# Resource-based learning strategies:

## implications for students and institutions

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*This paper reports some findings from a project in implementing resource-based learning in economics, and identifies some implications for students and institutions. These include student responses to a mid-semester evaluation and the views of the project team. The latter have been informed by action research which sought to recognize students' individual differences, employ active learning methods and, above all, integrate IT into the curriculum. While innovative strategies are clearly welcomed, students show strong attachment to some traditional methods. Most of those who suggested changes to the range of activities asked for reinstatement of at least some lectures, generally as additions to existing activities. Implications include the need for students and staff to acquire a wide range of new skills, for large-scale curriculum review if new learning technologies are to be fully integrated, and the need to acknowledge that, given student and staff perceptions of change, the process may be long and costly.*

## Introduction

In its strategic plan, the University of Greenwich envisages a significant shift to resource-based learning (RBL). Enterprise in Higher Education (EHE) has funded five pilot RBL projects during the past year, including one in introductory economics. The project was managed by three lecturers in the School of Social Sciences, supported by an Academic Development Officer. Learning outcomes were completely revised, and a range of assessment strategies, including computer-based tests, was identified. A resources guide was produced which identified the materials and activities that would enable students to achieve the learning outcomes. A number of innovations were adopted, including:

• computer-based curriculum delivery, assessment, and student evaluation of the course;

• an open approach to assessment;

• abolishing lectures in favour of a diverse range of teaching and learning activities.

A mid-semester computer-based evaluation was conducted using Question Mark Designer, with the specific intention of providing data to inform future curriculum revision.

## Rationale for the adopted approach

Previous work had shown that where computer-based methods were simply 'bolted-on' to existing teaching, neither students nor lecturers used them effectively, if at all (Freeman and Wells, 1994). The team felt that to be successful, IT needed to be an integral part of the programme (including its assessment), and that continuing curriculum review was essential. Accordingly, we began by identifying the relevant knowledge, skills and concepts needed by students at an introductory level, and turned them into clearly stated learning outcomes. This work entailed staff development on the part of the three subject specialists, and hence support from the Academic Development Officer. To facilitate testing of the learning outcomes, a range of assessment strategies was identified, in which the benefits of providing students with informative and frequent feedback were recognized (see Rowntree, 1992a, 24–7, 162).

It was noted by the team that individual difference affects the way students learn (Tomlinson, 1985; Messick, 1978, vi, 300, 310); adoption of a range of teaching and learning strategies was therefore paramount. The nature of the subject and diversity of available resources made management of teaching and learning situations an important issue. Consequently, it was decided that a guide matching resources to outcomes and assessment would be an invaluable aid to students and staff.

The unit was introductory and university-wide for students taking degrees other than economics or business studies but needing a basic understanding of economics. We could not assume previous exposure to the subject, and general background varied widely. The previous project had shown that we should insure against unexpected technical problems by timetabling supervised computer workshops.

A simple numerical problem then arose. We had 90 students and the maximum group we could place in the computer laboratory was 30. Moreover, our timetable called for three consecutive teaching hours. We therefore had to divide the class into three groups of 30 and process them one at a time; the remaining innovations were driven by this and the fact that just three subject-specialist teachers were available.

We could have dropped traditional seminars; but we decided not to, so that we could discuss with the students their laboratory work and associated learning outcomes. Thus, we tacitly recognized that computer-based learning on its own could not, at least so far, achieve the outcomes of the unit.

The same constraints suggested the most radical (in a local context) innovation which we made: to abandon lectures and substitute a timetabled hour of self-directed study. We knew from the previous work mentioned above that laboratory sessions for 30 students were likely to be unmanageable unless two teachers were on hand, and in each hour one member of staff was always needed to conduct the seminar. Hence scrapping lectures was not something we set out to do for educational reasons; we simply ran out of hours and staff.

## Mid-semester evaluation

As Question Mark Designer was used as part of the programme of assessment of the students, its use for student evaluation of the course seemed both appropriate and convenient. Accordingly, the software was used to administer a mid-semester questionnaire on student

response to the course. Reaction to the computer-based activities was very positive, with 79% of respondents stating that they found them very useful as a learning aid. When asked to indicate which of the strategies they would most like retained in the unit programme, 70% cited the supervised computer workshops. Reaction to the computer-based assessments (which contributed to students' final grades) were also positive, and there was evidence to suggest that students used them as a learning device (see below).

Open assessment was welcomed by students, with 90% favouring publishing examination questions in advance. The discussion, planning, structured feedback and sharing of essay plans, which also contributed to the final grade, was regarded as very useful by 84% of respondents. However, asked what changes to the unit students would like, 94% wanted formal lectures added to the existing range of activities.

## Comment

The very positive response to computer-based activities is significant, and justifies the team's view that embedding IT into the curriculum as a means of acquiring skills and concepts is sound. However, it was noted that some students spent considerable amounts of self-directed study time on the computer activities, yet many were unable – or perhaps unwilling – to complete some of the tasks which were needed as part of the seminar programme. This suggests that students found that the additional tutor-contact gained from attending workshops supported by specialist staff was motivating, but despite extra tuition some failed to identify the role of the computer-based activities in preparing for seminars.

We had previously discovered that it was difficult to disentangle acquisition of the IT skills needed for a particular activity from understanding the economic concepts. Also, experience with computer-aided learning packages suggested that students are reluctant to use the software outside scheduled classes, partly because they find it technically and logistically difficult to do so. This, plus our strong belief that such activities need to be supervised by a subject-specialist with computer experience (Freeman *et al*, 1995), were the reasons for treating workshops as part of teaching time and staffing them with economists.

