

JISC Leadership and Management Programme

i-continue

Sustainability of Investment in ICT

Final Report

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JISC DEVELOPMENT PROGRAMMES

Project Document Cover Sheet

i-continue - Sustainability of Investment in ICT
Final Report - Draft

Project

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1	August 2006	First draft with analysis of questionnaire input
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4	October 2006	Final report to the JISC

1. Acknowledgements

①-continue investigated the methods by which UK higher and further education institutions currently sustain and develop their ICT information systems infrastructure. This work was undertaken for the JISC Organisational Support committee (JOS) and funded under the JISC Management and Leadership Programme.

We are grateful to the 194 contributors from 166 separate institutions who participated in the study.

In particular we extend our thanks to the many people across the UK who assisted in the preliminary and final stages of the project. These include:

- those with whom we discussed the project at the UCISA conference, prior to submitting the bid;
- the selected individuals from various HE and FE institutions who, through completing pilot questionnaires, helped to design the final version of the questionnaire;
- the members of 14 institutions who agreed to participate in a more detailed examination of their experiences and of the issues of ICT sustainability;
- the assessors, Martin Price of EUNIS and Gerry Dougan of SFEU;
- Peter Kemp, University of Stirling, for his assistance in visiting and reporting on the sustainability issues faced by FEIs in Scotland;
- the StrICT project team for their help and advice in the early stage of the project.

Our thanks also extend to SFEU, fforwm and ANIC for their help in gathering input from the further education institutions of Scotland, Wales and Northern Ireland. We are particularly grateful to UCISA for their support with this project and for providing access to their membership list.

Finally, we extend our thanks to our colleagues in LISU at Loughborough University for their help in the collection and detailed analysis of the statistical information.

2. Executive Summary

The study was undertaken for the JISC Organisational Support committee between April 2006 and September 2006. The report provides a summary of current challenges facing the sector in relation to the sustainability of investment in ICT and comments on some of the strategies and practices being pursued to address these issues. A number of conclusions are reached and recommendations made to the JISC.

2.1 Key issues and outcomes

For the purposes of this study we defined ICT sustainability as *‘the extent to which choices made today enable the institution in the future to have access to the ICT it needs’*.

Interest in, and concern over, ICT sustainability varied widely across the sector. Some institutions have specifically identified this need and have made it a responsibility of a member of the senior management team, whereas others seem to be more pre-occupied with more apparently pressing current concerns.

From the analysis of replies received from staff in 166 institutions representing a broad cross section of HEIs and FEIs across the United Kingdom, supplemented by a programme of conversations with and visits to a number of institutions, we were able to identify the five most common issues raised in connection with ICT sustainability: funding; planning; management; staff availability/skills and user demands/expectations.

Funding – has a number of internal and external aspects. Institutions have adopted a variety of funding mechanisms for the provision of ICT, and some major general development decisions can have unforeseen knock-on implications for ICT. Medium term predictability of funding is an important contributor to ICT sustainability.

Planning – was often mentioned by respondents as one of the key enablers of sustainability, especially in those institutions where planning was fully integrated across all areas. In those cases planning appeared to be a contributor to a stable operating environment.

Management – probably the most important aspect for ensuring sustainability. The attitude and appreciation by senior management of the role and importance of ICT within the institution has a big effect on ICT provision and development. However, this also has its dangers in terms of pursuit of “hobby projects” and being influenced by out-of-date knowledge.

Staff availability and skills – increasing time pressures on staff are considered to be detrimental to sustainability. Some complained of the inability to find time for staff training and others were finding that the current low levels of staff turnover were impeding change.

User demands and expectations – as ICT in its many forms becomes more ubiquitous and also more varied both staff and students are experimenting with, or requesting, new types and formats of information delivery. This variety may threaten the ability to sustain ICT across this increasingly broad front in those institutions that choose to experiment with many of the new technologies.

2.2 Conclusions and recommendations

Whilst the funding of ICT is one of the key factors for its sustainability this is secondary to having the appropriate staff and structures. Without these there is no guarantee of sustainability irrespective of the amount of funding available.

At a day-to-day management level there were many examples of investment being undertaken without a full appreciation, or even evaluation, of the total life cost / full economic cost of the project, with many institutions assuming that they would be able, somehow, to provide the on-going maintenance and support required without a full analysis of what would be required.

There is also the danger that things are being sustained because “we’ve always done it that way” and that doing it that way was what staff were used to, rather than asking if that way was still fit for purpose. Thus, one of the most important questions for management is: “What should be sustained and how?” and ensuring that ICT does not become a barrier to change.

Our recommendations fall into three broad groups: total operational costs; staffing; institutional direction.

Operational costs – here we include both the direct accountable cost of a system and also the direct and indirect environmental issues relating to the provision of ICT systems and services. **We recommend that JISC in conjunction with other bodies increase the advice available to institutions on life-time costing of services and their related systems; and that JISC work with bodies concerned with ICT and the environment at least to increase institutions’ awareness and, where possible, to give guidance on best practice for true long-term environmental sustainability.**

Staffing – as the flexibility of ICT systems and services becomes increasingly important it is important that staff are able to adapt and respond to this challenge. **We recommend that JISC work with bodies concerned with staff development and appraisal to produce guidance for managers on ICT staff performance appraisal, development and career planning.**

Institutional direction – management and planning are key elements in ICT, and institutional, sustainability. A number of factors need to be considered by institutions when thinking about their information systems and services. **We recommend that JISC, in consultation with related bodies, draw up a checklist of factors to consider when attempting to link ICT with institutional aims, including consideration of structures for decision making and long-term financial planning.** This could also be extended to encompass guidance on issues of a more operational nature.

We also recommend that JISC should approve funding for the conversion of this report into a form suitable for dissemination to senior ICT managers.

3. Background

ICT is a driver as well as a tool. As it has become more pervasive and more commoditised institutions have adapted their structures and their funding methods in varying degrees. The ICT needs of institutions can also vary widely depending upon size, degree of specialisation, geographic dispersal of sites, types of courses provided and research intensity. The larger academic institutions are well known (notorious even) for the tensions inherent in an organisation which attempts on the one hand to utilise resources efficiently and maintain a corporate ethos, and on the other hand to maintain academic freedom and create a flexible, responsive system which takes account of independent needs such as those from particular disciplinary teaching and/or research groups. There is also a natural tension between the desire of UK governments and funding bodies to steer institutions in particular directions and the desire and need for each institution and its governing body to assess the best way forward for its particular organisation.

Planning can sometimes seem redundant in the face of central funding initiatives and the change in technology itself. There can be a confusion between capital and recurrent funding needs, and a confusion between time-limited projects and long-term programmes.

On the plus side, the tradition of, albeit varying, centralised funding and support has led to a collegiality which has been one of UK HE/FE's great strengths. It has served to nudge institutions forward, providing communal professional guidance as well as funding which individual institutions would in many cases have been unable to provide for themselves. It has enabled academics at smaller institutions to work at international level and students to experience information systems of a quality that would be beyond a single institution to provide.

In this environment institutions have evolved various methods of funding ICT, ranging from centralised to devolved and with various strategies for planning, ranging from totally subsumed within the wider institutional planning to complete separation. The degree to which ICT is treated as a set of commodity items or a fundamental developmental strategic tool varies. The use of, and demands on, ICT systems and services also varies between HE and FE institutions; within the HE sector this may depend on the degree of research intensity and within FE on the size, and therefore degree of fragmentation, of the college. The recent introduction of full economic costing (fEC) will also impact on the future operating environment.

The recent JCPSG project^[10] on the full economic costs of information services showed that much ICT provision is covertly supplied within departments and, increasingly, by individuals. It is therefore necessary to go beyond the obvious computer services activity to get the full picture.

4. Aims and Objectives

We will investigate and report on the methods by which UK higher and further education institutions currently sustain and develop their ICT information systems infrastructure.

We report on the methods used, assess future expectations of managers and make suggestions for future work to allow JISC to provide advice and guidance for senior managers about effective ways to sustain and develop the infrastructure available to support the work of the institutions.

Quotations used in the report are taken from replies to the questionnaires, interviews or referenced sources. In particular, we have used the green tinted text boxes framed by a single line to illustrate some actual experiences mentioned by respondents through the questionnaires or during interviews. Quotations from referenced sources are shown in yellow tinted boxes framed by a double line.

5. Methodology

ICT sustainability does not necessarily mean that we can run today's technology tomorrow. If it did we would all still be supporting teletypes on a mainframe, or worse. Even if our institutions did not change their aims at all, we cannot now guess at the ICT environment in months, let alone decades to come. This is what makes ICT sustainability complex.

For the purpose of this study we define ICT sustainability as: *'the extent to which choices made today enable the institution in the future to have access to the ICT it needs'*

We obtained as much general information on the various resourcing and planning methods used within the sector as is possible through well known and professionally guided techniques (eg short one-to-one interviews, questionnaires). Additional input was sought from sources such as institutional annual reports and national statistics. We sought to obtain enough data in well-defined form to be able to make some valid statistical conclusions on the types of method in use.

Using these data we selected a subset to represent the various types of institutions and to enhance our knowledge by undertaking research in more depth to understand the reality of sustainability. This was done through visits and telephone interviews with senior officers at the selected institutions.

We recognised that it would be unlikely that a single questionnaire to one part of the community would uncover the various types of resourcing methods in use. Also, it was possible that those closest to implementing them will have a different view of their efficacy to that held by, on the one hand, the senior management of an institution and on the other hand, the users.

The project took place in six main phases, each of which informed the way the next phase went forward.

- Phase 1 face-to-face 15 minute interviews with a subset of ICT Directors to inform...
- Phase 2 drafting of questionnaire and subsequent pilot to determine appropriate format and content that would maximise response rate and quality of evidence gathered to inform...
- Phase 3 refinement of questionnaire and dissemination to senior managers and in parallel some analysis of available published plans and financial reports to inform...
- Phase 4 analysis to find main categories of sustainability methods in use and subsequent in-depth interviews with a sample of representative sites in each category to inform...
- Phase 5 conclusions on the main strategies and practices for sustaining ICT infrastructure and senior managers' expectations, analysis of the gaps with draft conclusions discussed with external assessors to evaluate the work and inform...
- Phase 6 final report on the methods in use, expectations and a gap analysis and hence suggestions to JISC on useful further work and, subject to JISC approval, a dissemination Phase – see recommendation 5.

5.1 Involvement of other organisations

We needed to involve several other organisations in order to get the HE, FE and UK-wide perspective that was asked for. In order to target the distribution of the questionnaire to the relevant representatives in the various institutions and constituent parts of the UK we were able to make use of UCISA, SFEU, fforwm and ANIC. In addition Reading University's own Associate College Network expressed a willingness to participate to enable us to ascertain the particular circumstances of colleges in receipt of HEFCE funds through an HEI compared to those in direct receipt of HEFCE funds.

6. Implementation

Preliminary discussions were undertaken with ten directors of ICT and other interested parties during the submission of the bid. A six phase plan, as described above, was devised covering the six months of the project and was used to manage its implementation.

While the project was delivered on time there were a number of aspects of the implementation that took somewhat longer than anticipated, but overall it proved possible to keep broadly within the project plan.

The main areas of concern were:

- obtaining contact details for all HE and FE institutions covered by the project; of particular concern were the non-UCISA HE institutions and the FE colleges in England that are directly in receipt of HEFCE funding;
- arranging interviews with representatives from the selected institutions during late July and August; it was not possible to complete this part of the programme until late-September;
- the number of ICT related questionnaires that were circulating at the same time, with similar deadlines, including some for other JISC funded projects. This resulted in replies from some institutions that they had responded to the request, but it had been confused with another questionnaire – we sensed a degree of questionnaire fatigue!

Following award of the project, detailed discussions were held with LISU at Loughborough University to determine issues related to data collection and to design the general questionnaire. In parallel a number of contacts in various HE and FE institutions were approached to complete draft questionnaires in order to finalise the structure of the questionnaire. This was a particularly useful process that provided valuable input and helped to broaden and refine the options given in the final questionnaire.

Prior to commencing this project, we had agreed with UCISA that their HEI members' representatives could be sent the questionnaire. After further discussions it was agreed this approach to seek the views of the individuals most closely concerned with provision of ICT was the correct one.

As we had less experience of the way FE institutions are organised we enlisted the help of those closely involved. We are grateful to the FE organisations in Scotland, Wales and Northern Ireland who either circulated the questionnaire to the appropriate people in their member institutions, or provided a distribution list. For English FEIs, it was a JISC requirement that we study only those colleges in direct receipt of HEFCE funding. After consultation with the JISC and HEFCE we circulated the questionnaire to the Principal of each such college suggesting that they pass it on "to those of your senior colleagues who have a particular interest in ICT provision for your students and staff".

The following table summarises the contacts and returns, by type of institution for all four countries in the UK:

Table 1. Analysis of response rate by institution type and country

	Total no. of institutions contacted	Total no. of replies	From no. institutions	Response rate
HE				
England	134	61*	54	40%
Scotland	20	10	9	45%
Wales	12	8*	5	42%
N.Ireland	2	3	2	100%
Total HE	168	82*	70	42%
FE				
England	144	85*	71	49%
Scotland	42	17	16	38%
Wales	25	2	2	8%
N.Ireland	16	8	7	44%
Total FE	227	112*	96	42%
TOTAL HE + FE	395	194*	166	42%

* Three replies, one each from a HEI and a FEI in England and one from a HEI in Wales were received too late to be included in the statistical analysis of the returns.

Overall the response rate for both the HE and FE sectors was about 42%, with little difference in rates between the countries, except for FE colleges in Wales.

In HE the responding institutions, however, represented over half of the total number of HE students. The response rate for FE was somewhat lower, as shown in table 2 below:

Table 2. Proportion of total students covered by replies

	Higher Education			Further Education
	Under-graduates	Post graduates	Total	
England	52%	49%	51%	50%*
Scotland	59%	58%	59%	36%
Wales	61%	66%	62%	9%
N Ireland	95%	97%	95%	40%
Total	54%	52%	54%	

* Proportion of the HE students in FE colleges funded by HEFCE

As can be seen from the institutional response rate (table 1 above), despite a reasonable response rate from across the range of institutions surveyed it is not possible to produce statistically rigorous comparisons between the different funding regimes for both HE and FE in the four countries within the UK. This was largely due to the relatively small numbers of institutions in Scotland, Wales and Northern Ireland as compared with England.

The free-text replies to various questions yielded valuable insight into individual sustainability issues and helped to give some overall context to the 'tick box' replies given on the questionnaire.

From the replies received 14 institutions were selected to visit, or contact by telephone. A number of factors influenced the selection:

- replies given in the text sections of the questionnaires
- unusual ratings given in response to the 'tick box' questions

- geographic location and funding council dependence
- representation from a broad spectrum of institution type and size.

Wherever possible when visiting institutions, we tried to interview not only the person/people responsible for the provision of ICT and/or ILT but also a PVC, Principal, Vice Principal or other member of the Senior Management Team, in order to obtain a different perspective of the ICT sustainability issues facing the institution.

The members of Reading University's Associated College Network (ACN) participated at all stages of the study, providing useful background information about the organisation, structure and funding of FE in England, together with comments on the design of the questionnaire. The members of the ACN range in size and level of involvement in the education of HE students. Most receive funding for HE education direct from HEFCE, whilst others receive HE funding through HEIs. Through further interviews during Phase 4 of the project they also input useful additional information in relation to the FE sector.

In total, we were directly assisted in this project by over 40 members of 28 institutions, representing all four of the UK's funding regimes in the sector.

During the course of the study we became aware of interest in the project from Australia/New Zealand and France. With the approval of JISC we made the questionnaire website available to CAUDIT, the Australia/New Zealand equivalent of UCISA. Unfortunately, at the time of writing, there had been an insufficient number of responses from CAUDIT members to enable any meaningful comparisons to be made.

7. Outputs and Results - Analysis of the survey returns and input from visits

7.1 Introduction

A total of 191 responses was analysed – from staff in 80 Higher Education and 111 Further Education institutions. A copy of the questionnaire used for the HE sector is shown in Appendix 1 (with notes of the amendments made for FE), a summary of the results for each is given in Appendix 2 and a summary of the text replies is available on the ①-continue website, www.reading.ac.uk/imps/i-continue-questionnaire-replies.htm.

