

# Opening the Door to Third Level Education for Women

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## Abstract

*This paper discusses a model that worked successfully at Lettekenny Institute of Technology (LYIT) to encourage mature women to enter third level education for the first time. Funding provided by Funded by the Worker's Education Association's (WEA) Opportunities for Women Learning (OWL) Project enabled this to be run on a part time basis for the academic year 2006-2007. The design of the course and lessons learned during this initial pilot of the program are discussed here. While this initiative focused on the subject area of computing, and on the experience in this Irish college, the model is equally applicable to other countries.*

## Introduction

The percentage of female students who take up full time computing courses is extremely low, a situation that exists both nationally (Meehan, 2003; Meehan, McCusker, 2002) and internationally (Black et al, 2005). Anything which helps to redress this balance will be beneficial, especially as the numbers of students applying for computing courses as a whole is undergoing a dip at present. At the same time, an investigation into providers of ECDL and similar courses suggests that women who take these courses often desire to progress in this area. While the ECDL market is well catered for, at present there is little or no progression from these popular courses, and no bridge between these courses and third level courses. Recent employment problems especially for women in the textile industry who left school early to work, often for economic reasons, suggest an availability of women with academic ability that was never realised.

The Certificate in Science in Computing course was developed at LYIT to provide a route into third level for these women, and at the same time improve the gender balance on LYIT's computing degree. This course ran initially from September 2006 to June 2007 as a pilot. This paper discusses the decisions made during the design of this course and lessons learned during this initial pilot. This one semester course in level six computing skills for mature women leads to a minor award., with progression onto the second semester of the level 7 BSc in Computing with Business Applications. Although Access courses, which give a taster of several subject areas, have been running for some time, the approach here is innovative in that it targets a particular subject area and women who, prior to taking this course, have not considered third level study at all. As this is a huge change for the learners, the entire emphasis of the course is on nurturing and building the confidence of the students in a supportive environment in order to give them the skills, confidence and motivation to progress, if they wish to, to full time third level education. Funding provided by the Worker's Education Association's (WEA) Opportunities for Women Learning (OWL) Project was considered a key factor in its success. Section two discusses the design of the course in more detail. A blended approach to e-learning supported course delivery, and is covered in section three. Section four discusses the experience of running this course during its first pilot year and the final section summarises factors that contributed to its success.

## Design of the Course

The target group for this course are mature women who have not previously considered undertaking third level education. The course aims to offer these women a realistic experience of studying computing at third level which will enable them to make an informed decision if third level study is for them, and if it is, then if Computing is the subject they wish to study. The modules of the course are shown in Table 1.

Table 1: Modules on the course

Module	Credits
Introduction to Programming	10
Computing Skills	5
Social Computing	5
Study Skills	5
Computing Environment	5

To ensure progression, the course has similar learning outcomes to those on common Computing first semester at LYIT for topics such as Programming, Mathematics, Computer Architecture and Operating Systems. Unlike the full time common first year at LYIT, these women enter the course with ECDL or equivalent computing skills, so these did not have to be taught on this course, giving scope to gear the course to their particular needs. It is well accepted within the computer science community that first year students find programming difficult. McCracken et al (McCracken 2001) point out that a major stumbling block is the level of abstraction need to determine exactly what problem is to be solved from the description given.[McCracken et al, 2001]. To help with this, the Programming module was doubled to 10 credits and given double teaching time.

### ***Teaching and Learning***

As students on this course had been out of education for a number of years, the aim was to raise their self confidence and skills to a level where they felt up to the challenge of taking on an undergraduate degree program. To help with this the Study Skills module incorporated self-development and time management. It was important to ensure that this first experience of college was a positive one. Only if they achieved success and enjoyed the learning process could they continue and extend their new found skills. This required delivering the course content in small achievable chunks, that also inter-related to the other modules. All the lecturers on the course met regularly to co-ordinate progress and to ensure that the learning experience of the students was both coherent and positive. It was also considered important for their self confidence that these students did not become dependent on their lecturers but took responsibility for their own learning.

The nature of computing subjects needed special consideration as O’Kelly (2005) points out previous school experience means that students

*“often approach learning as a task in which they memorise, store and reproduce information. This type of learning, commonly called ‘surface learning’, is not a suitable learning strategy in computer science”.*

In contrast,

*“A major skill that is required in Computing is the ability to solve problems: understand what is required, design an approach and algorithm to solve this problem, then implement this in a particular programming language.” (Kelly 05)*

This is a much larger set of skills than merely recalling the rules or syntax of a particular programming language. In addition, within the computing industry this is usually in a team based setting where co-operation with others is an essential part of this development of design and implementation. Problem-based Learning (PBL) was used on this course as Duch et al [Duch 2001] show that this approach addresses the ability to:

- Think critically
- Analyse and solve complex, real-world problems
- Work cooperatively in teams and small groups
- Demonstrate versatile and effective communication skills, both verbal and written

The approach taken here is similar to that of O’Kelly (O’Kelly, 2004; O’Kelly, 2005; O’Kelly, Gibson, 2005) where the problems are designed by the lecturer and based around specific learning outcomes, yet still allow some flexibility in finding a solution so that each group of students may arrive at slightly different solutions. It is important that students feel empowered and responsible for their own part in this process, while the lecturers have a role more as coach and facilitator, rather than as expert directing exactly what to do. These problem based learning sessions started after the initial phase of building the necessary skills and self confidence.

