

Structured Electives in Computer Science

Introduction

I have been examining elective choice by students and the development of elective provision by Schools, disciplines and Programmes. I believe that there is a need for the development of a structured suite of electives in a number of areas.

In the area of Computer Science, it is the stated intention of Government to improve literacy in Information Technology and to create indigenous high-tech industries, particularly in the IT area, and having a greater participation in Computing modules would be an important element of this strategy. In this context, "Computing" refers to a range of IT skills, technical complexity and applications, from Web page design and implementation and user interface design to the more traditional computer programming skills in standard programming languages.

My idea is that a number of suites of structured elective modules in Computer Science would be offered to non-Computer Science students. One such suite would consist of modules on computer programming that would be of particular interest to students in other Science subjects and Engineering subjects. Another suite would comprise modules on Web design and management, which would be of interest to all non-Computer Science students.

Computer Programming for the Sciences

For students, graduates and professionals in the Sciences and Engineering, the computer has become an indispensable tool. Many complex software packages exist to carry out much of the modelling and analysis of various problems and solutions. However, there remains a need for custom-built software, tailored exactly to satisfy the particular requirements of the situation at hand. Even where software systems exist, there may be a need for these to be programmed to better handle particular problems.

One area of research I am examining is the demand for and provision of a suite

of structured electives in programming for undergraduate students in the Sciences and Engineering. An outline of such a suite is the following:

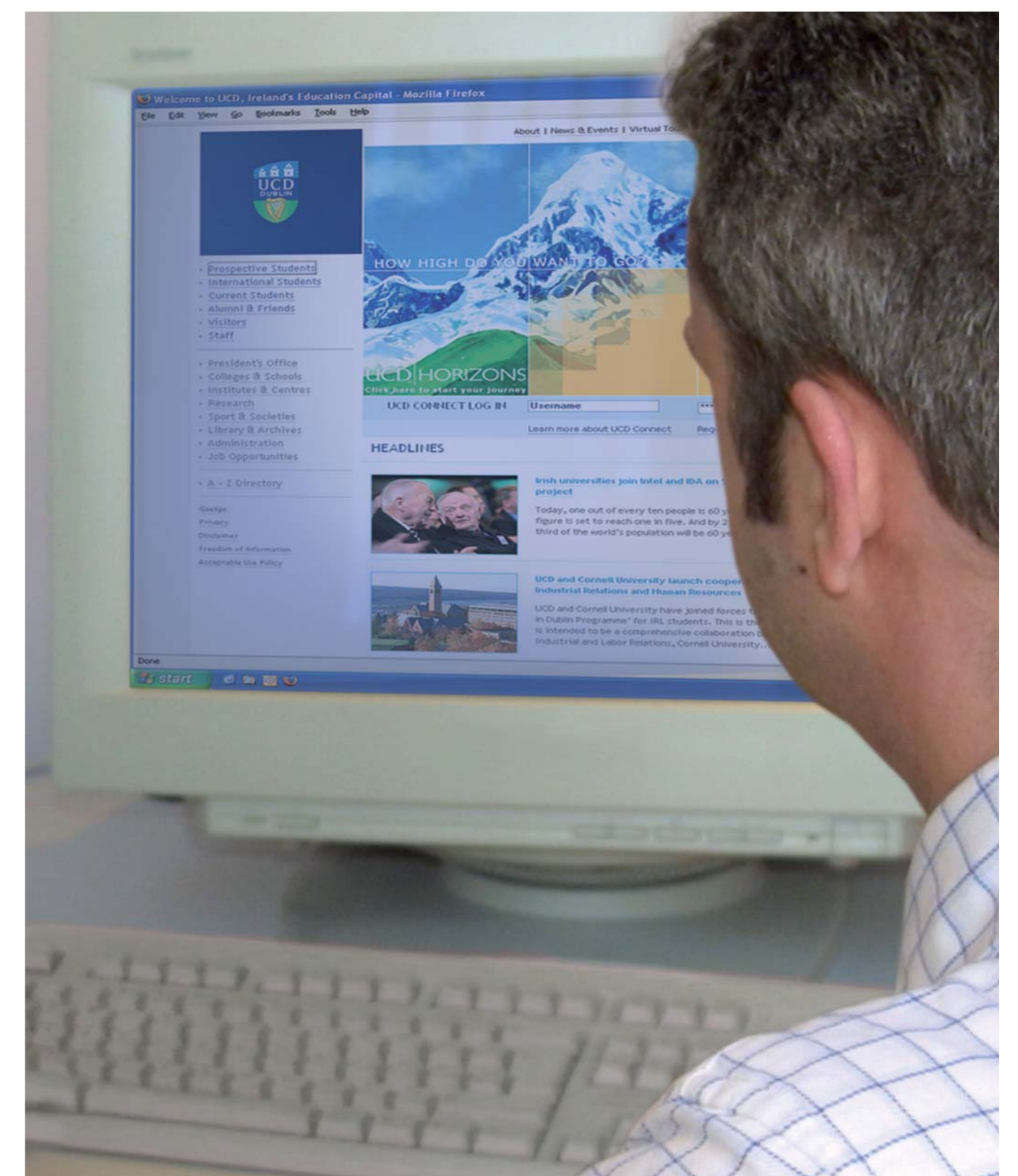
- Introduction to Programming (two modules)
- Data Structures and Algorithms (two modules)
- Object-Oriented Programming
- User Interface Design
- MathLab

Website Design and Management

With the popularity of the Internet, particularly since the advent of the World-Wide Web, and the consequent need for individuals and companies to have a "cyber-presence", accessible via the Web, there has been an increased emphasis on the development of Websites that present information, showcase and help market products and services and act as portals for sales and e-Commerce.

Another area of research in this project is the examination of the provision of a suite of structured electives on Website Design and Management. This research will involve discussions on the computing requirements of their respective disciplines with a number of colleagues in Schools in the College of Engineering, Mathematical and Physical Sciences, as well as in Schools in the Colleges of Arts, Human Sciences and Business and Law; co-operation with them and others on a suite of electives, developed collaboratively, would be an exciting addition to undergraduate and postgraduate degree programmes. Such a suite might include modules on such topics as the following:

- Introduction to Website Design and Management
- Introduction to Web Multimedia
- Provision and management of Web services
- Introduction to e-Commerce
- Website security
- Website Programming



Future phases

The emphasis in the first phase of this project will be on the development of Computer Science modules for the two suites of modules outlined above. In a future phase, there will be research into a suite of modules on Computational Science. I have already had discussions with colleagues in my own School and in the School of Mathematical Sciences on the provision of modules in the areas of Numerical Computing; the development of a structured set of electives in the area of Computational Science would be a natural development of this. These would be of interest, not only in my own School and the School of Mathematical Sciences, but also in other Physical Sciences, Engineering and Life Sciences Schools. As well as such modules being part of various undergraduate programmes, it would be the case that they would feed into taught postgraduate and structured PhD programmes, thus helping in the development of fourth-level programmes, an important element of the University's Education Strategy.

Future phases will examine suites of structured electives in areas such as Humanities Computing, Business and Law.