Because of the small number of HE and FE institutions in Wales, Scotland and Northern Ireland, it was not possible to analyse formally the data broken down by both institution type and country to assess the statistical significance of any apparent differences. The primary analysis was carried out by institution type as we recognise that they have different concerns and funding regimes. Where no statistically significant differences were found a secondary analysis by country was performed if sufficient data were available. Below we summarise the salient points and observations and comment on the similarities and differences of the two sectors. While the questionnaire analysis and associated comments enable us to list areas of concern with some statistically valid confidence, they do not of themselves provide sufficient information on the methods used to obtain sustainability. We therefore initiated further discussion with some institutions. In particular, we sought further information from 14 sites, interviewing some 30 individuals. Relevant information obtained from these interviews and from institutional documentation is included in the analysis.

Results are reported grouped according to the main headings in the questionnaire. All results noted as being statistically significant were tested at the 5% level, unless otherwise stated.

HEFCE Strategic Plan 2006-11

Sustaining a high quality HE sector

“..... To sustain its performance, continuous improvement must be reflected in particular in an emphasis on developing people and supporting organisational culture. This is a long-term investment, with the benefits of improved performance and responsiveness being realised over time. A long-term perspective is also needed to ensure that the condition of the physical infrastructure is appropriately maintained, developed and managed, and not allowed to deteriorate as has happened in the past.” (Para 144)

From the results it becomes apparent that, irrespective of sector or location, there are five main themes to ongoing sustainability – funding, planning, management, staff availability/skills and user demands/expectations. Some of these issues are recognised in the HEFCE Strategic Plan 2006-11^[8].

7.2 The importance and sustainability of some specific ICT systems and services

Question 2 listed a number of ICT issues, and asked respondents to rate both their importance, and the level of concern about their sustainability, each on a seven point Likert scale. Appendix 2 shows the average scores on each item by institution type and country.

7.2.1 Importance

Those issues rated as the most important overall, all with mean scores greater than six, were:

- management information and administration systems (6.4);
- physical network infrastructure (6.3);
- availability of experienced / qualified staff (6.2);
- web support and content management (6.2);

- e-learning systems (6.1); and
- hardware renewal and replacement (6.1)

The least important items, all with mean scores below four, were felt to be:

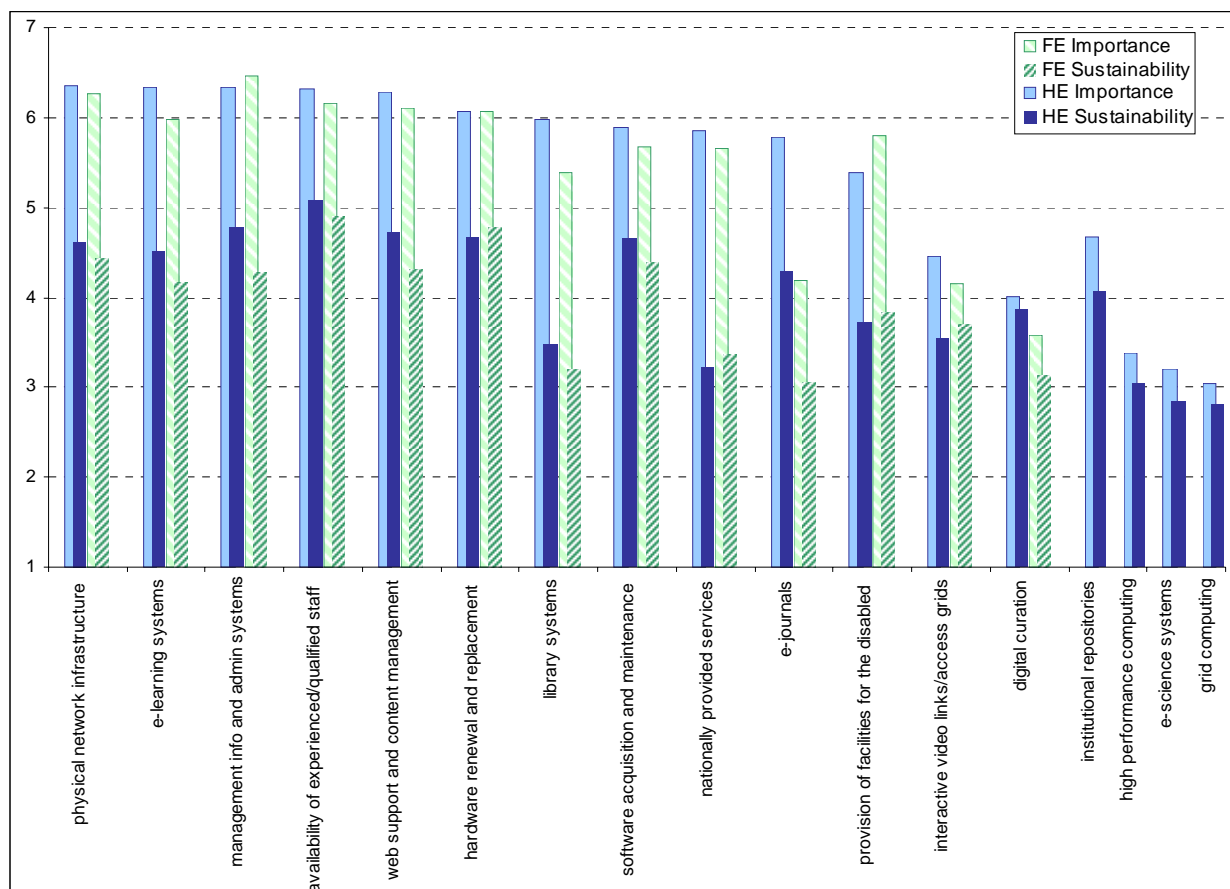
- digital curation (3.7)
- high performance computing (3.4);
- e-science systems (3.2); and
- grid computing (3.0).

Digital curation is of high importance in relation to e-learning, otherwise it is not a major factor for many institutions.

High performance computing, e-science systems and grid computing are not relevant to a significant proportion of HEIs. As a result the mean score was low. Of the institutions known to be involved in research requiring such technologies and systems the mean score for all three items was in the region of 5 for importance and 4-4.5 for concerns over sustainability.

Figure 1, below, illustrates the mean importance of a number of ICT issues to institutions (based on a seven-point Likert scale ranging from low to high) and for sustainability (ranging from “not a worry” to “huge worry”).

Fig 1. Importance and sustainability concerns of ICT issues, by institution type

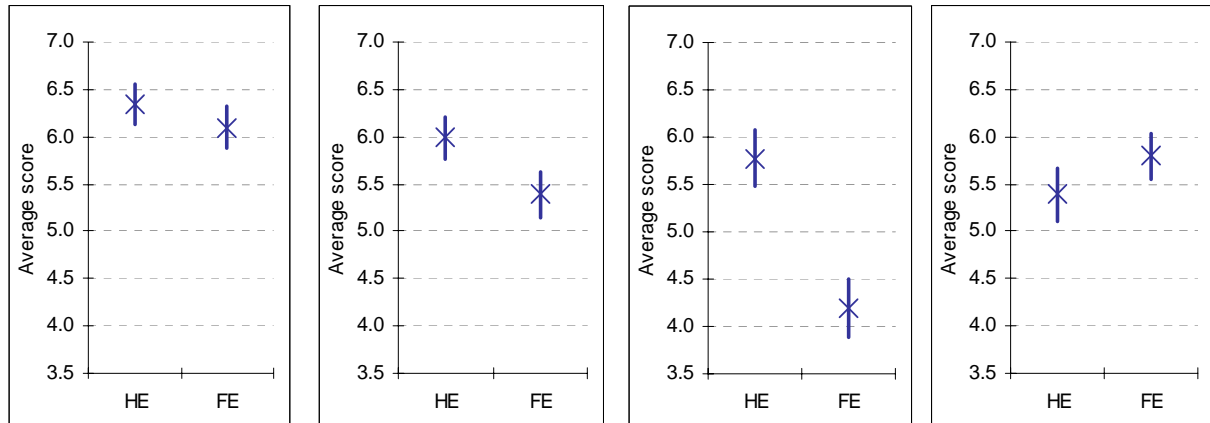


Only one of these, e-learning systems, showed a statistically significant difference between the mean scores for HE and FE respondents, with HE rating it more important than FE. Other items, with moderate importance ratings between 4 and 6, showing a statistically significant difference

between the institution types were library systems, e-journals (both thought more important by HE than by FE respondents) and provision of facilities for the disabled (thought more important by FE respondents). These means are illustrated in Fig 2. The remaining items were analysed by country; no statistically significant differences were found.

Fig 2. Significant differences in importance of ICT factors between types of institution

a) E-learning systems b) Library systems c) E-journals d) Provision of disabled facilities



The vertical lines indicate an approximate 95% confidence interval for each mean.

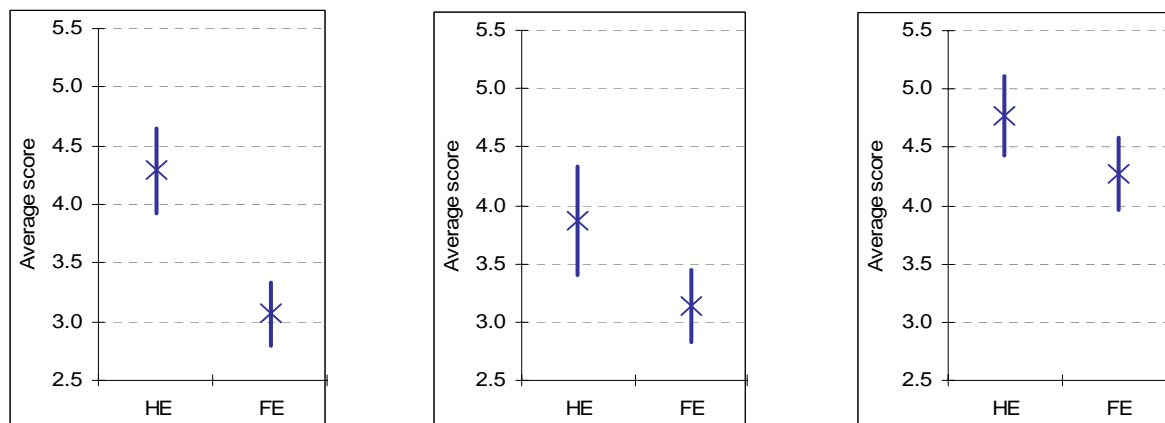
7.2.2 Sustainability

The greatest concern over sustainability was felt about the availability of experienced / qualified staff, with a mean score of 5.0 overall. Hardware renewal and replacement was also of considerable concern, with a mean score of 4.7 overall. Four items each had mean scores of 4.5 - physical network infrastructure, software acquisition and maintenance, web support and content management, and management information and administration systems. There was least concern about grid computing (mean score 2.8) and e-science systems (2.9).

Three issues showed statistically significant differences in the degree of concern about their sustainability between FE and HE respondents. These were e-journals, digital curation, and management information and administration systems, and the differences are illustrated in Fig 3. In each case, HE respondents showed a greater level of concern than did FE respondents.

Fig 3. Significant differences in concern over sustainability between types of institution

a) E-journals b) Digital curation c) Management information and administration systems

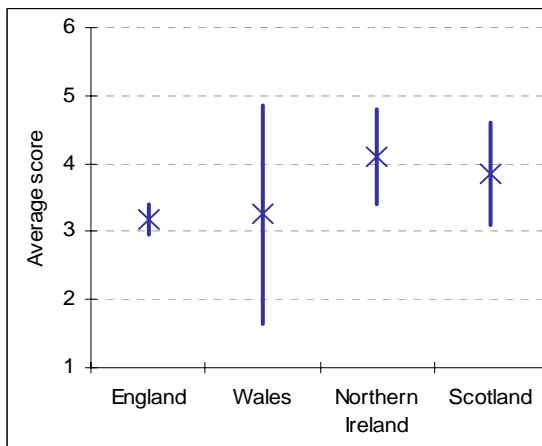


The vertical lines indicate an approximate 95% confidence interval for each mean.

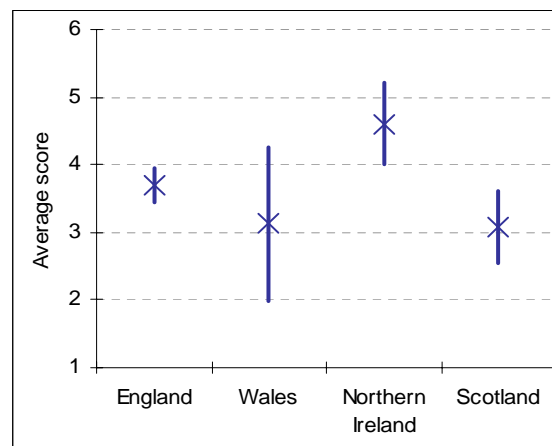
The remaining items were then analysed by country, and two were found to have statistically significant differences, illustrated in Fig 4. These were library systems, where English respondents showed significantly less concern than those in Northern Ireland or Scotland, and interactive video links and/or access grids, where Northern Ireland showed significantly greater concern than either Wales or Scotland, and England showed significantly greater concern than Scotland. In the case of Scotland it is thought that the relative importance of library systems is due to an increasing emphasis being placed, for many courses, on the use of libraries and open learning spaces.

Fig 4. Significant differences in concern over sustainability between countries

a) Library systems



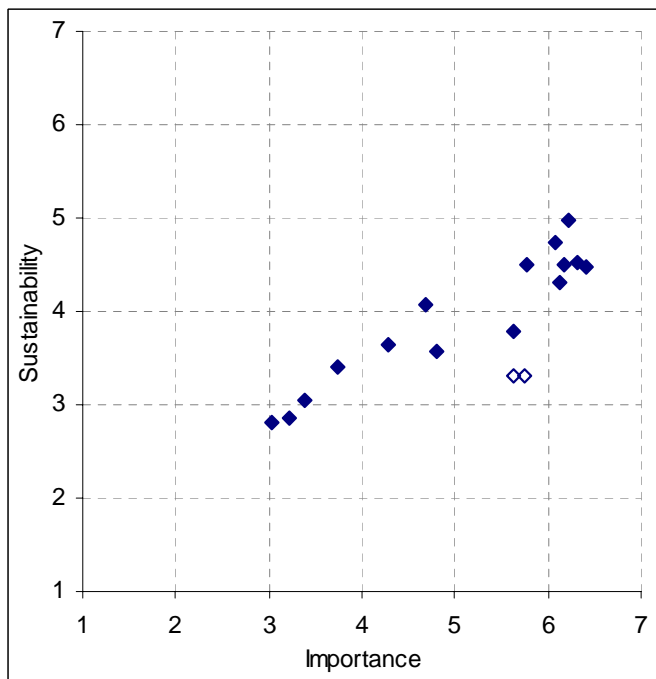
b) Interactive video links and/or access grids



The vertical lines indicate an approximate 95% confidence interval for each mean.

There is a clear association between the perceived importance and the degree of concern over sustainability of the items listed, illustrated in Fig 5. Not surprisingly, the more important an item, the greater concern there tends to be over its sustainability.

Fig 5. Mean importance and sustainability scores, overall



The two items which do not fit this pattern, shown in outline in Fig 5, are library systems and nationally provided services, where the degree of concern over sustainability does not appear to match their relative importance; we comment on possible reasons for this later.

For both HE and FE, management information rated very highly in terms of importance and concerns over sustainability. The other main items of importance were the physical network infrastructure, e-learning, the availability of experienced staff, web support & content management and hardware renewal; five of these also rated highly in terms of concern over sustainability.