Cohoon’s (Cohoon 01) recommendations include the following to enhance the learning experience of female computing students

- promote interaction among classmates
- develop learning communities and other forms of peer support
- foster peer support among female computing students
- mentor undergraduates
- communicate positive opinions of female student’s strengths

The delivery of the course aimed to implement these recommendations as much as possible.

## ***Experience by Other Educators***

The decision to offer the course only to women was in keeping with the desire to improve the gender balance. It was also found to be beneficial in itself, as was found in courses run at other institutions. The Edinburgh Women's Training Course (EWTC) is a woman-only IT training programme which seeks to enable unemployed women living in disadvantaged circumstances to enter the labour market or further / higher education.

*"the training is women-only so as to provide a supportive and safe environment for trainees who, because of their circumstances, generally do not believe in themselves much."*

This was extremely successful. A SIGIS report on this course by Wendy Faulkner and Tine Kleif in 2003 reports:

*"The merit of women-only training is a key theme in this case study."* (Kleif, Tine, Faulkner, 2003)

Another course examined was the International Women's Degree Program in Computer Science or Internationaler Frauenstudiengang Informatik (IFI) at the university in Bremen in Germany. This is a single gender program that offers places to 30 women each year. This course is one of 4 single gender courses in Germany, and is very successful with between 60-90 women applying each year for these 30 places.

## ***Blended Approach to Support Learning***

The WebCT Learning Environment was used to provide supportive e-learning in a blended approach. This encouraged students to actively participate in the course, and enabled them to take part in it while off campus. As the use of elearning tools was new to the women, the course began with an extended induction, showing how to access material on-line, how to take part in quizzes, send emails to the class, individual students and the lecturer, and take part in group discussions. This process was essential to allow the women to make best use of their time and to give them a measure of autonomy over their own learning which was vital for their self esteem.

WebCT proved to be a very useful tool, although there was considerable work for the lecturers involved to put their material in a form suitable for home study. It needed to be divided into manageable chunks which are easy to download and clear to students using it on their own, without lecturer support. A subset of the range of WebCT features is used as including all facilities could be confusing or intimidating. The features highlighted below were core to the delivery of the course.

### **Calendar**

This option provided a schedule for the duration of the course indicating holidays, assignment dates and topics to be covered during each session.

### **My Grades**

This option allowed students to check their assignment results. This also allowed students to keep their results confidential.

### **Course Notes**

All handouts and practical exercises/solutions issued during the course

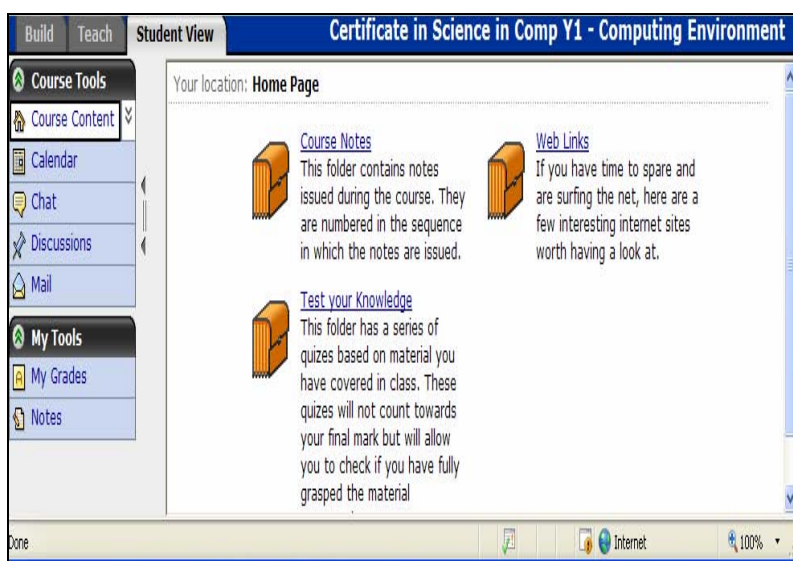


Figure 1. - Student view after accessing a subject on WebCT

### ***Formative Assessment***

A number of formative assessments helped build the women's confidence in material delivered previously. The assessments are shown on Figure 1. by the folder entitled "Test your Knowledge". Students used these assessments both during and after class to check their grasp of content delivered and to highlight areas that they personally needed to focus on. WebCT provides reports on how these were used, and showed in the initial pilot that for the twenty six assessments in the Computing Environment module, students on average attempted each assessment four times. They continued to use these resources at home as they were accessible over the internet. The nature of the mature women's group meant that students sometimes had to miss classes due to family commitments, yet they could still access their notes online and be confident that they understood the material by completing the associated formative assessment.

