
Cross-curricular IT tools

for university students: developing an effective model

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Information technology is now recognized as a key study-enhancement measure in higher education, and there is increasing demand for the provision of basic IT awareness and skills across the whole range of subject departments. One response to this demand is the central provision of a generic IT course or programme of courses. We draw upon the experience of such courses at the Universities of Glasgow and York to identify some of the significant dimensions in the development and operation of generic IT programmes. These include the policy context, the structure, content and educational stance of the programme, relationship of the programme to existing curricula, and the extent and nature of resourcing, assessment and certification. Operation of such courses raises important issues, such as questions of compulsory IT preparation, study skills, staff development, standardization, institutional policy and evaluation. This discussion is set within current trends in higher education.

Introduction

Enabling students to make effective use of study opportunities is an increasingly important element in consideration of university resource provision. Universities are expected to identify the added value which higher education represents, both to public funding bodies and to clients, whether students, parents or employers. Maximizing study potential can facilitate, as well as demonstrate, the added value which higher education offers. Quality assurance processes have also increased the focus on the climate and provision of support for study. And in a more robust climate of competition, provision of study-enhancing measures may be part of an institutional profile which will attract students of the best quality.

Information Technology is recognized as a key study-enhancement measure, and there is increasing demand, from both students themselves and from their subject departments, for provision of basic IT awareness and skills. The main reasons for this are the perceptions that IT skills can enhance both the student's study effectiveness and ability to participate in subject activities, and that general IT confidence is a factor in a student's potential value to employers. This paper will consider one form of response to the demand.

IT and study enhancement in higher education

Awareness of a possible need for 'computer literacy' in higher education is not a new one. During the 1960s, mainframe computers became well-established in universities, carrying out a variety of functions, and concerns about undergraduate preparation for computer use culminated in the Barnard Report of 1970 with its emphatic central recommendation: 'We have no hesitation [. . .] in advising that all undergraduates should be taught computing' (UGC/CBURC, 1970, p. 5). Yet as an endorsement of computer literacy, Barnard made little practical impact. McDonough suggests some of the reasons:

The main reason was lack of finance, though there were other important causes. Mainframe computing was not ideally suited to undergraduate use with its demand for large numbers of simultaneously active terminals. The lack of educational software was a major disincentive in humanities departments in the University. The lack of experience of many members of staff in these departments in using computers was also a major obstacle. (McDonough, 1986, 113)

Neither the mass access to computing which the microcomputer was to offer, nor the plethora of easily-used and powerful applications programs currently taken for granted, were available, so that computer literacy in practice meant simple computer science plus computer programming – not an easy package to offer (especially as it included a substantial time commitment) to undergraduates or their teachers.

It is only over the last decade that IT has become a major element in the general study environment in higher education. First, it has become a powerful personal tool. Thus, word-processing of study-related documents is now common enough to be taken for granted, and in many courses has been made compulsory. Second, the elaboration of networks, which has enabled email to become a routine facility, has also provided the ability to access data from distant sources. Most students now consult university library catalogues electronically; many access local course material; a growing number search for material on the World Wide Web, or download files from other sources. Third, CAL has become a normal part of the study material available to the student. Significant here are initiatives such as TLTP (in the UK) and technical developments such as authoring systems and multimedia environments. And fourth, easily usable computers bearing relevant software are widely available to students, with a growing proportion of the student body owning a computer.

For the past decade, the focus of cross-curricular IT in higher education has tended to be on CAL, and much has taken place in this area. Provision of basic IT capabilities has tended to occur within subject departments. However, this results in an inevitable variation across the university, both in terms of the level and breadth of IT capabilities addressed, and hardware and software used. And a focus on departmental IT requirements can result in provision which is narrowly based and may overlook basic competences, such as managing files or copying data between applications, or to a recipe approach where students can implement a list of button-clicks but have no mental map of the system they are using. For departments which provide a general grounding in IT, there is a heavy price to pay in terms of resource provision. This sometimes results in expensive anomalies where senior staff spend hours teaching students the simplest features of computer use.