The cost of, particularly commercially based, VLEs is not in the control of institutions and is feared, but as one senior manager put it *'funding it is a no-brainer. We need to topslice for that and move onto thinking about other things.'* We found VLEs that had been implemented using piecemeal funding (for example, using the HEFCE e-University 'bonus' to HEIs) and evidence that they were not completely embedded in core funding systems. Concerns were expressed on the as yet unknown effects of Blackboard's takeover of WebCT. There was some confidence at an FE College that a move to open source would be sustainable, particularly given the Open University's adoption of Moodle. Open source might not be cheaper, but what is spent on it and the rate of upgrading are at least within the control of the institution.

E-science, high performance computing (HPC) and grid computing were only rated by the HE sector and were rated as the three least important of the systems/services identified and had the lowest level of concern over sustainability – this may be a reflection of their limited spread within the HE sector. For those institutions where these facilities are of above average importance the level of concern over their sustainability was much higher - in the 4.5 – 5 range on the seven point scale.

We heard of instances where fEC issues were not overtly considered when high performance computing was obtained. The costs of sustaining a service can be startling – with not only high security, special machine rooms being required – but also significant on-going power issues and operational staffing needs seemingly ignored at the outset.

We found this potential problem both in relation to institutions' responses to capital funding initiatives and departmental purchases. In the context of work funded by the Research Councils, one institution despaired of ever finding the *'money to pay for recurrent and replacement (costs) through fEC'*; they concluded that *'fEC is not likely to achieve sustainability if there is a huge recurrent cost as well as a huge capital replacement cost. Therefore some high cost activities will not achieve sustainability without some further injection of investment from outside the HE (sector)'*

In more than one institution we heard of unsustainable situations created by the way one-off initiatives are handled. The most obvious was the donation of a high performance computer by a supplier where no account of the cost of improvement to a machine room, air-conditioning and electricity consumption was made. Leaving aside staffing requirements, software costs and so on, this amounted to annual costs of around £150,000 for which there was no funded plan.

We subsequently heard of other institutions with the same sustainability issues. In one case they had determined that the only way possible for the investment to be sustainable was to make it a centrally provided service, **not** part of an academic department.

In a similar area, the cost of keeping an institution's distributed PCs powered-up overnight to enable grid / e-science work was not thought of initially.

The ultimate result of such examples is a non-sustainable service.

Nationally provided services, such as JANET, JSTOR and NGS, were rated as quite important by both sectors, but neither had a particular concern over their sustainability – presumably on the basis that sustainability was something that is beyond the control of any individual institution and/or because these services had wide backing and a history, in the case of JANET, of being sustained. This raises the question of whether sustainability concerns for other ICT services

would change if the funding model was changed to one that was provided as a ‘national’ service, possibly as a shared service or in collaboration with the private sector.

Library systems and e-journals are of greater importance to HE than to FE and, in the case of e-journals, this is matched by a greater concern over their sustainability. The previously noted disparity between the importance and sustainability of library systems may be a reflection of the proven reliability and continuing sustainability of library services in universities over a long period of time.

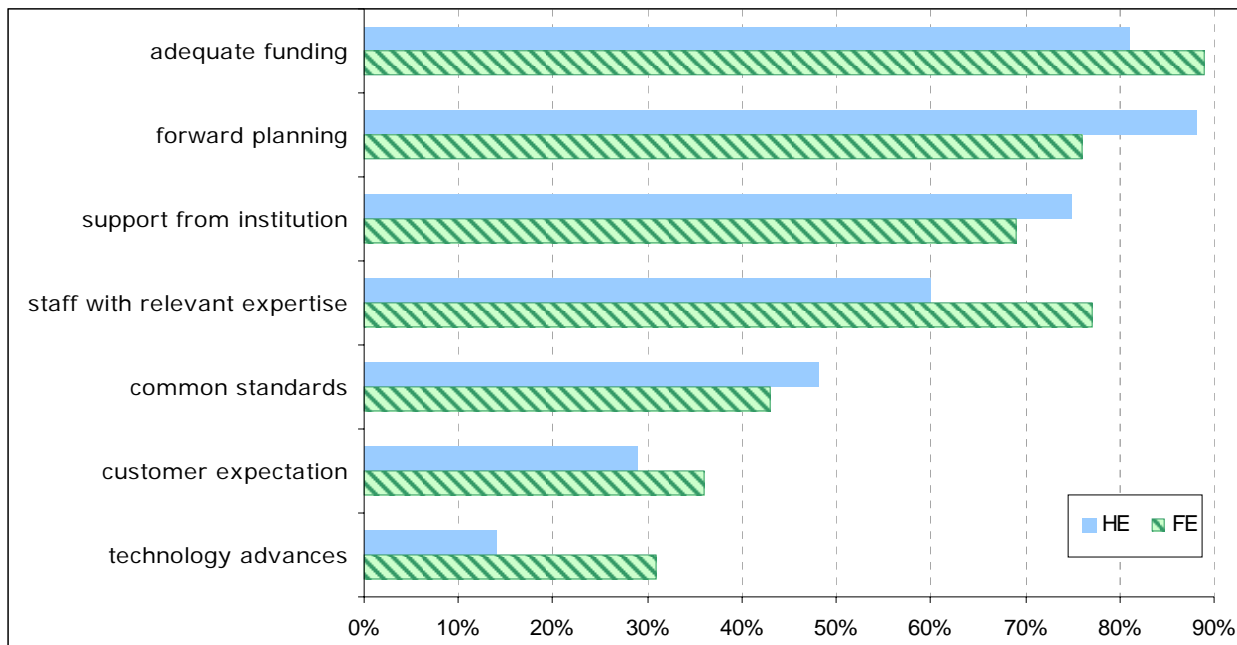
At two sites we learned that the worry of sustaining the library materials budget in the face of unsustainable periodicals inflation had a knock-on affect on funding available to develop IT.

7.2.3 ICT sustainability – enablers and barriers

Questions 3 and 4 were concerned with the main enablers of, and barriers to, ICT sustainability. Perhaps unsurprisingly, 86% of respondents felt that adequate funding was one of the main enablers of sustainability, with 81% indicating forward planning, 72% support from institution, and 70% staff with relevant expertise (see Fig. 6). Other items were marked by no more than one half of respondents. There were statistically significant differences between FE and HE respondents on three of the potential enablers:

- Forward planning – 88% of HE and 76% of FE indicated this
- Staff with relevant expertise – 60% of HE and 77% of FE indicated this
- Technology advances – 14% of HE and 31% of FE indicated this.

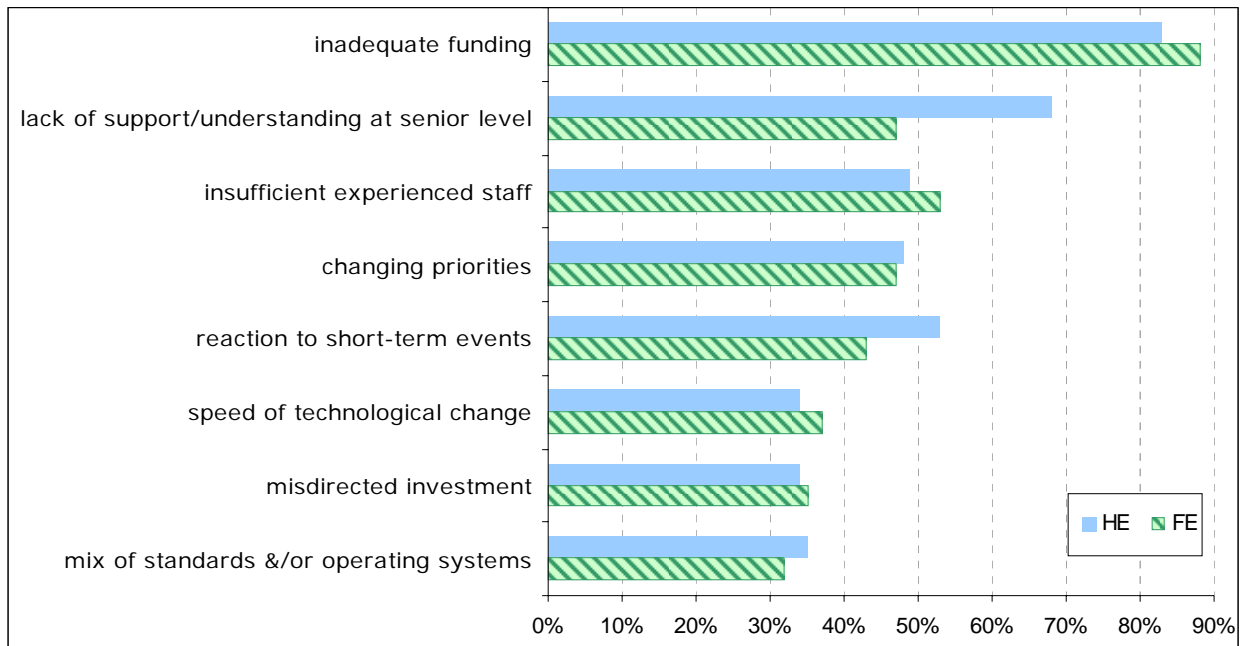
Fig 6. Main enablers of sustainability, by institution type



The availability of funding is seen as the main enabler of ICT sustainability in the FE sector and came second to forward planning for HE, which was third for FE. The availability of staff with relevant experience was the second most important factor for FE and fourth for HE. In HE support from the institution was ranked third and by FE was ranked fourth. These four were felt to be considerably more important than any other factors for ICT sustainability.

The main barrier to sustainability was thought to be inadequate funding, marked by 86% of respondents overall. Other areas indicated by more than half of all respondents were lack of support/understanding at senior level (56%), and insufficient experienced staff (51%). Only one item showed a statistically significant difference between HE and FE respondents: 68% of HE respondents felt that lack of support/understanding at senior level was a barrier to sustainability, while 47% of FE respondents held this view (Fig 7).

Fig 7. Main barriers to sustainability, by institution type



In terms of barriers to sustainability the next closest was ‘reaction to short-term events’. The overriding consideration seems to be funding – to quote one respondent when considering the effect of technological change and its impact on sustainability “*very positive if I can afford to implement it and very negative if I can't*”.

There was insufficient data to analyse these questions by country. However, some figures do stand out. The availability of staff and funding are both shown by **all** eight respondents from the FE sector in N. Ireland as being key enablers of sustainability. There was a similar unanimity from HE respondents in Wales (7) and FE respondents in N Ireland (8) concerning inadequate funding as a barrier to sustainability, and from HE respondents in Scotland (10) on forward planning as an enabler of sustainability. There is the need to recognise that “*ICT is a huge and continuing cost. It is no longer optional funding is the prime issue*”. The sustainability concerns related to the library aspect of the information infrastructure are summed-up in the recent report by SCONUL^[11] on the analysis of library trends.

**SCONUL library statistics:
Trends 1994-95 to 2004-05**

“... relative importance of libraries in terms of total institutional expenditure. In general, this is a measure which changes relatively little over time. There is a declining trend becoming apparent in all sectors, In the medium term, such trends give cause for concern regarding the sustainability of adequate information and library support for teaching and research in these sectors.”

The funding for FE in England was of particular concern. Funding is tied to student numbers and the retention, achievement and progression of the students. Increasing numbers are signing up at

FE institutions, which is good for initial funding, but retention and progression are more difficult to achieve – resulting in the reduction of funding and, thereby, the means of financing ICT provision. We also understand that the methodology in Scotland is similar.

Association of Scottish Colleges
Information and Communications Technologies (ICT) Strategic Framework For Further Education Colleges
 (September 2001)
“Critical Success Factor – Funding
 A key issue will be the provision of predictable and sustainable funding in the longer term to match future ICT developments and to enable effective development planning and progress.

The predictability of funding was also clearly recognised as an issue by the Association of Scottish Colleges as a Critical Success Factor^[2].

Generally for both the HE and FE sectors, it appears that the institutions that were most confident

about the sustainability of their ICT infrastructure were those where ICT was well integrated into the strategic planning process and where planning is firmly embedded within the institution. But it was noted that *“a yearly budget does not assist in long term planning”*. Many of those, where planning is embedded, commented on the positive nature of effective medium/long term planning. The need to adhere to plans and implement them was stressed in a number of cases with sustainability being compromised if plans were subsequently abandoned to meet short-term needs or altered as priorities change. To succeed there is a requirement for *“IT and IS strategies that have a clear line of sight to College long term business objectives”*.

Differences in management styles and structures became apparent from the replies to the questionnaire. Where ICT has strong representation, or a champion, on the Senior Management Board there is a greater chance that the ICT is felt to be sustainable. However, this is not always the case where the ‘champion’ is a very strong personality and tends to drive through their own ‘hobby’ projects – this was noted in a number of institutions. *“Strong SMT voices can lead to initiatives that are not well justified, while essential investments go un-championed”*. The greatest unease in relation to sustainability appeared to be in those institutions in which senior management had no great understanding of ICT, or where poor management/administration or timetabling result in inefficient use of resources.

Staff resources and training were mentioned by a high proportion of respondents as a particular concern, many claim to be under-resourced and as a result struggling to maintain existing services with little time available for staff training and development. This has been specifically identified as an issue in the plans of some institutions, for example Glasgow^[7].

University of Glasgow
Strategic Plan 2002-2006
“Key actions in support of objectives
 The University will:
 • Develop a sustainable infrastructure (including information resources) with adequate provision of trained research support staff and relevant support services.”

In discussions, there was some notable (heartfelt even) concern not about staff retention but about staff’s ability/willingness to move on technically.

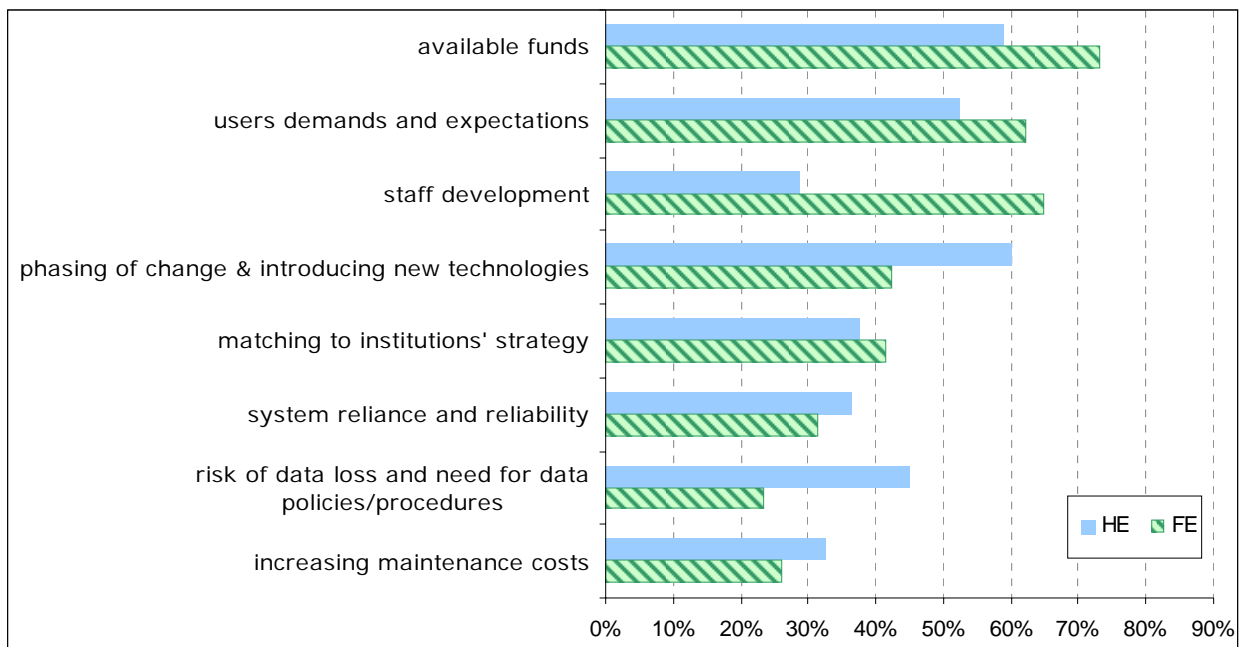
Sustaining ICT infrastructure requires rolling forward into supporting new technologies and to do this efficiently requires continuous decisions on, for example, in- versus out-sourcing, collaboration and sharing of resources (including staff), or providing new equipment versus lengthening the life of the old.