Staff scepticism about multiple-choice questions was partly dispelled by the way students used the computer-based tests as an aid to learning. It would have been possible to score 100% in the first of these tests merely by recording the feedback given by the program and entering this at the second attempt. But students did not 'cheat' in this way; instead, they repeated the test until they achieved what they regarded as a satisfactory score. These repeated attempts, the resultant improvements in scores, and the summative nature of the test, suggest that the students were motivated both to learn and succeed (see Rowntree, 1992a, 22–4). Thus the use of computers in assessment brought about a fundamental change in the relationship between the students and the test – essentially, by placing the students in control of when and how often they took it (see Laurillard, 1988, 218).

As well as the qualitative data generated by the students' evaluations, we have a substantial body of quantitative data resulting from the number, variety and frequency of assessments. Preliminary results (Wells *et al*, 1995) suggest that open assessment, even when students can explicitly practise for it, has no less power to discriminate between different levels of achievement than traditional methods (in the examination there were 16 upper seconds, 23

lower seconds, 23 thirds, 13 fails, and no firsts). In fact, comparison of results from the course essays and the students' attempts on the same topics in the examination actually shows a small decline in average performance (Table 1), thus undermining the idea that open assessments are less rigorous. Moreover, there is evidence of improvement on the part of students whose essay results were weak: of the 22 students who scored less than the median essay mark of 59, 15 did better on the same question in the examination, while of the 27 who scored 59 or more, only five improved on their essay mark (and 15 of the 27 declined by more than 10 marks).

|  | Essay | Exam |
|---|---|---|
| Mean | 59.96 | 53.73 |
| Median | 59.00 | 55.00 |

*Table 1: Comparison of results from course essays and examination*

At the first session of the unit, students were told it was resource-based and given documents including an introduction to the unit, a timetable of the weekly sessions, the intended learning outcomes, the final examination questions, and advice on how to organize their work. This amount of information was unusual for a taught unit, but was felt to be necessary if students were to be supported and guided through this new experience (see Rowntree, 1988, 11, 163). However, evaluation suggests that this provision was ineffective.

The students' desire for traditional lectures appears to be grounded in the view articulated by one student: 'What I did not like about the course is that I was expected to find out everything myself instead of being told'. An important issue here is that students wanted lectures in addition to the other resources provided, a preference for a greater emphasis on tutor-led activity clearly implying that they wanted more direction and less autonomy and control (see Rowntree, 1992b, 62). They felt that lectures would be useful for defining terms and providing an overview, reviewing relevant book chapters and identifying examination topics. Classroom experience and informal discussion with students suggest that some felt threatened by an approach which demanded not only that they become responsible for their own learning, including planning and managing their time effectively, but also that they use one set of learning opportunities (the computer workshops) to provide material for another (the seminars). Some students admitted to liking the approach, but found it strange compared to their previous experience of the institution, where the formal lecture followed by a discussion seminar was the norm. The novelty of this unit's approach might have been both an advantage – in terms of motivating students – but a disadvantage insofar as it posed a potential threat to their psychological safety.

This desire for more tutor contact rather than less has serious implications in a higher-education culture currently seeking to reduce contact time. The double-edged sword of novelty might also pose problems in an institution wanting to promote RBL. If the approach is to gain wider acceptance, then both these issues need further investigation.

## Some conclusions and observations

If the adoption of RBL is viewed as an opportunity to review the curriculum, then it may also be used as a vehicle for embedding IT into that curriculum. Our experience shows that in order

to be effective, any such activity must be appropriately supported and supervised, and the outcomes need to contribute to the final grade.

It is clear that while students may welcome some innovations, they also wish to retain traditional approaches, and that they value contact with tutors. If students perceive lectures as important and necessary, then an approach which precludes them may not be popular. An institution wishing to move towards RBL will thus need to consider these perceptions and how best to accommodate them.

Compared with more traditional approaches, and in common with open and distance learning, students and staff need a different, and wider, range of skills. If students are required to use new learning technologies, they need to be competent users of software, hardware and information, and to be able to manage their time effectively. Institution-wide use of such technologies can occur only if all undergraduates possess or have the opportunity to acquire this vast array of skills. One possible approach is a core programme in information and study skills and computer literacy for all undergraduates. An alternative – which we favour – is to embed these skills into the curriculum of all subject areas so that they become contextualized, as they did within this project.

Furthermore, our experience teaches us that staff engaged in this approach need to be able to redesign and evaluate curricula, understand new learning technologies and employ them appropriately, construct a range of learning and assessment activities to meet outcomes, design teaching and learning materials, provide tutorial support, and operate effectively in teams. While one may argue that these are the skills all teachers in higher education require, in our experience RBL makes the full range of these skills essential and not merely desirable.

This raises the issue of staff development (see Rowntree, 1992b, 260–63) Even where these skills already exist, the time required to prepare the project described above exceeded that for a standard lecture and seminar programme. Innovation is an expensive exercise (which in our case was funded by the EHE). Unless sufficient funding can be found it is unlikely that thorough and continuing curriculum review can be sustained within the current cost-cutting regime.

Further infrastructural implications include the physical design of IT facilities so as to permit discussion and other group activities in conjunction with computer work, the technical support needed to ensure that hardware is configured correctly and software operates as intended, and the training of IT support staff to play a pedagogical rather than merely technical role.

The significance and role of student feedback, while currently a popular issue and target for automation, also needs to be examined further in the light of what it revealed about our students and their views on our approach.

Finally, further investigation is needed into how an institution sets about 'mainstreaming' innovation so that it becomes the rule rather than the exception. There are, in our view, many obstacles to this, not least of which are prevailing organizational cultures. Cultural shift is a long-term goal of enormous scale, but to adopt RBL in an otherwise alien culture is likely to be unproductive, if not foolhardy.

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