In a small number of institutions, notable achievements were made in student IT

preparation in the 1980s. For instance, at Exeter University the Pallas project was established in 1984, with CTI funding, to provide computer training and support in the Faculty of Arts, and has continued to develop since then (Buckett, 1985, 1991; Dobson and Kinrade, 1990). At Glasgow University, the DISH project was established in 1985, also with CTI funding, based on a consortium of the University's History departments (Trainor, 1986, 1988). In Durham University, a Computer Literacy Programme was established, with Enterprise in Higher Education funding (later from TLTP), to operate across the whole University (McCartan, 1990; Preece and Adcock, 1990).

A growing number of institutions have become aware that they need an IT strategy envisaging not only a university-wide computing environment (i.e. hardware and software), but also a university-wide approach to IT preparation of students, especially in respect of generic IT tools which they may employ irrespective of departmental affiliation. Generic IT preparation removes the burden of basic tuition from departmental staff while enabling them to focus on providing the additional IT requirements specific to study within the department. This approach is feasible because it is now possible to focus on generic tools rather than on Computer Science Made Simple, a characteristic of earlier approaches to 'computer literacy' which could give courses the appearance of unrelated bolt-on additions to subject modules (see, for example, Gardner, 1990).

Contexts of provision

The authors of this paper have been involved in providing cross-curricular IT preparation programmes for the last two years at the Universities of Glasgow and York respectively. Comparison of our experiences suggests that the following areas are central to discussion of the effectiveness of IT or Information Skills preparation programmes:

Policy context

In what policy environment do programmes develop?

The Glasgow programme arose directly out of the University's IT Strategy development. Included in the strategy document, approved in the Spring of 1993, was provision for a 'University-wide Introductory Course in IT' for undergraduates. The ILIAD (Information Literacy in All Departments) at York was soon linked into the University's IT Policy. Hodgson *et al* (1995, 79-85) identify three approaches to IT-skills provision: localized, where isolated courses are available in a variety of places and forms; institutional, where a computer literacy programme is available centrally for all students; and integrated, where IT-skills provision is integrated into degree courses. Institutional commitment is required for the two latter approaches, and both York and Glasgow display elements of both: the provision is centrally funded and organized, but is integrated, to degrees chosen by departments, into the curriculum.

Resource context

What resources are available and how are they provided?

Resource levels will determine the extent of the programme. At York, 500 students will pass through the programme in the current academic year (1996-7), while at Glasgow something over 4,000 are expected, building up from 700 in 1994-5 and 2,800 in 1995-6. Resourcing in terms of staff, finance and equipment may be provided centrally, as in

Glasgow and York, or devolved to departments. External resourcing may also be sought through sponsorship (as at York) or project funding (as, for instance, at Durham). We would suggest that central funding is most likely to produce an IT-literate student body. Devolved resource control may result in a legitimate focus on the limited range of IT competences needed for successful completion of modules offered by a department and perpetuate differentiation of IT competence across the university. Centralized funding at Glasgow has enabled the integrity of a broadly-based (in IT terms) course to be maintained; indeed, the broad base of the course has generally been supported by departments. Their attitudes might have been different if departmental funds had to be handed over directly for IT courses, rather than indirectly through the top-slicing mechanism.

Programme context

How broadly conceived are the aims of the programmes? Do they focus on mastering particular applications, or are they related to students' study requirements?

The latter has been the case both at York and Glasgow and, we would suggest, is the approach likely to be most successful. The central feature of the Glasgow programme is the IT Baseline, a group of generic competences which are set as an expectation for all students to achieve across the University, and which are seen as a broad base both for students' own study activities and for subject-focused IT-based work within departments. At York, the ILIAD programme sets IT within the context of information-handling skills.

Do programmes make provision for students with differing levels of existing IT competence?

At Glasgow initial courses address three levels of existing competence, but for each the intended outcome is the Baseline package of competences. At York a customized programme for Science students has been developed to take account of prior knowledge.

Curricular context

Are programmes limited to generic IT skills (as at Glasgow and York) or do they overlap with IT provision within departments or with degree modules with significant IT content? Are generic IT course units integrated within subject curricula?

At Glasgow several levels of integration are possible, ranging from a course offered on a voluntary basis to any student outside his or her subjects studied, to the same course offered as an integral and compulsory part of a subject module. There are assessment implications here, since fully integrated units may carry weight in module assessment.

Delivery context

How are course units delivered? Are they taught (as at Glasgow and York), or delivered through self-study packages, as is the case at many institutions. Is a distance-learning mode available?