The ability to undertake serious skills audits, to redeploy staff and to downsize if necessary was stressed. There was some feeling that academic institutions were not set-up well to tackle the flexibility and pace of change required. For example, there was not a strong or effective appraisal culture and/or staff reviews were not firmly linked to the institution's aims.

7.2.4 Current pre-occupations about ICT sustainability

Given the importance of adequate funding as an enabler of/barrier to ICT sustainability indicated above, it is not surprising that the most frequently indicated item among the list of current pre-occupations, as raised in Question 5, concerning sustainability was available funds (Fig 8). There were some clear differences between the sectors, with statistically significant differences in the proportions indicating available funds; staff development; phasing of change & introducing new technologies; and risk of data loss and need for data policies/procedures. The first two of these are of more immediate concern to FE institutions, while HE respondents were more concerned with the latter two.

Fig 8. Current preoccupations, by institution type



Question 5a showed that three quarters of respondents indicated that something was being done about their concerns, with no difference in the proportions between FE and HE respondents. Overall, 44% of respondents felt that this was being helped by institutional practices, while 34% thought it was being hindered (question 5b). The apparent differences between HE and FE respondents were not statistically significant.

While institutional structures at the most senior level were put forward as largely helpful to sustainability, with an IS responsible Director on the Senior Management Team, or close to it, we heard concerns about methods both of involving ICT users and of maintaining explicit links with wider institutional strategies. This was more marked in HE institutions where the autonomy of academic departments had led to a wide variety of decisions on systems and staffing which impacted on the institution's ICT sustainability. FE colleges seem less encumbered with historic IT teams, both centrally and in departments. One, for example, had adopted an 'ICT champion' approach, explicitly linking teaching staff roles to central ILT support. This seems to avoid

decisions on the basic ICT utilities being taken all over the place, instead concentrating on linking ICT and the institution's core teaching business.

In both FE and HE the main steps being taken to address current concerns revolve, mainly, around the provision of funding and the development and implementation of strategies and plans, in some cases staff development is also linked into these. Where no action is being taken to address issues the most cited reasons relate to the availability of funds and lack of strategy, other reasons cited included culture, priorities and institutional structures.

We also looked at the responses concerning enablers and barriers to sustainability in conjunction with current preoccupations, with separate analyses for FE and HE respondents where statistically significant differences had been found in either question. This analysis was carried out using the χ^2 statistic, to identify those items which were more likely to be considered enablers of/barriers to ICT sustainability by respondents marking each of the current preoccupations. The results are summarised in table 3 below:

Table 3. Relationship between current preoccupations, enablers and barriers to sustainability

Current preoccupation	Associated enablers	Associated barriers
Available funds	Adequate funding (HE) Support from institution (FE)	Inadequate funding (HE) Changing priorities (FE) Lack of support/understanding at senior level (HE)
Staff development	Support from institution (FE) Staff with relevant expertise (FE & HE)	Insufficient experienced staff (HE & FE)
Increasing maintenance costs	Forward planning (FE)	Changing priorities Speed of technological change
Matching to institutions' strategy		Reaction to short-term events Lack of support/understanding at senior level
Users demands and expectations	Adequate funding Forward planning (FE) Technology advances (FE) Customer expectation Common standards	Inadequate funding Changing priorities Reaction to short-term events
Phasing of change & introducing new technologies	Adequate funding (FE) Support from institution (HE) Staff with relevant expertise (FE & HE)	Speed of technological change (FE)
System reliance and reliability	Common standards	Insufficient experienced staff Speed of technological change
Risk of data loss and need for data policies/procedures	Customer expectation (FE & HE) Common standards (FE)	Mix of standards and/or operating systems (FE)

In each case, those who indicated the particular preoccupation were significantly more likely to have also indicated the associated enablers/barriers than those who did not have that preoccupation. There were no cases where the opposite was true; i.e. no cases where those who indicated a particular preoccupation were significantly less likely to have marked any enablers/barriers.

The key factors identified above as being enablers/barriers of ICT sustainability are, not surprisingly, a reflection of people's current pre-occupation. The availability of funds scores highly amongst both groups of users, only in the FE colleges of N. Ireland does staff development rate as more important. Other major concerns include meeting users' demands and expectations; and the phasing of change. Generally staff development ranks much higher in FE (second most important factor) than it does in HE (the least important of the eight main concerns) – it is possible that this is because in HE staff development is thought of in terms of the ICT support staff, whereas in FE this may be considered in terms of all staff who use ICT; this is not to say that the provision of opportunities for the development of ICT technical staff in FE is not considered important. The fourth most common concern in HE was the risk of data loss and the need for data policies and procedures; this was of much less concern for FE, presumably because of less research data, and was, in fact, the least of their concerns.

Questions 6 and 7 were concerned with past experiences of change and current strategies, and the impact they have had on ICT sustainability. Overall, 46% of respondents felt that their past experiences of change had had a positive impact on their ICT sustainability, whilst 37% believed the impact to be negative. Two-thirds of respondents feel that current strategies have a positive impact on ICT sustainability, with 16% viewing current strategies as a negative impact. The apparent differences between HE and FE institutions were found not to be statistically significant. There were no statistically significant differences between FE and HE respondents. There was insufficient data to analyse this question by country.

In FE, a number of institutions pointed to the changing priorities for funding driven by Government policies as making ICT investments high-risk. Whereas others complained of poor focus at a local level and asked for clear direction at a regional, or national, level.

For example, one college noted *“Changing focus of LSC funding and differing demands of the ICT required”* and another *“Continually changing course structures i.e. from BTEC National to GNVQ to AVCE back to BTEC National (rewritten)”*. Another noted the problem of *“proliferation of e-assessment systems with no common standards, support issues and high internal support overheads”*.

Software development and deployment was mentioned as an area of concern by some as it was felt that there was some potential here for resources being wasted. Some saw the parallel development of applications as wasteful and believed that some central guidance could result in greater efficiencies across the HE/FE sectors. This would also be of interest to the sector because of the shared services agenda, and some greater direction from funding councils could be helpful.

A significant number of FE institutions mentioned mergers and new estates programmes as potentially being of benefit to their ICT infrastructure. As one reported *“new building, new equipment everything going well thank you”*. This was in marked contrast to another college that had been through the process a few years earlier and noted *“PFI is a major barrier both to change (contract makes development of space difficult) and spending (almost all ‘profit’ goes towards reducing the cost deficit)”*. The high level of estate development in FE is borne-out by a recent review of college requirements in England, undertaken by UKERNA^[12], where they state that *“Feedback suggests that 15-20% of the sector is currently seeing some kind of building or campus redevelopment. With the opportunities offered by refurbishment or Greenfield sites, colleges are concentrating on technology strategies that would include category 6/7 wiring; campus wireless; VoIP; building management and access control; multimedia content delivery; IP CCTV and others.”*

7.3 Technology, systems and services changes

Question 8 asked respondents what they felt to be the level of the impact of technology changes on their institution's ICT sustainability and to rate it on a seven-point Likert scale ranging from very negative to very positive. Overall, respondents gave a mean score of 4.7 (with this being the same for both FE and HE respondents). Wales was the only country to give a mean score over 5 (at 5.2) with the mean scores of Northern Ireland, England and Scotland all ranging between 4.5 and 4.9 – however, there were no statistically significant differences between the averages.

In question 9 a number of possible changes over the next five years were considered. Unsurprisingly with the current technological climate, overall, respondents expect wireless and mobile working to increase most in its use or application followed by demand for continuous access, and this was the case for both FE and HE respondents. On the whole, all of the listed changes were expected to increase in their use or application. The only possible exception to this is the number of institution owned desktops which had a higher proportion of respondents in the HE sector expecting the number to decrease than were anticipating an increase, and is the only area of change with a statistically significant difference between the sectors. Outsourcing and shared services is the only other area where less than half of respondents expect an increase in its use or application overall. One other area where there was a large discrepancy between the sectors was with the use of non-institution owned equipment on the network – with 50% of FE and 86% of HE respondents expecting it to increase in use, however there was insufficient data for statistical significance.

The use of open source software is expected to grow faster amongst FEIs than in the HE sector whilst at the same time it is expected that there will be greater integration of software systems. On a strategic front, there is expected to be an increased level of linkage between ICT and the estates programme. The overall proportions of respondents expecting the changes to increase, decrease or stay the same in its use or application are illustrated in Fig 9.

On the whole, it appears that people don't think about document sustainability when they chose packages. As one contact commented:

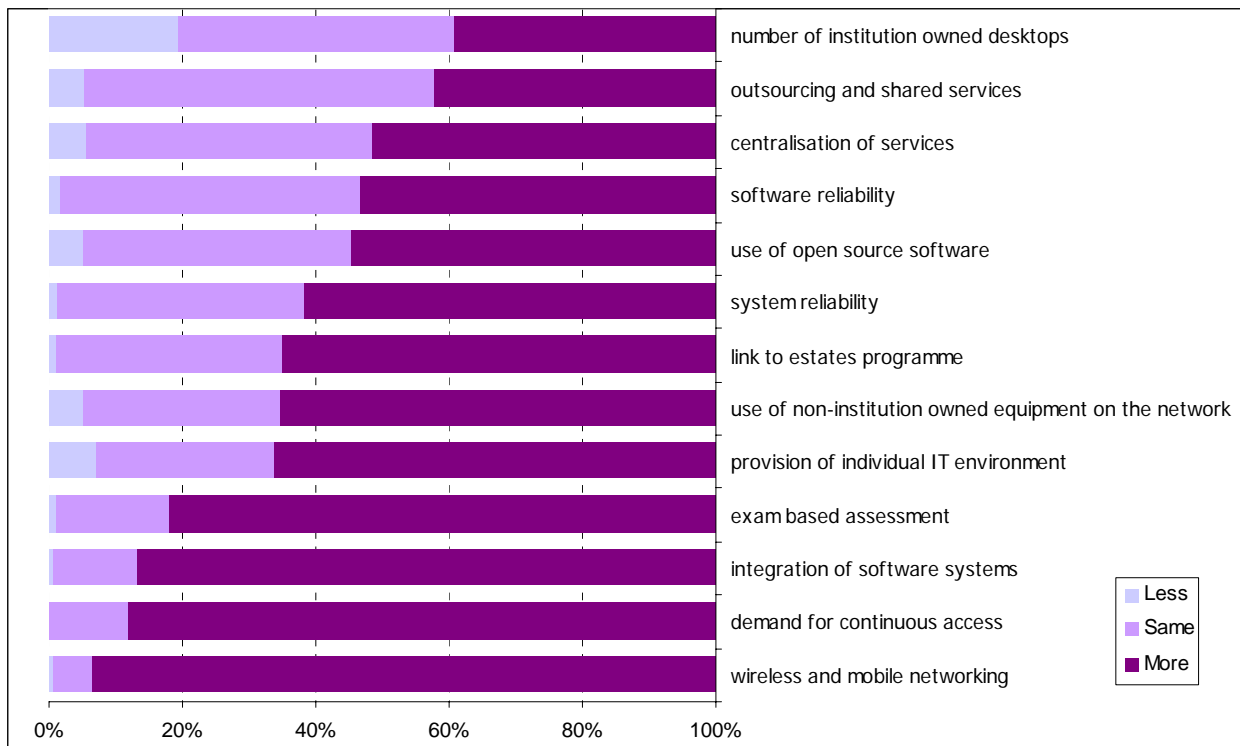
'Software things: I believe quite a few universities world-wide now officially support applications like Firefox, Thunderbird, OpenOffice etc for student use. The beauty of genuinely open source stuff is that you can make it widely available – for download and/or on CDs – without falling foul of licensing restrictions. What you would have to do is think carefully about what support you were going to offer, and to whom (e.g. what does a member of staff do if they get an assignment submitted in an OpenOffice format?).'

'Incidentally one good reason for actually preferring the open source office applications is that they support Open Document formats, which any sensible institution ought to be adopting sooner rather than later, simply for longevity and archiving of electronic material; the greater the investment in .doc and .xls formats becomes, the worse the problem will be in the long run.'

This aspect of sustainability highlights the importance of institutions having a clearly defined and thought through record retention policy. It is probable that much of the information contained in administration systems does not require long-term preservation and systems are not, therefore, required to sustain such data.

There was insufficient data to analyse this question by country.

Fig 9. Changes in the scale and nature of information systems



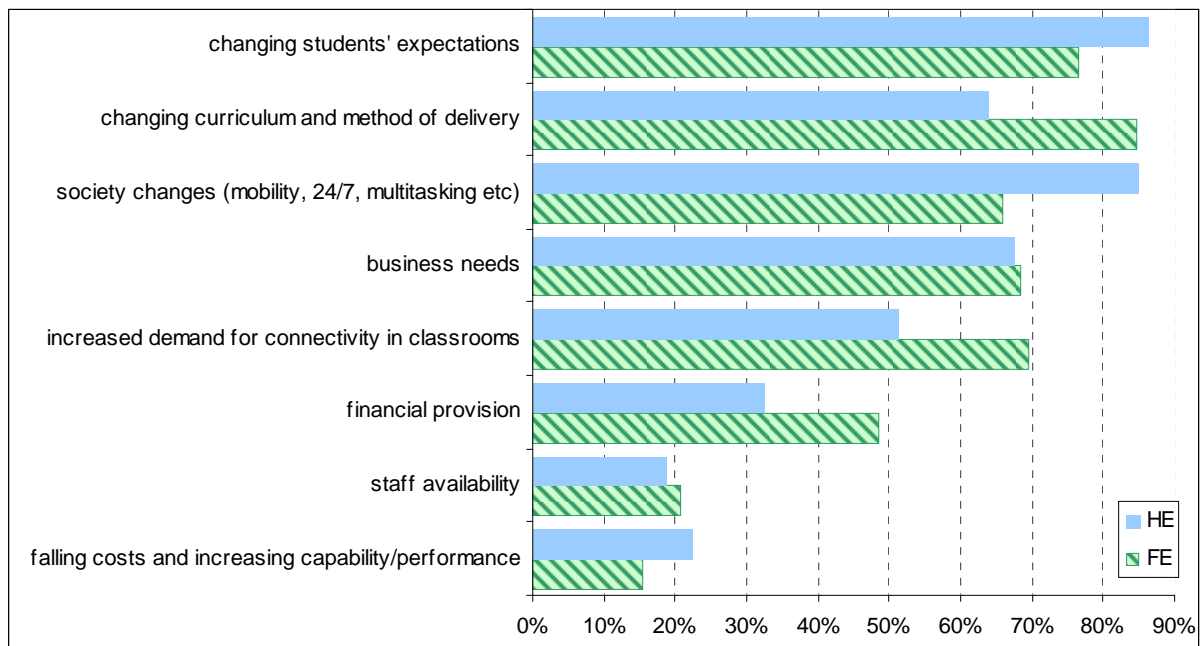
From question 9a it emerged that changing students’ expectations proved to be important in ICT sustainability, with 81% of respondents overall indicating it to be one of the main drivers for the changes discussed above. Other main drivers were considered to be changing curriculum and method of delivery, society changes (mobility, 24/7, multitasking etc.) and business needs – with all of these selected by over two-thirds of respondents. The financial position rates somewhat behind these as a driver. Falling costs and increasing capability and staff availability were rated least as drivers for change – with less than 20% of respondents selecting them.

Again though, there were some clear differences between the sectors, with statistically significant differences in the proportions for financial provision, changing curriculum and method of delivery, increased demand for connectivity in classrooms and society changes. The first three of these are considered more highly as drivers for change in the FE sector, with the latter considered more so by the HE respondents. Fig 10 highlights these differences.

There was insufficient data to analyse this question by country.

We found some evidence of over-stability which mitigates against sustainability. This seems particularly true of older research-led institutions where there had been a long history of both central and departmental ICT provision. Remnants of structure more suited to the age of the mainframe era remain and are ill-suited to the current world in which a user can be as likely to use their own equipment off campus while engaged in university work as their institution’s while on it. We also found instances of academic departments supporting basic functionality such as e-mail way beyond its having become a universal, commodity service. While such services may have begun ahead of the central university’s provision, and may contain some special features, they can become islands stuck in a time warp while the rest of the university moves on.

