The importance of cost-benefit analysis: a response

David Nicol and Michael Coen
University of Strathclyde
email: d.j.nicol@strath.ac.uk

The critique by Draper raises some interesting points that we did not have space to discuss in our published paper. As he points out, taking a purely quantitative approach to the evaluation of ICT investments in teaching and learning is wholly inappropriate. However, in this transitional period, where ICT applications are new and the effects on operational processes within higher education institutions are unknown, it is not only qualitative issues that need to be investigated but also the potential changes to the scope and nature of the costs incurred by institutions. While the small-scale, and localized, introduction of ICT in teaching might only affect the time and effort of a few individual academics, large-scale deployment of the same methodology may require substantial institutional investment (for example, in network infrastructure, hardware, licenses, support staff). The CBA model encourages institutions to consider and record all the cost implications of their strategies, not in an attempt to quantify the outputs (benefits) of these new learning processes but to identify and quantify the inputs to these processes. These quantitative inputs can then be evaluated in the context of qualitative outputs.

Draper argues that the merit of our model lies in 'the value and accuracy of the categories or factors . . . [benefits and costs] . . . used'. He then notes areas where the model fails to take into account some important factors (for example, staff stress, student time). While we agree the factors chosen for the CBA are critical, we did not intend that users of the model would merely *select* from our example list of benefits. Instead, we envisaged that a decision-making group, with representatives of all those with a stake in the CBA, would discuss and formulate their own benefit types in relation to institutional strategies and context. A limited set of benefits, those that matter most to the institution, would then be used to evaluate the investment options. Similarly, institutions would determine what costs to include within the costing framework. Hence Draper's examples of staff stress and student time could be accommodated. If, as a consequence of an investment, academic staff become unduly stressed then this would show up through some indicator of low-staff

satisfaction if that were one of the benefit categories. Likewise, if student time is an important consideration, this could be incorporated into the model by including student time or student satisfaction as an evaluation criterion on the benefits side.

As Draper highlights, there are difficulties in the model when it comes to allocating cost information to activities. For example, time spent at a conference might benefit both teaching and research activities. Although costing staff time is difficult (see Rumble, 1997), we must attempt at least rough estimates of allocations for different activities. Otherwise we might as well abandon any attempt to evaluate activities within higher education or to plan future investments. That said, the model advocates a light touch approach to estimating staff time, a much less rigorous methodology than that recommended by the HE Transparency Review (Joint Costing and Pricing Steering Group (JCPSG), 1999). This type of broad estimating has the inevitable consequence that the 'cost' side of the CBA exercise cannot claim great accuracy. However, we believe that the process of investigating and debating the costs is, in itself, useful and that sensitivity analysis can be used to assess the potential impact that variations in the estimates of staff time will have on the final CBA evaluation outcomes.

Just as the model does not limit what benefits can be included, the model does not proscribe what costs should be included in the evaluation. Indeed, the model encourages institutions to identify all activities that have a bearing on the investment options under evaluation. Draper is concerned about 'learning costs' such as the basic skills training of new students. The model represents this as a 'support activity'. A percentage of the total cost (made up of staff costs, revenue costs, capital costs, etc.) of 'learning' support can be allocated to the activities associated with each ICT investment option; that percentage would be determined using a suitable metric (for example, number of students).

It is true that the CBA model attempts to reduce all factors to quantifiable inputs and measurable, but qualitative, outputs. Users end up with a single figure for each implementation option, although choice is based on what trade-off between costs and benefits fits best with institutional priorities. The institution might decide on the lowest cost, the highest benefit or something in between. However, the process of getting to these inputs and outputs is much more important than the figures themselves.

While defending the model we acknowledge that many problems remain. In the original paper we implicitly assumed that large-scale ICT intervention in learning would be 'top-down', that is, a strategy would be defined and options could be evaluated through CBA with reference to an institution's strategic objectives (potential benefits). While an individual's perspective of the benefits of an activity might vary over time (before, during and after), as Draper notes, we assumed that the long-term strategic objectives expressed in an institution's learning or e-learning strategy would be stable over time and would provide an appropriate context for the evaluation of large-scale investments. Moreover, we assumed that these strategic objectives would have been developed by an institution based on its understanding of educational processes not, as Draper seems to suggest, that the CBA evaluation would be used to investigate the learning processes themselves.

However, further work in studying the risks associated with ICT investments in teaching and learning, has led us to review some of these assumptions (Nicol and Coen, 2003). This type of 'top-down' approach to strategic management and investment is not the only

approach that can be taken. Many institutions adopt a 'bottom-up' approach – funding a range of ICT projects with the intention of gaining practical experience and exploring (rather than planning) benefits. With this 'thousand flowers bloom' approach institutions refine their strategies based on the outcomes of pilot implementations and a complex mix of factors (pedagogical, political, cultural, financial) determine which models are more widely adopted within the institution.

As Draper points out, we do not yet fully understand all the consequences for institutions of ICT investment in teaching and learning. Therefore, where 'bottom-up' experimentation is prevalent, CBA, with its reliance on a set of planned objectives, may not be the most appropriate tool. Other techniques such as the Balanced Scorecard (Kaplan and Norton, 1996) may provide a better tool for the management and evaluation of ICT investments. In the Balanced Scorecard methodology a handful of critical perspectives are defined, such as a 'financial' perspective, a student perspective and a staff perspective. The methodology advocates the use of performance measurement to facilitate a process of continual performance review and improvement against each of these perspectives. This type of management tool may have particular applicability in early, small-scale implementations of ICT in teaching and learning where costs and benefits are difficult to forecast and resources (staff time and cash expenditure) are not limited to, or defined by, a strict budgetary limit. This type of methodology might also address Draper's call for an alternative management method that is less heavily reliant on accountancy and financial considerations.

However, at some point each institution, armed with the knowledge gained from its experimentation, is forced to decide whether to invest potentially large sums of money in expanding and/or embedding successful models or, in rare cases, transforming the learning experience and associated institutional processes entirely. In this type of situation much more structured evaluation, of the type proposed by the Insight CBA model, is required. The model cannot guarantee that the information on costs and benefits that institutions feed into it is appropriate, but it does provide a structured, transparent framework through which institutions can insure that all relevant views have been reflected in the CBA and in strategic investment decisions.

References

Joint Costing and Pricing Steering Group (JCPSG) (1999), *Transparency Review*, Manchester, *http://www.jcpsg.ac.uk/transpar/index.htm*

Kaplan, R. S. and Norton, D. P. (1996), *The Balanced Scorecard: Translating Strategy into Action*, Cambridge, MA: Harvard Business School Press.

Nicol, D. J. and Coen, M. (2003), 'A framework for identifying the risks associated with e-learning investments FE and HE', University of Strathclyde, unpublished manuscript.

Rumble, G. (1997), *The Costs and Economics of Open and Distance Learning*, London: Kogan Page.