Title: Managing Investment in Teaching and Learning Technologies

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Information and communications technologies are radically changing the way that teaching and learning activities are organised and delivered within HE institutions. A wide range of technologies is being deployed in quite complex and interactive ways, including virtual learning environments (VLEs), mobile communication technologies, digital libraries and on-line resources. A key challenge for university leaders is to maximise the benefits derived from these investments for all institutional stakeholders (not just teachers and learners), while at the same time minimising cost and risk (Ford et al, 1996). This requires not only co-ordinated strategies for change management but also new approaches to decision-making and to the evaluation of changes resulting from these decisions.

While there is published literature on strategic planning within HE (eg Shattock, 2003) there are serious concerns about how strategies are actually implemented in practice (Cowburn, 2005). For a number of reasons these concerns are compounded when applied to the strategic planning of e-learning:

- Often objectives for investing in e-learning, and the evaluation criteria for measuring progress in achieving those objectives, are not clearly defined.
- To achieve the benefits of e-learning requires a high level of co-ordination across different operational areas and stakeholder groups within institutions eg academic staff, students, student registry, IT services, finance, learning support staff (Twigg, 2003). Yet, these groups often have different perspectives on priorities and they rarely get the chance to share ideas or to reach a consensus view about the direction of change.
- The implementation of major information systems to support teaching and learning (eg virtual learning environments, digital repositories, assessment engines) have repercussions across the whole institution making it is difficult to address change issues in isolation.

Recognising that the planning and management of e-learning requires new approaches and methodologies the Joint Information Systems Committee (JISC) of the Funding Councils commissioned a number of projects designed to support institutions. This paper focuses on two of these:

- 'The Risks Associated with E-learning Investments in HE and FE'
- 'The Insight Cost/Benefit Project'

One of the outcomes of these projects has been toolkits designed to support institutional managers during two key phases of the strategic management of e-learning - strategy development and evaluation and the prioritisation of investments.

Strategy Development

A key issue in developing a coherent e-learning strategy is how to foster consensus around the direction of change, and around the relevant issues, given the different stakeholder perspectives within the institution. As part of the Risk project, Nicol, Coen, Howell and Breslin (2004) addressed this issue by developing a methodology and associated tools to help educational institutions develop or review their strategies for e-learning. The methodology utilises a model for strategic change originally developed by Scott Morton at MIT (1991). The MIT90s Framework (figure 1) has been used to analyse the effects of IT developments on business organisations.

The framework assumes that an institution's effectiveness in the use of ICT for teaching and learning is a function of six inter-related elements:

- the *external environment* within which the institution is operating
- the institutional *strategy* in relation to ICT in teaching and learning
- the way human resources are prepared and deployed *(individuals and their roles)* to support the implementation of ICT in teaching and learning
- the organisational *structures* that support the application of ICT to teaching and learning
- the characteristics of the *technology* being applied.
- the *management processes* that facilitate the initiation, sustainability and success of the application of ICT in teaching and learning.

Some basic assumptions underpin the framework when applied to managing the changes associated with e-learning:

1. Change management is about managing the interaction of the elements (strategy, structure, management processes etc.) and their configurations rather than just about managing the elements themselves.
2. E-learning is more likely to be embedded where all the elements are co-ordinated and are all pulling in the same direction ie where there is a 'goodness of fit'.
3. The fit between internal configuration and the external environment is important. For example, the survival of an educational institution depends on its ability to provide products (eg courses) that meet market needs.
4. The framework recognises that cultural issues (structure, management processes and individuals/roles) mediate the strategy-technology relationship.
5. The model does not assume a direction of change. Educational institutions have different trajectories for change. Some implement change as a 'top-down' process, while others support a 'bottom-up' direction of change. However, despite these trajectories most writers on change recommend a dual approach (Trowler et al, 2003. Fullan, 1993) addressing top-down and bottom-up issues concurrently. The optimal balance of these trajectories will vary from institution to institution depending on size, history, culture and strategic objectives.

Nicol and Coen have used this framework as a tool in work with a number of universities (including the University of Strathclyde, the University of Bradford, Newcastle University and Cardiff University), helping them formulate strategy and identify the issues (risks) to be addressed in strategy implementation. The process involved bringing together stakeholders from across the institution (teachers, students, IT and learning support, library, finance, etc.) in an all-day workshop. The workshop focuses on facilitating dialogue across the different stakeholder groups about the direction of change and the associated issues. The involvement and support of senior management, is essential to ensure that the outputs of the workshop are used to inform and clarify the institutional e-learning strategy. A typical workshop is described in figure 2.

Having used the MIT90s model to facilitate the development of strategy Nicol and Coen have piloted its use as an evaluation tool to monitor and chart progress in the achievement of strategy objectives. This work is now being more widely piloted as part of Phase 1 of the Higher Education Academy's national E-learning Benchmarking Initiative (URL:http://www.heacademy.ac.uk/benchmarking.htm)

For each of the five internal areas of activity embedded in the MIT90s framework - Strategy, Technology, Individuals & Roles, Organisational Structures and Management Processes – a number of performance indicators are being defined. Although many of the issues related to e-learning may be qualitative it is assumed that, for the purposes of strategic evaluation, these can be translated into appropriate quantitative measures (eg student satisfaction can be measured by survey , staff 'buy-in' measured by training course attendance or level of e-learning activity)

Utilising some of the concepts develop in the 'Balanced Scorecard' (Kaplan and Norton, 1992), the institution will periodically gather data to inform each of these indicators with the expectation that improvement will be seen in each and that the improvement will be 'balanced' ie progress in one area will not be at the expense of progress in another.