Fig 10. Main drivers for change



Having considered the range of changes listed in question 9 respondents were asked, in question 9b what they felt the impact of these changes would be on their institution’s ICT sustainability and to rate it on a seven-point Likert scale ranging from very negative to very positive. Overall, respondents gave a mean score of 4.3 (4.1 for HE respondents and 4.5 for those from FE).

7.4 Management practices

Question 10 asked for a rating for the institutional strategic planning method for ICT on a seven-point Likert scale, ranging from centralised to devolved. Over two-thirds of respondents indicate that their institutions' ICT planning is centralised, with no statistical differences between the sectors.

Respondents were also asked (question 11) to comment on whether their institution has a rolling programme for ICT system upgrades – 84% said that this was the case – this, in itself, should be positive for sustainability, if fully funded. There were no statistically significant differences between the sectors. Where respondents had given a range of values, the mid-point was used for the calculation of the means. Overall, the mean length of the replacement cycle for PCs and servers was 3.9 years, with the mean for networks 5.6 years. No significant difference was found between the sector or country averages.

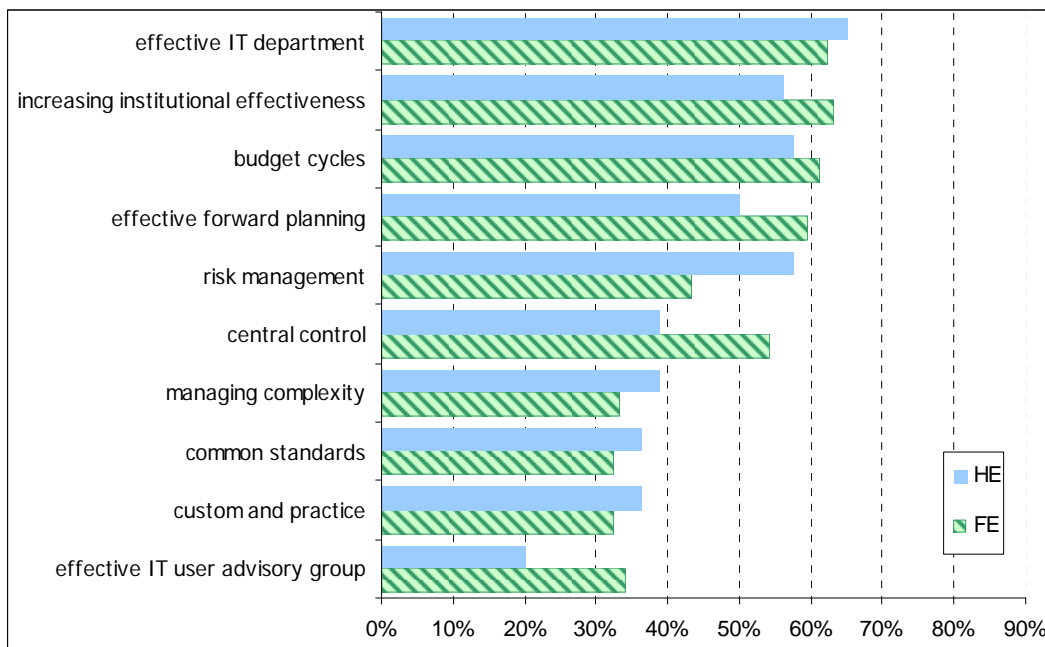
Evidence of over-sustainability was also found in relation to PC hardware. Different policies for dealing with ‘old’ hardware were found, ranging from providing support for many PCs of different vintages and over 40 different images to, at another site, the regular rebuilding of the images for over 8,000 various machines. Another institution guarded against such problems by aiming for a rigid three year replacement cycle for PCs with a fall-back situation that demanded that the image on all machines be updated annually and that all older machines failing to meet the required standards be replaced.

In question 12 respondents were asked to list the key factors influencing the method of providing and managing ICT in institutions. The overall results were:

- Effective IT department (63%)
- Increasing institutional effectiveness (60%)
- Budget cycles (60%)
- Effective forward planning (56%)

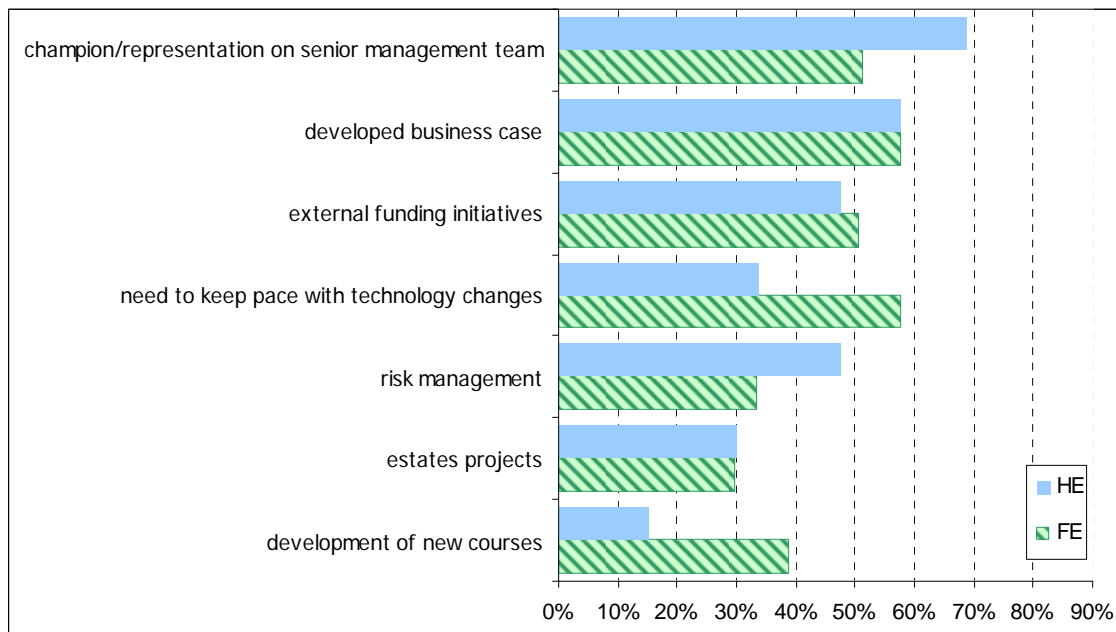
These four key factors are the most selected in both the FE and HE sectors although the ordering does change somewhat, with HE also indicating risk management on a similar level. Two of the remaining factors – central control and effective IT user advisory group – showed statistically significant differences between the sectors, and in both cases respondents in FE institutions found them more influential in management than those in the HE sector. These differences are illustrated in Fig 11.

Fig 11. Key factors influencing ICT provision and management



Question 13 showed that overall, two of the key factors that influence major capital expenditure are a champion/ representation on senior management team (59%) and a developed business case (58%). These are the key factors in both the HE and FE sectors, although their importance is reversed in FE institutions and they are joined by the need to keep pace with technology changes. There are statistical differences between the sectors in the proportions indicating a champion/ representation on senior management team, risk management, the need to keep pace with technology changes and the development of new courses. The first two are considered to be more important by respondents in the HE sector, with those in the FE sector viewing the latter two as more important – this is highlighted by Fig 12.

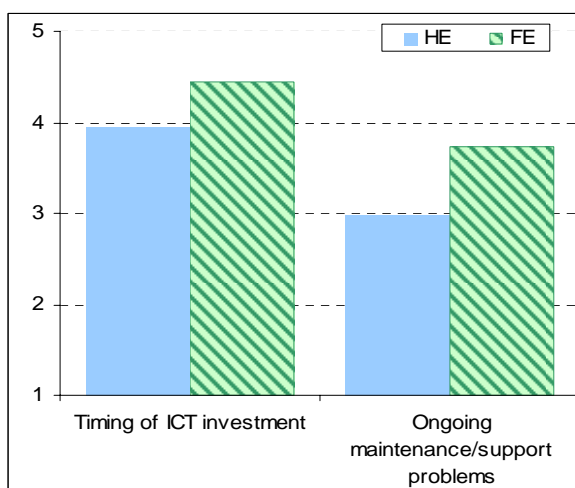
Fig 12. Key factors influencing ICT capital expenditure



It is salutary to note that so many of the main factors are not directly linked to the main institutional business of teaching. **See Recommendation 4 – that JISC draw up a checklist of factors to consider when attempting to link ICT with institutional aims, including consideration of the structures for decision making and long-term financial planning.**

Whilst not at the top of either list the existence of external funding initiatives influences capital expenditure decisions for both groups and is possibly one of the main external and relatively unpredictable influences. Question 14 concerned one-off external funding initiatives and whether these have any bearing on the timing of ICT investment or ongoing maintenance and support problems. Again, respondents were asked to rate their response on a seven-point Likert scale ranging from a significant negative effect to a significant positive effect. Overall, the average rating for the effect of one-off funding initiatives on the timing of ICT investment is 4.3 - the effect on ongoing maintenance and support problems is viewed as a slightly more negative effect with an average rating of 3.4. There are statistically significant differences in the means between the sectors, with HE respondents giving a more negative mean score in both instances – this is highlighted by Fig 13. There were no statistically significant differences between the countries.

Fig 13. Impact of one-off funding initiatives



As was noted “one-off grants of strategic investment have a positive and negative affect – positive in the short term in filling gaps; but negative in the long term in that they do not provide sustainability and provision is unlikely to be made by the institution”.

The following indicates the general sentiment “the college would not turn down (nor should they) a ‘gift’ or one off piece of funding from the funding council even though the equipment it is spent on will not be sustainable”.

This has been recognised by HEFCE in a recent consultation document^[9].

The dangers of one-off funding were clearly recognised in the University of Aberdeen Strategic plan 2001-05^[11]:
“We argued strongly last year that our most urgent need was for capital infrastructure. We are therefore delighted by the response in terms of SHEFC and SRIF funding, though care will be needed to avoid skewing investment too heavily away from non-Science areas Capital to maintain and strengthen an appropriate ICT infrastructure is a further rapidly growing demand ... ”.

Other HEIs recognise the importance of ICT in research and in their information strategies identify this as a research objective, for example Cranfield University^[5] state that *“Researchers are encouraged to obtain sponsorship that includes computational facilities.”* This, of course, is also a reflection of the introduction of fEC.

**HEFCE Capital investment framework
 Consultation on a new approach**

(February 2006/04)

“HEIs need to plan strategically and invest appropriately if their physical infrastructure is to remain fit for purpose in the long term. This is part of the broader issues of the long-term sustainability of higher education and its role in helping to deliver economic and social goals.”

“The main weaknesses of the present capital funding arrangements are:

- a. Capital funding is provided on a limited fixed-term basis, which does not sufficiently encourage long-term planning or optimal use of resources
- b. In many instances HEIs wait until capital funding is announced before deciding how it is to be used.
- c. The present arrangements risk distorting HEIs’ priorities.
- d. Currently we provide separate funding streams for research and for learning and teaching capital. This carries risks; that HEIs plan their requirements in a compartmentalised way and that the underlying supporting infrastructure is not fully considered or adequately funded.”

It is apparent from the project that the extent to which ICT figures in the management of institutions varies quite significantly. One respondent noted that *“very few senior managers in FE seem to see IT as enabling, they see it like training and development as, at best, a hygiene factor, but fund it as a major cost that they feel they can afford to skimp on”.* By contrast, at Bristol University ICT and its sustainability is shown as one of the main duties of a member of the senior management team^[3].

University of Bristol

Roles and responsibilities

Senior Management Team

Director of the Institute for Learning and Research Technology & Assistant Director of Information Services

Main duties/ responsibilities include:

- Identify, promote and pursue strategic opportunities and alliances and engage with appropriate networks, projects and funding streams to support the development and sustainability of systems and services for learning and research

The leadership style also appears to play an important role in determining the confidence that people have in their ability to sustain the infrastructure. Changes in senior management, their attitude to ICT, degree of delegation or propensity to micro manage can all influence the confidence which staff

have in their systems. Thus, many recognise that change can be beneficial for sustainability but, as widely acknowledged, change of leadership can also bring uncertainty to an institution.

7.5 Environmental and energy issues

Overall, just over half of respondents indicated that they know that their institution has formal policies on environmental and energy issues, with approximately one-quarter stating that there are no such policies (question 15). However, this does vary between sectors, with 60% in HE and 45% in FE stating there were policies, although the differences were not found to be statistically significant.

In question 15a respondents were then asked to rate the level of impact these policies have on their ICT provision and their effect on ICT sustainability (question 15b), using a seven-point Likert scale ranging from a significant negative effect to a significant positive effect. Both questions produced relatively neutral results, with a mean score of 4.3 for the level of impact on ICT provision and a mean score of 4.2 for the affect on ICT sustainability. There were no statistically significant differences found between the sectors or countries.

This was an area where an interest was expressed in JISC providing some guidance: *“There are some rough guidelines, but we really want something formal. We're beginning to look at this but something from JISC would be incredibly useful - even a management briefing document to get us started.”* **See Recommendation 2 – that JISC work to increase institutions’ awareness and give guidance on best practice for true long-term environmental sustainability.**

Environmental issues seemed dissociated from ICT considerations although there is growing awareness about disposal and the WEEE directive. As the example in previous sections shows, and it was not unique, power and construction costs are not factored into thinking about ICT sustainability. A current example of this is the prevalent feeling that the basic infrastructure for cluster computing ‘falls out in the wash’, by leveraging the power in student PC labs or personal machines. This results in thousands being left on overnight.

This is an immensely difficult area in which to make the ‘right’ environmental and/or economic decision. For example, we found sites with different techniques for sustaining desktop PC services. One managed thousands of machines of various vintages by building systems ab initio remotely as needed, another kept images for dozens of different PC configurations, another forced physical upgrading across the college every set number of years. It is not possible to say easily which method is the most environmentally sound, weighing up use of raw materials and manufacturing versus electricity consumption versus people time, transport etc. Even at the simpler level of weighing up people cost versus equipment cost, we found institutions’ budgeting and management structures not set up to enable the most cost effective decision to be made.

7.6 Sustainability concerns of users

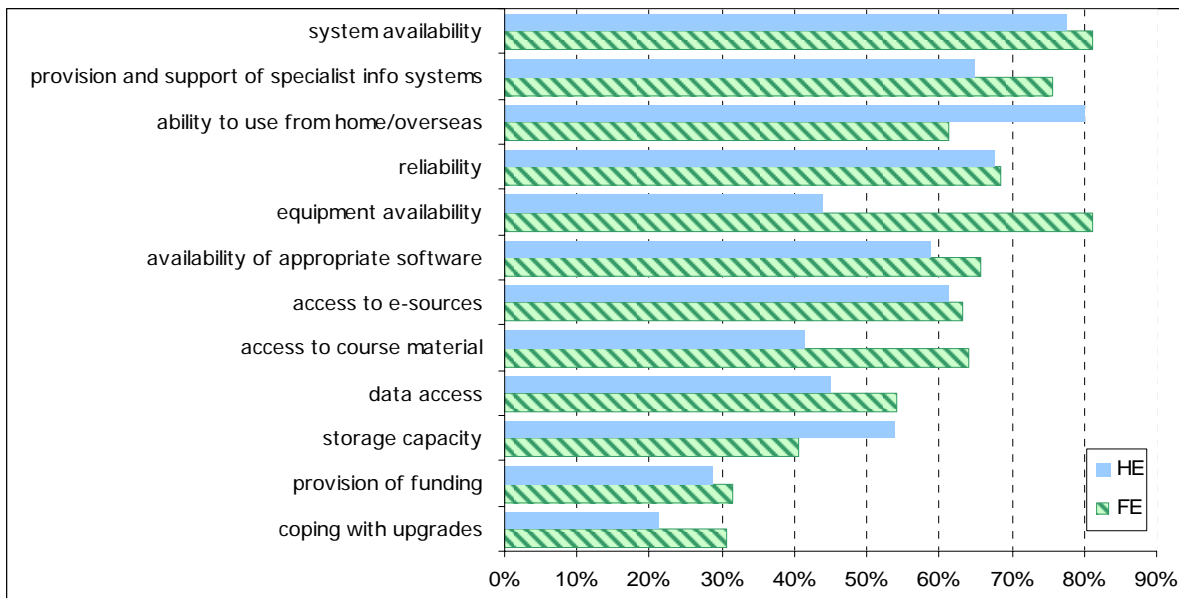
Question 16 concerned respondents’ opinions on what they consider to be the main sustainability concerns of three separate groups of users – academics, management and support services and students. There was insufficient data to analyse this question by country for any of the three user groups.

