Year Computer Science at NUI, Maynooth**
Jackie O'Kelly 45
- 6. Designing a Problem-based Learning (PBL) Module: A Case Study of a Speech and Language Therapy Module at Trinity College Dublin**
Margaret Leahy and Irene Walshe 55

Section 3: Tutoring Enquiry and Problem-based Learning

- 7. Tutoring Project-based Learning: A Case Study of a Third Year Software Engineering Module at NUI Maynooth**
Declan Delaney and George Mitchell 65
- 8. Tutors' Experience of Introducing Problem-based Learning to Non-traditional Students on the Higher Diploma in Nursing Studies (Gerontology) at NUI, Galway**
Ann O'Kelly and Phil Noone 77

Section 4: Assessing Student Learning

- 9. Assessment Strategies for Enquiry and Problem-based Learning**
Ranald MacDonald 85
- 10. Assessing Project-based learning: A Case Study of an Undergraduate Selling and Management of Sales Module at the University of Limerick**
Conor Carroll 95
- 11. Assessing Problem-based Learning: A Case Study of a Physics Problem-based Learning Course**
Brian Bowe 103

Section 5: Listening to Students' Experiences

- 12. Lecturers' Experience as Problem-based Learners: Learning as Hard Fun**
Terry Barrett 113
- 13. Postgraduate Nursing Students' Experience of Enquiry-based Learning at NUI Galway**
Siobhan Smyth 125

Section 6: Linking Education to the World of Work

- 14. Design Education for the World of Work: A Case Study of a Problem-based Learning (PBL) Approach to Design Education at Dublin Institute of Technology (DIT)**
Brenda Duggan and Brenda Dermody 137
- 15. Continuing Professional Development of Occupational Therapists: A Case Study of Problem-based Learning in Work**
Deirdre Connolly 147

Section 7: Developing, Supporting and Managing Learning Initiatives

- 16. Using Technology to Support Project and Problem-based Learning**
Roisin Donnelly 157
- 17. Developing Student Information Literacy Skills to Support Project and Problem-based Learning**
Ellen Breen and Helen Fallon 179
- 18. Coordinating and Managing PBL Programmes: Challenges and Strategies**
Jacinta McLoughlin 189

Section 8: Reviewing and Researching Learning Initiatives

- 19. Reviewing PBL Together: A Case study of a PBL Programme in the Faculty of Veterinary Medicine, University College Dublin**
Deirdre Campion and Geraldine O'Neill 197
- 20. Researching Lecturers' Perceptions of Problem-based Learning (PBL)**
Alison Clancy 207
- 21. Probell: A Finnish Problem-based Learning (PBL) Research Network**
Esa Poikela and Sari Poikela 217