Unlike the Balanced Scorecard, the indicators will reflect measures of input (eg what resources are applied) and process (eg what activities and projects took place) as well as measures of output (eg what was actually achieved). This approach will help address the difficulty in associating changes in outcomes at an institutional level (eg recruitment, retention, achievement, etc.) with investments in e-learning.

More detail about these processes, including worksheets, workshop plans, presentations and a management briefing paper are provided at the project website (URL: http://www.insight.strath.ac.uk/projects/risk/index.htm.)

Option Appraisal: Insight

Having developed an e-learning strategy, the institution must translate this into implementation plans and projects. This is likely to require a process of prioritisation ie evaluating which projects and investments should be implemented first in order to deliver maximum benefit within the context of limited funding.

Research shows that it is quite difficult to evaluate the costs and benefits of any ICT investment and especially in the area teaching and learning (Nicol & Coen, 2003. Draper, 2003). There are a number of reasons for this:

- most institutional finance systems do not facilitate the collection of costs under teaching and learning activity headings such as individual courses or classes (Bacsich & Ash, 1999).
- the anticipated benefits of an investment are often too narrowly defined (often in terms of benefits to students) and they are rarely considered in relation to other strategic objectives of the institution such as external relations or organisational efficiency.
- it is difficult to isolate the contribution of ICT within the teaching and learning process or to evaluate its repercussions across the institution.
- comparing benefits across different types of ICT projects can be problematic , even where common evaluation criteria exist.

Nicol and Coen (2003a,b) developed a cost-benefit framework called 'Insight' which was designed to address these issues and assist senior managers tasked with evaluating ICT investments (either prior to making an investment or retrospectively). The framework utilises concepts from traditional Cost-Benefit Analysis but with certain key alterations to fit the requirements, culture and systems of Higher Education.

The framework encourages institutions to take a holistic view of the benefits of investment under three categories: educational, organisational and external benefits. Rather than assign a 'shadow-price' to these benefits the framework facilitates the translation of qualitative information into a weighted score reflecting the benefits derived from the investment and its priority in the context of the institution's strategy.

The framework uses Activity Based Costing (ABC) methods to determine investment costs. Historically HE has been resistant to using ABC, citing the high implementation costs involved. However, as full economic costing for research activities is implemented, the concepts of activity based costing, and systems to support it, are increasingly prevalent within HE. While an activity-based approach to costing is advocated the framework does not prescribe the detail, allowing institutions to define for themselves the granularity of the cost information they wish to include in the process.

The framework is intended to support a dialogue between representative decision-makers and stakeholders from across the institution about strategic objectives and about the contribution that each of a set of 'competing' investment options might make towards the achievement of those objectives. While scoring systems are used to facilitate discussion of qualitative matters, the real value of the framework lies in providing a structured methodology for these discussions. Consequently the 'journey' through the Insight evaluation process is as valuable as the final 'destination' - the output ratio of a cost-benefit evaluation. Further information about the insight framework can be found at URL: http://www.insight.strath.ac.uk/projects/insight/index.htm.

Conclusion

The HE sector is still in the middle of a series of investment and evaluation cycles which will continue until e-learning technologies mature and a good understanding of how to use technology to support teaching and learning develops. Consequently those institutions that can 'learn' effectively from their investments, by engaging in structured evaluations and by feeding that information back into the strategic planning process, are likely to invest much more efficiently and derive much greater benefit from those investments.

References

Bacsich, P., Ash, C., Boniwell, K., Kaplan, L. (1999), *The Costs of Networked Learning*. Sheffield Hallam University.

Bacsich, P., Ash, C., Heginbotham, S. (2001) *The Costs of Networked Learning - Phase Two*. Sheffield Hallam University.

Cowburn, S. (2005), Strategic Planning in higher education: fact or fiction? *Perspectives: Policy and Practice in Higher Education*, 9(4),103-109

Draper, S. (2003), The importance of cost-benefit analysis: a response, *Association for Learning Technology Journal*, 11(3), 118-121

Ford, P., Goodyear, P., Heseltine, R., Lewis, R., Darby, J., Graves, J., Satorius, P., Harwood, D. and King, T. (1996), *Managing change in higher education*, (Buckingham, The Society for Research in Higher Education & the Open University Press)

Fullan, M. (1993). *Change Forces: Probing the Depths of Educational Reform*. (London, Falmer)

Kaplan R S and Norton D P (1992). *The balanced scorecard: measures that drive performance*, (Harvard Business Review)

Nicol, D. (2004). *The Risks Associated with E-Learning Investments in FE and HE: Senior Management Briefing Paper.* Prepared for JISC and available at http://www.insight.strath.ac.uk/projects/risk/documents/briefing_paper.pdf

Nicol, D.J. & Coen, M. (2003) A Model for Evaluating the Institutional Costs and Benefits of ICT Initiatives in Teaching and Learning in Higher Education, *Association for Learning Technology Journal,* 11(2), 46-60

Nicol, D.J. & Coen, M. (2003) The importance of cost-benefit analysis: a response, *Association for Learning Technology Journal,* 11(3), 122-124

Scott Morton, M. S. (1991). *The Corporation of the 1990s: Information Technology and Organisational Transformation*. (New York. Oxford University Press)

Shattock, K. L. (2003), *Managing successful universities*. (Buckingham, SRHE/Open University Press).

Trowler, P., Saunders, M and Knight, P. (2003). *Change Thinking, Change Practices*. The Learning and Teaching Support Network Generic Centre, UK. available at http://www.heacademy.ac.uk/resources.asp?process=full_record&section=generic&id=262

Twigg, C. (2003) *Improving learning and reducing costs: new models for online learning.* Educause Review, available at http://www.educause.edu/ir/library/pdf/erm0352.pdf