7.6.1 Academics

Overall, respondents believed system availability (80%), provision and support of specialist information systems (71%), the ability to use from home/overseas (69%) and reliability (68%) to be the four main ICT sustainability concerns of academics. This differs slightly within sectors with FE institutions favouring equipment availability over the ability to use from home/overseas.

There were statistically significant differences between HE and FE in the proportions indicating equipment availability, access to course material and the ability to use from home/overseas. Equipment availability and access to course material are of more concern to academics in FE institutions, with the ability to use from home or overseas a higher concern for those in HE institutions (Fig 14).

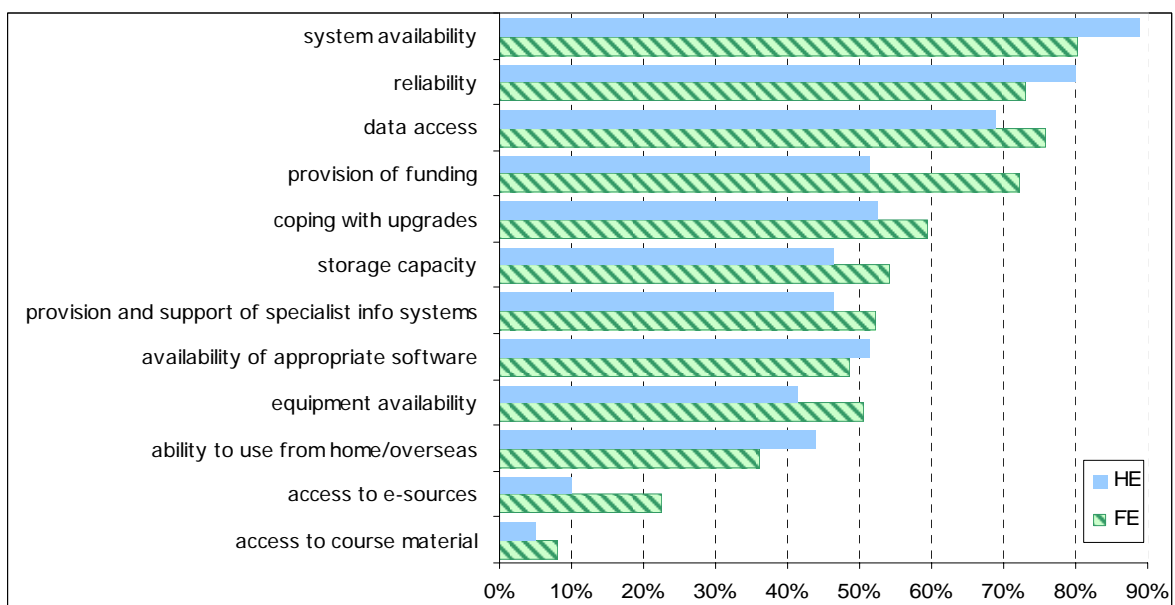
Fig 14. ICT sustainability concerns of academics



7.6.2 Management and support services

Overall, over two-thirds of respondents viewed the main ICT sustainability concerns of management and support services to be system availability, reliability and data access. These are also the top three concerns when looking at the sectors separately – although the order changes slightly, with FE institutions viewing data access as more of a concern than reliability. There were statistically significant differences in the proportions indicating the provision of funding and access to e-sources, with both viewed as more of a concern to management and support services in FE institutions (Fig 15).

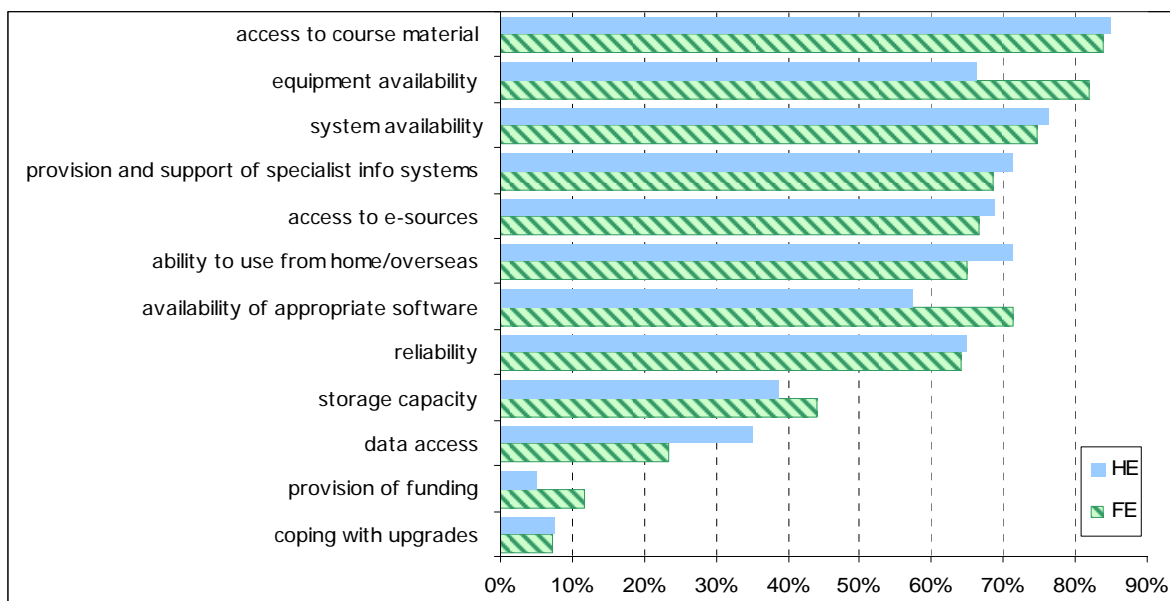
Fig 15. ICT sustainability concerns of management and support services



7.6.3 Students

The four most frequently indicated items among the list of the main ICT sustainability concerns for students are access to course material, system availability, equipment availability and the provision and support of specialist information systems. This is fairly consistent for both HE and FE institutions, although the order varies. However, respondents in the FE sector place a higher importance on the availability of appropriate software than on the provision and support of specialist information systems. Those in the HE sector place a higher importance on the ability to use from home/overseas than on equipment availability. This is highlighted by the fact that there are statistically significant differences in the proportions indicating equipment availability and the availability of appropriate software, with both viewed as more of a concern to students in FE institutions (Fig 16).

Fig 16. ICT sustainability concerns of students



Comparing the three groups and what are viewed to be their main ICT sustainability concerns, we can see that there is much variation. Access to course material is thought to be a concern of academics and students according to 55% and 84% of respondents respectively – this compares to 7% of respondents viewing access to course materials to be of concern to management and support services.

In contrast to this, only 7% and 27% of respondents view coping with upgrades as a concern for students and academics respectively, compared to 57% indicating it as a concern of management and support services. This should probably not come as a surprise, as most students and academics will just expect things to work with no need to care how (and academics may also have some control over the process) whereas amongst administrative staff MIS changes are more likely to be imposed upon them. Thus for the majority of users, ICT has become so ubiquitous that it is almost viewed in the same way as other utilities.

System reliability was also thought to be a significant concern for all members of staff, less so for student users. Academics and students in both sectors are also thought to be concerned about the sustainability of the provision and support of specialist information systems.

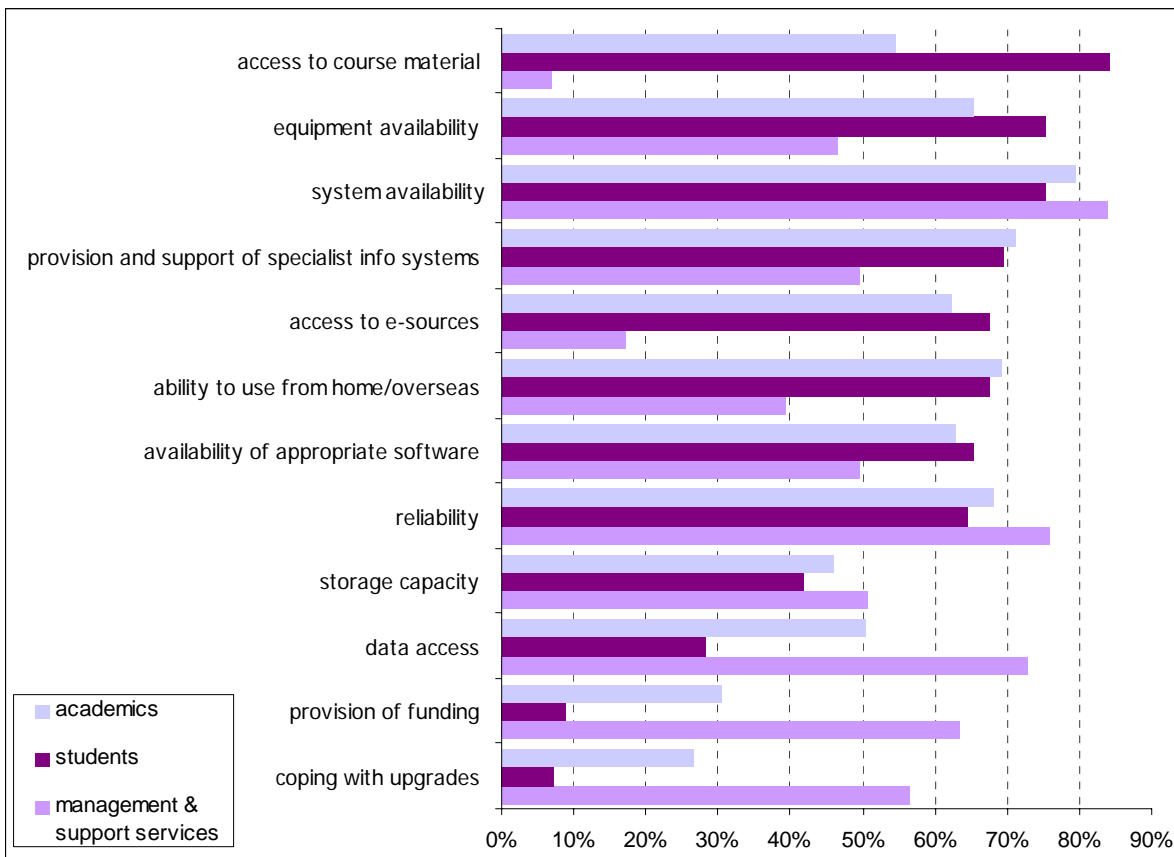
As one respondent noted *“it’s probably something the ‘users’ don’t have as a high thing on their agenda, but would be if we say had a stoppage that brought the VLE or e-mail to*

a halt.” In a similar vein another commented that “*They’re just concerned with the here and now, and just want stuff to work – they don’t care how.*” And another “*Most are completely unconcerned!*” Importantly someone noted that “*Students’ concerns are not the same as those of academic staff. Need to understand which of these groups is our primary customer*”; which is the ‘primary customer’ will, of course, vary within institutions depending on the type of ICT system or service; and also from institution to institution.

Whilst these differences are not surprising considering the nature of the three groups involved, it does illustrate the wide range of concerns thought to be affecting the different stakeholders – this is further illustrated by Fig 17.

Short to medium term sustainability of course material was acknowledged as important and sites had various methods of coping, ranging from fixing material and systems for three years to freezing each year’s material and rolling in the new. Sustainability over more than a few years currently seems impossible, for all the reasons underlying digital curation, including changing technology and lack of standards. Examples cited include non forward or backward compatibility of .doc files, worry about pdf being owned by a company with which none of us has a contract and rss being owned by an individual. User expectation was also cited - for example the diminishing usefulness of material made for OU TV.

Fig 17. ICT sustainability concerns



7.7 Some general observations

The key issue for many institutions, in particular in FE, is the provision of adequate funding for sustainable provision. It is noticeable how frequently ‘finance’ and ‘funding’ appeared in the text comment boxes throughout the questionnaire.

There appears to be an amount of re-organisation taking place in FE at the moment, some of which is seen to be beneficial from the point of view of ICT sustainability. A number of colleges highlighted mergers with other colleges, moving to new premises or rebuilding. Mostly saw this in a positive light and one stated that the rebuild contract included a periodic refresh of the ICT system. However, as previously noted, others have had negative experience of PFI investment.

It was noted that *“One-off funding, especially from external bodies is fine for the implementation of new services, but cannot sustain or replace them in a properly scheduled manner”*; and another *“In particular, no-one likes to let a grant slip through their hands so we have used them on capital without quite knowing how recurrent funding will come.”*

When looking at the service required and what would need to be sustained in the future, someone observed that *“remote access should be assumed to be the norm and on-campus the special case.”*

There were many mentions of planning and strategy and their role in ensuring sustainability, almost as if by having a strategy and some plans that would solve ICT sustainability problems. But it was noted that there is *“tension between long term planning with short term need to deliver a service now.”*

8. Outcomes

The study has identified that the five main issues surrounding ICT sustainability are : funding; planning; management; staff availability/skills and user demands/expectations. Within these headings a number of gaps have been identified in terms of guidance and support needed by institutions and these have been addressed in our recommendations.

We consider each of the five issues in turn and comment on the practical methods being employed to maintain ICT sustainability.

8.1 Funding

There are a number of aspects to this, as already discussed. There are both internal and external influences and these may present different challenges in terms of ICT sustainability.

The ability of institutions to cost courses correctly and to have an understanding of the full economic cost (fEC) of all activities is likely to become increasingly important to ensure adequate future funding.

Internal financial pressures can be many and varied. The most obvious is the ‘quick-fix’ reaction of many institutions to short-term financial pressures – keep the PC’s going for another year. This may be a viable option for one year, but can pose serious problems if pursued in successive years. It was noted by one institution that “50% of PCs over 6 years old and causing the whole college network to run on outdated OS & applications”.

The leasing of ICT hardware can also be viewed as a way of sustaining the infrastructure through the expectation that this will give the ability to ensure that hardware is replaced on a pre-determined regular basis, as specified in the lease terms; leasing also transfers the responsibility for the safe disposal of old machines from the institution to the lease company. Short-term funding considerations may, however, continue to have an impact on replacement cycles through being forced to buy-out the residual value and extend equipment life, rather than entering into new lease contracts.

One institution that we visited was very positive about the benefits of leasing and is planning to gradually extend the role of leasing of ICT hardware as equipment came up for replacement. Others did not believe the benefits of such arrangements arguing that the finance company’s cost of capital was bound to be greater than that of their own institution.

There are a number of ways in which major developments can have long term impact on ICT sustainability. These include such things as estates programmes and one-off initiatives from the funding councils.

PFI and new building programmes can be ways in which some institutions expect to ensure ICT sustainability. New buildings should help to ensure that a modern ICT infrastructure is created but care needs to be taken to ensure that the total cost of ownership is recognised at the outset and that the fabric of the building will outlive that of the ICT infrastructure. In addition PFI type deals need to be sufficiently flexible to accommodate the rapid changes in ICT needs; for example, as student ownership of PCs, notebooks, etc. increases then PCs labs may be expected to decline in importance and demand for the availability of wireless access to become greater.

A major influence is the one-off initiative which may be for research, teaching and learning or increased access. This type of funding is generally strongly biased towards the provision of

lump-sum capital with little, or no, provision of funds for ongoing maintenance, or future upgrades and replacement, or support staff. The sustainability of such an investment is, therefore, compromised or puts greater pressure on existing resources, thereby compromising other aspects of the ICT provision. Whilst, generally, being welcomed as providing the impetus and ability to improve capabilities, the unpredictability of such funding is difficult to build into ICT strategic plans and can impact on the timing of upgrades to the system.