Whenever students did grasp topics they then requested, and were provided with, further assessments in the same area. This was required since the students lacked self confidence and needed further confirmation that they understood the topic and were not just recalling the answers to the first question set.

### ***Discussion Boards***

In addition to email for communication, students had access to a discussion board. All students read these messages even though only about 50% of the students contributed. This helped engender a sense of community within the class as students shared views ranging from the academic to the frivolous.

### ***First Pilot Year***

The course was offered part time, six hours per week for 24 weeks and three Saturdays, and ran on Monday and Wednesday evenings from 7.00pm - 10.00pm. The course was assessed using a mixture of informal interviews and by questionnaire giving both qualitative and quantitative feedback. A major factor in its success was the Funding given by the Worker's Education Association (WEA)'s Opportunities for Women Learning (OWL) Project, which meant the applicants did not have course fees and also had child and elder care, and travel expenses. This ensured that the course was available to anyone who was eligible, rather than only those who could afford it. This was felt to be important as women questioned said that before they experienced the course and realized the opportunities it gave them, they would not have used the household budget for themselves, preferring to focus spending on their families. As the course is open to all women with ECDL or equivalent and an interest in computing, no interviews were held. The response to the course was overwhelming, so eligible applications were taken on a first come basis. Enquiries about the course have continued during the year, and the successful information evening for next year indicates that this level of interest within the county has been sustained.

In spite of being largely self selecting, these students had a higher retention rate than other equivalent classes, and higher marks when tested on similar computing tests than full time first semester students. Their confidence in their ability to study at third level, largely absent at the beginning, grew steadily and towards the end of the course, all women were enthusiastic and confident about progressing to full time study at degree level. While there was an initial expected drop-out from the course, the remaining fourteen students continued to attend regularly and participated fully in the course. All of the women entered the course feeling unsure about their ability to progress to full time third level study, and some even expressed doubt concerning their ability to complete the course, and a few required lengthy discussions and encouragement to even apply. A serious difficulty for many was entering the college for the first time, so the initial information evening was kept as friendly and informal as possible. Everyone who phoned or dropped in and wanted to discuss the course further was seen individually and shown round the college to allay their fears which were either evident, expressed or both. This took a lot of time, but was felt to be important.

From the first week, the confidence of these women grew visibly. By the second half of the course all except one woman expressed the confident desire to progress to study further at third on Computing courses. The exception was a woman who had not been considering third level previously who now decided to take up a Law degree. The timescale for their planned return to study varied, with some wishing to do so immediately, and others waiting until children were older, or other financial measures were in place. Fourteen students completed the course and the conferring held in June was a celebration of their achievement. Discussions with these successful students indicate that their lives and those of their families have been changed as a result of taking this course. A summary of the evaluation questionnaires is given in Table 2. The students were asked to evaluate various aspects of the course with 4 being the highest score representing "Very good".

*Table 2: Summary of Questionnaire Results*

Course	4
Clarity of the course objectives	3
The degree to which the course met learning needs	4
The flexibility of the tutor to meet learning needs	4
The tutor's skill and knowledge	4
The pace of the learning	3
The amount of feedback you received during the course	4
The way the tutor encouraged you to join in	4
The quality of the learning materials you were given	4
The information given about other courses available	4
The venue	4

### ***Conclusion***

The course was considered successful as the confidence and enthusiasm of the women who took part in it increased visibly during the course. At the beginning of the course many of these learners expressed concern about their ability to even finish the course, yet by the end all of them said they were interested in progressing to study at degree level. The majority put their names down for the Computing with Business degree course, although for some financial and family reasons were cited as reasons for postponing this decision, and one student decided to apply for a degree in another discipline. The change for the learner from attending an evening class in ECDL to studying full time at Letterkenny Institute of Technology is a huge one both in time commitment and depth of study. To facilitate this the following points were inherent in the success of this course:

- 1) The whole ethos of the course was on confidence and esteem building. Taking up study at third level a huge change for these women so a lot of encouragement and support was needed during this process to ensure they were fully equipped for further academic study should they desire this.
- 2) The course began with an extended induction, where students were shown how to use the on-line facilities for accessing materials, and to undertake group discussions.
- 3) Students were expected to spend some of their time participating in on-line tasks. This encouraged the students' ability to take responsibility for their own learning as well as developing confidence and proficiency in using an online tool. WebCT was found to be useful for this purpose, but any online learning system which provides similar facilities could be used.
- 4) The learning outcomes of the programming, mathematics, architecture and operating systems aspects of the course were close to those from the first semester of the common Computing first semester at LYIT to enable progression. Comparison of enthusiasm and marks gained by full time students on similar computing tests revealed much higher averages for the women on this course.

Overall the pilot was found to be intensive of staff time and commitment but also an extremely rewarding experience. As with any new course, preparing material is most time consuming during the first year. The students considered that taking this course was extremely beneficial, both for the door it opened for them into third level, and also for their own personal development.

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