We would suggest that a taught course is most appropriate for the majority of students who require IT preparation, but that for those who are already confident with IT, a non-taught route may be suitable. The current expansion in distance learning raises questions in this area, particularly whether mixed-mode or distance-only courses can be developed.

How are course units assessed?

Our experience would indicate that the most effective assessment plan in this area is one which includes both assessed tasks within the IT course and tasks related to students' subject studies.

Is there a form of certification?

At Glasgow and York the provision of a locally-based certificate clearly stating what has been achieved has been found to be a worthwhile incentive or bonus to many students. There is little demand for this to be tied into national structures.

Implications

A number of significant issues are raised by the introduction of IT preparation programmes:

Institutional policy

Considering an IT preparation programme poses the question of whether the institution has an IT strategy, and what model of student-IT needs underlies it. As Hodgson *et al* (1995, 85) show, on the basis of a survey of several institutions, and as our own experience confirms, appropriate decision-making at this level is crucial. A generic student preparation programme has so many implications that it can be carried forward effectively only as a central element of institutional policy.

Compulsory IT preparation

Is there a case for compulsory IT preparation of students, coupled perhaps with assessment of IT capabilities on entry to university?

This would seem the most comprehensive way of achieving an IT-literate student population, but it involves both will and resource commitment. At Glasgow and York, a large number of departments are prepared to require achievement of the IT Baseline from first-year students, and this requirement may in the future be enforced by some faculties. The resource issue is closely linked, since increasing the numbers of IT-literate students, and raising the expectation by departments of IT use by students, implies the provision of sufficient IT resources to satisfy demand. This issue, and its implications, have still to be fully grasped.

Study skills

Offering an IT preparation programme raises the broader issue of study-skills preparation for those students who need them. The ILIAD programme at York includes study-skills elements, and at Glasgow it is possible to take a course unit integrating IT with basic study skills. But in both York and Glasgow there is an emphasis on selecting appropriate IT tools for study tasks, rather than on technical competence alone. This in turn raises the issue of the locus of provision of such courses. It seems anomalous for courses focused on student study needs, IT or otherwise, to be offered by university computing services. At York, the programme is offered in collaboration with the University Library; at Glasgow, by the University's IT Office, which is responsible for IT strategy across the University. However, one could suggest that the most appropriate locus might be a special unit focused on student preparation for study.

Staff development

There are major staff development issues in providing large-scale IT literacy programmes.

Staff need to be made aware of, and empowered to deal with, the increased range of teaching strategies which student IT literacy enables, and also of the expectations which IT-literate students may have of staff. While TLTP has been very significant in introducing both awareness of and opportunities for developing CAL material for use within teaching, and while many institutions have CAL development and support units, developing general staff awareness and routine usage of IT is a much more difficult question, which still has to be seriously grasped, since it involves both the provision of resources and education, and the sponsoring of an element of culture change.

Standardization

A university-wide programme raises the question of standardization of hardware and software environments across the university, and of providing students with a uniform basic IT capability and attitude. In a situation of increasing modularization, a requirement for standardized prerequisites for study becomes very important. Should this extend beyond individual universities? Within institutions, despite the current drift towards devolved control of resource provision, provision of cross-curricular basic competences may be an area in which provision, and funding, should be retained centrally.

Evaluation

It is important that IT preparation programmes can be shown to be addressing institutional aims and to be contributing to the overall effectiveness of the institution. Appropriate evaluation will indicate the areas of success of the programme, and will assist policy development at departmental and institutional levels.

Trends

Our observations seem to suggest three broad trends in higher education. First, there is an ongoing culture change as the implications of IT for teaching, for learning and for study empowerment are adopted into day-to-day practice, and modify what is taken for granted by both students and staff. Second, we are moving towards a situation in which universal IT competence will be a normal expectation of students, and provision will be made for all who do not display the competences and qualities deemed to be the basis for study effectiveness. And third, there may well be a limited number of effective models of such provision; we have been struck by the extent to which the programmes at York and Glasgow, initiated independently, were already converging by the time contact was made between the two.

The programmes at York and Glasgow will continue to develop, and we will report at a future date on their outcomes and on the implications for teaching and learning practices and environments, and institutional policies. In so doing we will discuss at greater length than has been possible here the issues which arise from offering such programmes, the implications following therefrom, and the general directions in which higher education is moving.

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