The importance of financial resources was summed-up by David Giaretta, Associate Director for Development of the Digital Curation Centre^[6] who remarked that the primary resource needed for digital preservation is **money**. This statement could equally well be applied to all other aspects of ICT sustainability.

See Recommendation 1 – that JISC increases the advice available to institutions on life-time costing of services and their related systems.

8.2 Planning

We have noted that sustainability concerns appear to be lower in the institutions in which planning is well embedded. It should also be noted that the planning, throughout the institution, needs to be sufficiently flexible to respond to changing circumstances and demands.

When asked about current strategies that have a direct impact on ICT sustainability almost 60 of the respondents specifically mentioned strategy or planning as examples of positive impact, and one also mentioned the importance of “*top level recognition of mission critical risk issues*”.

One college ascribes its relative confidence in the sustainability of its ICT infrastructure, to its thorough and integrated planning processes. The SMT sets strategic targets and the subsidiary strategies (for example Learning and Teaching, ICT) are tested for alignment with these. There then follows an iterative process in which strategic targets, supporting strategies and operational plans are checked for consistency and feasibility before the final integrated plan is accepted. The whole process is ‘owned’ by the SMT, providing leadership from the front.

The attitude to and implementation of strategy and plans appears to be key to this success. Whilst all institutions will claim to have strategic plans, in some form or another, the way in which these are interpreted and used within the organisation varies considerably. The institutions that have the greater concerns over their ICT sustainability are those that operate in an unstable environment due to frequent changes of policy and direction. A well constructed plan provides clear direction and has the flexibility to adapt to changing circumstances whilst providing a stable base for the implementation of ICT and IT development. The predictability of funding is also, of course, key to the ability to execute institutional plans.

See Recommendation 4 – that JISC draw up a checklist of factors to consider when attempting to link ICT with institutional aims, including consideration of the structures for decision making and long-term financial planning. This recommendation also relates to recommendation 1 arising from the StrICT project recently completed by the University of East London and Education for Change.

8.3 Management

This is probably the most important aspect for ensuring sustainability. Senior management style is largely responsible for giving the institution confidence in itself – a “can do” attitude. This will

be reflected in the way that decisions are taken, how plans are implemented, how funds are allocated, how staff are treated and how user (staff and student) demands are dealt with.

Worryingly, one college noted that “*Change of management style and leadership which does not see ICT as fundamental to the institution’s success and sustainability*”. Whilst another reported that “*Management buy-in*” had had a positive effect on sustainability.

The way in which ICT is managed can vary considerably between institutions. It appears that, generally, there is more freedom and variety in HE, partly due to the varying demands and nature of research projects. In FE there is a greater opportunity to adopt a more centralised approach to ICT management with some colleges determining the minimum specification for PCs that they would support, and using this to determine forthcoming replacements. Through adopting this approach they have been able to ensure that all network machines have the same image. Providing that the funding remains available to maintain this policy then this will aid the sustainability of their system and services.

Management of content is also important, with external web content causing some concerns as sites change and web links, which may be embedded in teaching and learning material, become out-of-date or non-functional.

The attitude to open source software varies but those that use it appear not to have greater concerns about its sustainability – especially where they have some local development capability.

For VLE there are many users of open source software (mainly Moodle) and also many using commercial software such as Blackboard or WebCT. We found little concern over the sustainability of Moodle, mainly due to its widespread use across the world and also because of the implied endorsement by the OU. The users of Blackboard and WebCT were less sure of the sustainability of their VLE due to the recent acquisition of WebCT by Blackboard and the resultant uncertainty over the long term prospects for both of these software packages.

8.4 Staff availability/skills

Time pressures on staff are seen as being detrimental to sustainability. There is the complaint that insufficient training time is available for staff to become familiar with new software and systems. For example the way in which e-learning software is used can vary widely across an institution, as has been picked up in student satisfaction surveys.

In many cases the ability to support legacy systems will depend upon staff knowledge and retention; given the probable age and experience profile of many central ICT support teams this should not be relied upon for very much longer.

Some experience has shown that when funds are available it may be better to “buy” time of permanent staff in departments, to create a number of ICT/ILT champions, rather than to make a full-time appointment; the champions then become embedded in the institution and aid sustainability.

For some institutions staff progression and development can be challenging, as some ICT staff are reported to be happy at their present level and reluctant to move up to a managerial position - this can result in ‘over-sustainability’. For some specialist positions there is also the problem of staff retention when such expertise is also in demand in the commercial market. Each of these

has implications for sustainability. Such problems are, to an extent, cyclical depending on the external economic environment and commercial/industrial trends.

See Recommendation 3 – that JISC produce guidance for managers on ICT staff performance appraisal, development and career planning.

8.5 User demands/expectations

As ICT in its many forms becomes more affordable it is becoming more ubiquitous but also, in many respects, more varied. Thus staff and students today have access to a wide range of equipment from laptop PCs and notebooks to PDAs, iPods, Blackberries, 3G mobile phones and PSPs, etc. Each has the ability to play a part in the academic work of an institution, and as ownership of these, and other new technologies, becomes wider so user demands will change. The past few years has seen a great increase in the demand for mobile access and campus-wide wireless coverage. Also system and content availability 24/7 is becoming increasingly important. The ability to provide access across a number of platforms in a variety of formats will pose an interesting sustainability challenge that must, eventually, focus on the content, not the technology.

For example, we heard of institutions where the ability to meet the high rating given by users to system availability was largely reliant upon the goodwill of technical staff to resolve difficulties that occur outside of 'normal working hours'.

9. Conclusions

A report on IT flexibility from the Butler Group^[4] sums up some of the feeling we got, especially from the older universities, that sustainability can sometimes be mistaken for keeping what you've got going.

Achieving IT Flexibility (Butler Group, October 2006).

“In a constantly changing business and social environment, organisations in both commercial and public sectors must continuously adjust priorities and react to internal and external demands. In the majority of cases, the IT function has been seen as an inhibitor of change, burdened by isolated systems, a lack of interoperability, and a poor track record of delivery. However, if organisations are to become truly agile, they must develop an approach to IT that incorporates flexibility in all aspects; from architectural design through to models of delivery.

“Achieving IT flexibility requires a well planned and consistent approach that draws together the domains of infrastructure, software, operations, management, and governance. IT flexibility will be a significant driver for competitive advantage, whilst the alternative of persisting with a disjointed and unmanaged approach will result in underperformance and increasingly unmanageable complexity”

The study highlights a number of issues, at various levels, that need to be recognised and addressed by the sector in order to ensure the sustainability of institutions' ICT infrastructure:

- The extent to which ICT infrastructure and systems are sustained and how they are sustained is directly related to **money**
- The way in which the ICT resources are managed and governed is also important for the long term
- How can the attitude of senior management towards ICT be changed, where necessary, to recognise its importance to the long-term sustainability of the institution?
 - Should ICT sustainability become a required topic for disclosure/debate, at least on an annual basis, at Governors/Council/Senate meetings.
 - Need to encourage more institutions to consider the Total Cost of Ownership for all new ICT investment – need to recognise on-going operating and support costs.
 - can JISC help in providing guidance on, for example, running costs by type of machine.
 - How can **all** institutions be encouraged to integrate ICT into their strategic plans effectively and fully, and provide the resources to implement them?
 - ICT Governance structures need to be strengthened to reduce the incidence of “hobby projects”
- As one respondent noted: “... *need to understand that we are a very long way from steady state and thus sustainability ... must learn to regard systems and technologies as disposable items, not capital investments. Outmoded technology must be discarded, backwards compatibility should be a bonus, not a pre-requisite*”.
- Need to link ICT sustainability strategies to guidelines on record retention, particularly for administration and management systems
- The extent to which services are shared between and across institutions

- JISC to help make best use of resources by establishing standards and leading software solution evaluations
 - Stronger direction from JISC would be helpful at times – not everyone needs a ‘racing car’ or ‘Rolls-Royce’ solution.
- JISC, or the funding councils should provide guidance on environmental and energy issues, or even an outline ICT environmental strategy.
- Can/should JISC help by providing a framework for:
 - Information strategies **AND** IT strategies
 - ICT system and infrastructure reviews
- Should JISC provide a toolkit for the evaluation of the various options for financing ICT investment, including leasing?
- Can JISC help to embed fECs for information services through provision of guidance on operating costs by system/hardware type – the reason for the introduction of fEC was to enable sustainability
 - fEC should also enable better estimation of TCO
- Should application of fEC methodologies across the institution be used as a driver for the hypothecation of funds?
- Can the Funding Councils be encouraged to adopt a longer-term strategy for ICT funding, in place of the current short-term initiatives?
- How can JISC help to facilitate the exchange of innovative practice on ICT sustainability?
- Withdrawal of LSC from JISC is perceived to have disadvantaged the FE sector in England.

Whilst variety and diversity can result in important new developments, not all institutions will benefit from such freedom. The degree to which individual institutions ICT infrastructure is sustainable will continue to vary considerably from one to another driven, in part, by the degree to which its importance is recognised by the senior management.

Given the wide variety of demands on, and uses of, ICT across HE and FE it will be very difficult to ensure that every institution has achieved and can maintain sustainability. However all institutions should be encouraged to put into place an appropriate mechanism to review and implant policies and procedures that will assess, monitor and guide ICT sustainability.

A code of best practice for ICT sustainability is required.

10. Recommendations

Our recommendations from this report are listed below:

Recommendation 1 – costing of ICT systems

While the introduction of the fEC agenda in the research arena has provided some guidance on the true costs of running systems and services, there is evidence that institutions enter into new ICT-related capital projects in particular without due regard for the longer term ICT sustainability issues. We therefore **recommend that JISC** (in conjunction with bodies such as UCISA and the purchasing consortia) **increase the advice available to institutions on life-time costing of services and their related systems**. Additionally it is recommended that the services considered first are those thought most important by the respondents to the questionnaire.

Recommendation 2 – ICT and the environment

There is potentially a disparity between people's actions concerning overall environmental sustainability and ICT sustainability. Taking a truly holistic view of the environmental effects of ICT-related decisions is immensely complex. **We recommend that JISC** work with bodies concerned with this area (for example the RSA, BCS, the Funding Councils) at least to increase institutions' awareness, and, where possible, to **give guidance on best practice for true long-term environmental sustainability**.

Recommendation 3 – staff performance

ICT sustainability can sometimes be mistaken for 'keeping the old systems going' and there is evidence, particularly in the HE sector, that institutions find difficulty for example in orienting some staff towards the institutional aims and in making well-planned decisions on in- versus out-sourcing. This can result in (often highly technically able) staff maintaining systems which either are no longer fully fit for purpose or duplicate others. **We recommend that JISC** work with bodies concerned with staff development and appraisal (for example, the Leadership Foundation for HE, HEFCE's LGM fund, the club of HE/FE personnel directors...) to **produce guidance for managers on ICT staff performance appraisal, development and career planning**. This should cover ICT support staff in academic departments as well as those managed by a central IT service.

Recommendation 4 – institutional aims

In some cases it seems difficult to link an institution's development of ICT directly with its core business aims. While there is talk of information strategy, so many of the underlying ICT systems have become commodities that they do not offer a strategic advantage or differentiate an institution from its peers. Many of the strategic decisions about basic ICT do not therefore pose the step-change question 'shall we have this service at all' but rather 'what risk are we prepared to take on having it at a certain level?' Linking such value judgments to institutional aims is hard. **We recommend that JISC**, in consultation with related bodies (for example, UUK and CUC) **draw up a checklist of factors to consider when attempting to link ICT with institutional aims**, including consideration of the structures for decision making and long-term financial planning. A further example of the need to address these issues is the current debate over shared services. There are also a number of specific related issues which could be incorporated into such a checklist including: shared services, VLE, digital curation, record retention, business continuity planning and disaster recovery, external providers etc.

Recommendation 5 – dissemination of a management report

It was noted by an assessor that the report in its present form, whilst meeting the requirements of JISC, did not easily meet the needs of ICT heads in institutions. It is **proposed that JISC should approve funding for the preparation of a report for dissemination to senior ICT managers**.

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Glossary of abbreviations

(includes abbreviations used in the summary of text replies shown on the ①-continue project web site)

A4BC	Action for Business Colleges	IS	information services
A/C	air conditioning	IT	information technology
ADS	automated deployment services	ITIL	IT infrastructure library
ANIC	Association of Northern Ireland Colleges	JCPSPG	Joint Costing and Pricing Steering Group
AV	audio visual	JISC	Joint Information Strategy Committee
BC/DR	business continuity/disaster recovery	JOS	JISC Organisational Support committee
BECTA	British Educational Communications & Technology Agency	LAMP	Linux, Apache, MySQL & Perl/PHP
CAUDIT	Council of Australian University Directors of Information Technology (also covers universities in New Zealand, PNG and the South Pacific)	LCD	liquid crystal display
CDP	continuing professional development	LIS	library & information services
CEL	Centre for Excellence in Leadership	LSC	Learning and Skills Council
CIS	computing and information services	LTAS	learning teaching & assessment strategy
CMS	content management system	MIS	management information system
CPD	Continuing Professional Development	MLE	managed learning environment
CPU	central processing unit	NDS	Novell directory services
CoVE	Centre of Vocational Excellence	NGS	National Grid Service
CRM	customer relationship management	OS	operating system
CRT	cathode ray tube	OU	Open University
DEL	Department of Education and Learning (N. Ireland)	PC	personal computer
DfES	Department for Education and Science	PDA	personal digital assistant
DR/RM	disaster recovery / risk management	PFI	private finance initiative
DVC	Deputy Vice Chancellor	PSP	Play Station Portable
eQuIP	e-Learning Quality Improvement Programme	PVC	Pro Vice Chancellor
ERP	enterprise resource planning	QTLS	Qualified Teacher Learning & Skills
EUNIS	European University Information Systems	SAN	storage area network
FE	further education	SFC	Scottish Funding Council
fEC	full economic cost	SFEU	Scottish Further Education Unit
FEI	further education institution	SHEFC	Scottish Higher Education Funding Council
fforwm	the national organisation representing the FE colleges and institutions in Wales.	SLA	service level agreement
HE	higher education	SMT/SMB	senior management team / board
HEFCE	Higher Education Funding Council for England	SOA	service oriented architecture
HEI	higher education institution	SRIF	science research investment fund
HPC	high performance computing	T&L	teaching and learning
ICLT	Information, communications & learning technology	TCO	total cost of ownership
ICT	information communications technology	TTF	thin film transistor (PC screens)
IIP	Investor in People	UCISA	Universities and Colleges Information Systems Association
ILT	information and learning technology (mainly used in FEIs - refers to the use of ICT to support the core business of colleges: the delivery and management of learning)	VC	Vice Chancellor
		VFM	value for money
		VLE	virtual learning environment (e.g. based on Blackboard, Moodle, WebCT etc.)
		VOIP/VoIP	Voice over IP (internet protocol)
		WEEE	waste electrical & electronic equipment
		WIP	work in progress

Appendices

1. The Questionnaire
2. Questionnaire Results Summary

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The Questionnaire

①-continue — ICT Sustainability Survey



The University of Reading



Welcome, and many thanks for considering a reply to this national survey. As we noted in the invitation e-mail addressed to you or one of your colleagues, your response is important as a key part of the evidence gathering for the ①-continue study being undertaken on behalf of the JISC.

①-continue investigates the methods by which UK higher and further education institutions currently sustain and develop their ICT information systems infrastructure. This work is funded under the JISC Management and Leadership programme.

ICT is a driver as well as a tool and sustainability does not necessarily mean that we can run today's technology tomorrow. If it did we would all still be supporting teletypes on a mainframe. Even if our institutions did not change their aims at all, we cannot now guess at the ICT environment in decades to come. This is what makes ICT sustainability complex. For the purpose of this study we define ICT sustainability as: *'the extent to which choices made today enable the institution in the future to have access to the ICT it needs'*.

It is your view of your concerns/solutions, not a single *'official'* view from each institution, that we are seeking. It would be tremendously helpful if you complete this questionnaire before the **NEW EXTENDED DEADLINE of Monday, 10th July 2006**.

We hope that the methods and practices used to sustain ICT infrastructure is a subject of interest and importance to you, and in this questionnaire we invite you to contribute your experience and views to the study and to express your interest in sharing experiences with others in the sector.

On behalf of the ①-continue project team at the University of Reading and LISU at Loughborough University thanks, in advance, for any help you can give and best wishes

Annette Haworth
Director of Information Services
The University of Reading
Project Director ①-continue

Roger Jones
Project Manager ①-continue
The University of Reading

①-continue — ICT Sustainability Survey

Institution name

* required field

Some ICT Specifics

2 For each of the following, please rate their likely importance to your institution over the next five years, and their sustainability:

Importance (1=low, 7=high)								Sustainability (1=not a worry, 7=huge worry)						
1	2	3	4	5	6	7		1	2	3	4	5	6	7
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	e-learning systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	e-science systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	library systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	e journals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	institutional repositories	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	digital curation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	interactive video links and/or access grids	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	web support and content management (inter & intranet)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	management information and administration systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	nationally provided services (eg JANET, JSTOR, NGS etc)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	high performance computing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	grid computing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	hardware renewal and replacement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	software acquisition and maintenance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	physical network infrastructure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	availability of experienced/qualified staff	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	provision of facilities for the disabled	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	others (please specify below)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Others and comments on the above:

N.B. For the FE Questionnaire e-science systems, institutional repositories, high performance computing and grid computing were excluded from the above list.

3 What do you consider to be the *main* enablers of ICT sustainability? *please tick all that apply*

- adequate funding
- forward planning
- support from institution
- staff with relevant expertise
- technology advances
- customer expectation
- common standards
- others *(please specify)* or add comments on the above

4 What do you consider to be the *main* barriers to ICT sustainability? *please tick all that apply*

- inadequate funding
- changing priorities
- reaction to short-term events
- lack of support/understanding at senior level
- insufficient experienced staff
- misdirected investment
- speed of technological change
- mix of standards and/or operating systems
- others *(please specify)* or add comments on the above

5 What are your *current* pre-occupations about ICT sustainability? *please tick all that apply*

- available funds
- staff development
- increasing maintenance costs
- matching to institutions' strategy
- users demands and expectations
- phasing of change and introducing new technologies
- system reliance and reliability
- risk of data loss and need for data policies / procedures
- others *(please specify)* or add comments on the above

5a Is anything being done about them? Yes: *please describe* No: *please describe why not* Don't know**5b Is this being helped, or hindered, by institutional practices (eg decision making structures, financial planning and staffing policies)?** Yes, helped Yes, hindered No Don't know**6 Have you had past experiences of change which impacted on your sustainability?** Yes, positive impact: *please describe* Yes, negative impact: *please describe* No**7 Do you have current strategies that you believe have a direct impact on ICT sustainability?** Yes, positive impact: *please describe* Yes, negative impact: *please describe* No

8 What do you feel is the likely impact of technology changes on the sustainability of your institution's systems?

Very negative	1	2	3	4	5	6	7	Very positive
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

9 What changes do you foresee in the scale and nature of your information systems and infrastructure over the next five years? *please rate all that apply*

Less	Same	More	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	link to estates programme
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	exam based assessment
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	outsourcing and shared services
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	system reliability
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	software reliability
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	use of open source software
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	centralisation of services
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	integration of software systems
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	wireless and mobile working
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	provision of individual IT environment
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	demand for continuous access
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	number of institution owned desktops
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	use of non-institution owned equipment on the network
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	others <i>(please specify)</i> or add comments on the above

9a What are the *main* drivers for these changes? *please tick all that apply*

- financial position
- staff availability
- changing students' expectations
- changing curriculum and method of delivery
- business needs
- falling costs and increasing capability/performance
- increased demand for connectivity in classrooms
- society changes (mobility, 24/7, multitasking etc.)
- others *(please specify)* or add comments on the above

9b Please rate the overall implication for sustainability of these changes

Very negative 1 2 3 4 5 6 7 Very positive

Financial and managerial influences

10 How would you best describe your institutional strategic planning method for ICT?

Centralised 1 2 3 4 5 6 7 Devolved

11 Do you have a rolling programme of ICT system upgrades?

Yes: length of cycle (years)?

 PCs Servers Networks

No Don't know

12 What do you regard as the key factors influencing the method of providing and managing ICT in your institution? please tick all that apply

- custom and practice
- managing complexity
- risk management
- central control
- common standards
- budget cycles
- effective IT department
- effective forward planning
- effective IT user advisory group
- increasing institutional effectiveness through IS systems and services
- others (please specify) or add comments on the above

13 What are the key factors that influence major ICT capital expenditure in your institution? please tick all that apply

- champion/representation on senior management team
- developed business case
- risk management
- estates projects
- external funding initiatives
- need to keep pace with technology changes
- development of new courses
- others (please specify) or add comments on the above

14 To what extent do one-off external funding initiatives

a) affect timing of ICT investment?

	1	2	3	4	5	6	7	
Significant negative effect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Significant positive effect

b) present ongoing maintenance and support problems?

	1	2	3	4	5	6	7	
Significant negative effect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Significant positive effect

15 Does your institution have formal policies on environmental and energy issues?

Yes No Don't know

If yes:

a) What level of impact do these have on your ICT provision?

	1	2	3	4	5	6	7	
Significant negative effect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Significant positive effect

b) How do they affect ICT sustainability?

	1	2	3	4	5	6	7	
Significant negative effect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Significant positive effect

Comments on impact of environmental and energy issues

Users

16 What do you understand to be the *main* ICT sustainability concerns of each of the following groups of users? *please tick all that apply*

	academics	management and support services	students
system availability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
equipment availability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ability to use from home/overseas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
data access	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
access to e-sources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
availability of appropriate software	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
storage capacity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
provision of funding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
coping with upgrades	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q16 (cont)	academics	management and support services	students
reliability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
access to course material	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
provision and support of specialist information systems (eg VLE, VRE, student and staff portals)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
others <i>(please specify below)</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

or add comments on the above

General comments

17 Please use this space to elaborate on any answers, or outline any other issues or concerns relating to ICT sustainability in your institution which are not covered above.

Contact details

18 Would you be interested in exchanging views and sharing good practice with others through receiving email bulletins?

Yes No

19 Name

20 Your title / position in your institution

21 Your email address

Thank you for taking the time to complete this survey.

Please return to: **LISU**
Loughborough University
Loughborough
Leicestershire LE11 3TU

If you have any queries or want to contact us please email the ①-continue project team at i-continue@reading.ac.uk

Questionnaire Results Summary

Summary (191 replies)	Averages					Further Education Institutions				
	Higher Education Institutions					Further Education Institutions				
	England	Scotland	Wales	N.Ireland	Total	England	Scotland	Wales	N.Ireland	Total
No. Replies	60	10	7	3	80	84	17	2	8	111
No. Institutions	54	9	5	2	70	71	16	2	7	96
Q2 For each of the following rate importance to your institution over the next 5 years (1=Low, 7=High)										
e-learning systems	6.4	6.1	6.4		6.3	6.0	6.0		5.8	6.0
e-science systems	3.2	4.0	2.4		3.2					
library systems	5.9	6.0	6.3		6.0	5.4	5.2		5.4	5.4
e journals	5.6	6.4	6.5		5.8	4.3	3.3		4.8	4.2
institutional repository	4.7	4.6	4.8		4.7					
digital curation	3.9	5.3	3.4		4.0	3.6	3.3		3.9	3.6
interactive video &/or access grids	4.4	4.8	4.0		4.5	4.2	3.6		4.9	4.2
web support & content management	6.2	6.4	6.4		6.3	6.1	5.9		6.1	6.1
management information & admin systems	6.3	6.7	6.3		6.3	6.5	6.3		6.0	6.5
nationally provided services	5.8	6.3	5.7		5.9	5.6	5.9		5.8	5.7
high performance computing	3.3	4.3	2.9		3.4					
grid computing	3.0	3.8	2.4		3.0					
hardware renewal & replacement	6.0	6.7	5.9		6.1	6.1	5.8		6.3	6.1
software acquisition & maintenance	5.8	6.7	6.0		5.9	5.7	5.6		6.0	5.7
physical network infrastructure	6.3	6.9	6.3		6.4	6.3	6.0		6.3	6.3
availability of experienced/qualified staff	6.2	6.9	6.3		6.3	6.1	6.4		6.1	6.2
provision of facilities for the disabled	5.3	6.2	5.7		5.4	5.8	5.7		5.9	5.8
... and their sustainability (1=No worry, 7=Huge worry)										
e-learning systems	4.7	4.4	3.3		4.5	4.2	4.1		4.7	4.2
e-science systems	2.9	2.6	2.1		2.8					
library systems	3.4	4.4	3.2		3.5	3.0	3.6		4.1	3.2
e journals	4.2	5.1	3.8		4.3	3.1	2.7		3.9	3.1
institutional repository	4.2	3.8	3.3		4.1					
digital curation	4.0	3.3	2.8		3.9	3.1	3.3		3.7	3.1
interactive video &/or access grids	3.6	3.0	3.0		3.5	3.7	3.1		4.7	3.7
web support & content management	4.7	5.2	4.6		4.7	4.2	4.6		4.7	4.3
management information & admin systems	4.7	5.0	5.0		4.8	4.2	4.4		5.1	4.3
nationally provided services	3.2	3.3	3.3		3.2	3.4	3.0		4.3	3.4
high performance computing	3.2	2.6	2.1		3.0					
grid computing	2.9	2.5	2.1		2.8					
hardware renewal & replacement	4.6	5.2	4.6		4.7	4.9	4.4		4.9	4.8
software acquisition & maintenance	4.6	5.2	4.4		4.7	4.6	3.6		4.7	4.4
physical network infrastructure	4.5	5.2	4.7		4.6	4.5	3.9		5.4	4.4
availability of experienced/qualified staff	5.2	5.0	4.6		5.1	4.9	5.3		4.7	4.9
provision of facilities for the disabled	3.6	4.3	3.7		3.7	3.9	3.2		4.7	3.8
Q3 What do you consider to be the main enablers of ICT sustainability ...?										
adequate funding	82%	80%	71%		81%	90%	82%		100%	89%
forward planning	85%	100%	86%		88%	76%	71%		75%	76%
support from institution	70%	90%	86%		75%	68%	76%		63%	69%
staff with relevant expertise	57%	80%	71%		60%	75%	76%		100%	77%
technology advances	12%	30%	14%		14%	32%	18%		38%	31%
customer expectation	27%	50%	29%		29%	38%	29%		25%	36%
common standards	43%	80%	29%		48%	43%	47%		25%	43%
Q4 ... and main barriers to ICT sustainability?										
inadequate funding	80%	80%	100%		83%	87%	94%		100%	88%
changing priorities	42%	80%	43%		48%	50%	35%		38%	47%
reaction to short-term events	52%	50%	71%		53%	49%	29%		13%	43%
lack of support/understanding at senior level	67%	90%	29%		68%	44%	65%		38%	47%
insufficient experienced staff	47%	60%	43%		49%	51%	53%		63%	53%
misdirected investment	35%	40%	29%		34%	36%	41%		13%	35%
speed of technological change	33%	60%	14%		34%	38%	29%		38%	37%
mix of standards &/or operating systems	33%	40%	29%		35%	29%	29%		50%	32%
Q5 What are your current pre-occupations about ICT sustainability?										
available funds	58%	60%	43%		59%	75%	71%		63%	73%
staff development	27%	40%	14%		29%	62%	65%		88%	65%
increasing maintenance costs	28%	50%	43%		33%	26%	24%		38%	26%
matching to institutions' strategy	43%	20%	14%		38%	46%	29%		25%	41%
users demands & expectations	55%	50%	43%		53%	64%	65%		38%	62%
phasing of change & introducing new technologies	60%	60%	71%		60%	46%	35%		25%	42%
system reliance & reliability	38%	40%	14%		36%	35%	18%		25%	32%
risk of data loss & need for data policies / procedures	47%	50%	43%		45%	21%	35%		13%	23%

Summary (continued)	Averages					Further Education Institutions				
	Higher Education Institutions				Total	England	Scotland	Wales	N.Ireland	Total
Q5a Is anything being done about them? (% Yes)	77%	60%	86%			76%	75%	76%		75%
Q5b Helped or hindered by inst. practices (% Helped) (% Hindered)	30%	40%	71%		35%	42%	59%		63%	47%
	47%	20%	14%		41%	31%	18%		13%	27%
Q6 Have you past experience of change impacting on sustainability (% Yes +ve) (% Yes -ve)	50%	50%	43%		50%	40%	47%		63%	43%
	33%	50%	43%		35%	39%	41%		25%	39%
Q7 Do you have current strategies which impact on sustainability? (% Yes +ve) (% Yes -ve)	77%	70%	71%		74%	62%	65%		38%	61%
	15%	10%	43%		16%	19%	6%		13%	16%
Q8 What do you feel is the likely impact of technology change on sustainability of your inst. systems? (1=V.-ve, 7=V.+ve)	4.6	5.0	5.0		4.7	4.6	4.8		4.5	4.7
Q9 What changes do you foresee in the scale & nature of your info. systems & infrastructure over the next 5 years? (Less=-1, More=+1)										
link to estates programme	0.65	0.88	0.57		0.67	0.59	0.60		0.88	0.62
exam based assessment	0.63	1.00	0.83		0.71	0.91	0.62		1.00	0.88
outsourcing & shared services	0.53	0.57	0.67		0.55	0.21	0.36		0.50	0.24
system reliability	0.66	0.70	1.00		0.71	0.53	0.50		0.50	0.53
software reliability	0.49	0.70	1.00		0.57	0.49	0.43		0.38	0.48
use of open source software	0.29	0.33	0.57		0.31	0.71	0.31		0.38	0.63
centralisation of services	0.53	0.60	-0.20		0.51	0.42	0.40		0.71	0.43
integration of software systems	0.91	0.90	1.00		0.92	0.83	0.79		0.75	0.82
wireless and mobile working	0.95	0.70	1.00		0.92	0.93	1.00		0.88	0.93
provision of individual IT environment	0.56	0.00	1.00		0.52	0.66	0.58		0.29	0.63
demand for continuous access	0.88	0.90	1.00		0.90	0.87	0.86		0.88	0.87
no. of institution owned desktops	-0.02	0.22	-0.60		-0.06	0.30	0.69		0.63	0.37
use of non-institution owned equipment on the network	0.79	1.00	0.83		0.82	0.45	0.47		0.14	0.45
Q9a What are the main drivers for these changes?										
financial position	27%	50%	57%		33%	51%	29%		63%	49%
staff availability	10%	60%	29%		19%	23%	12%		13%	21%
changing students' expectations	88%	60%	100%		86%	77%	71%		75%	77%
changing curriculum and method of delivery	67%	50%	71%		64%	83%	88%		100%	85%
business needs	63%	80%	71%		68%	69%	71%		63%	68%
falling costs & increasing capability/performance	18%	50%	29%		23%	15%	12%		25%	15%
increasing demand for connectivity in classrooms	43%	80%	57%		51%	69%	71%		63%	69%
society changes (mobility, 24/7, multitasking etc.)	85%	70%	100%		85%	67%	71%		38%	66%
Q9b Impact of changes on sustainability (1=V.-ve, 7=V.+ve)	4.1	4.3	4.1		4.1	4.5	4.6		4.3	4.5
Q10 Strategic planning method for ICT (1=Centralised, 7=Devolved)	2.8	2.8	3.0		2.8	2.8	2.6		3.4	2.8
Q11 Rolling ICT system upgrades (% Yes)	77%	90%	86%		80%	76%	82%		75%	77%
Length of cycle (yrs) - PCs	3.8	3.8	4.1		3.8	3.8	4.4		4.2	4.0
- Servers	3.9	4.2	3.9		4.0	3.8	4.2		3.8	3.9
- Networks	5.5	5.2	5.5		5.5	5.7	5.2		6.6	5.6
Q12 What do you regard as the key factors influencing the method of providing and managing ICT in your institution?										
custom & practice	28%	60%	71%		36%	32%	35%		25%	32%
managing complexity	38%	40%	43%		39%	33%	29%		25%	33%
risk management	53%	70%	71%		58%	44%	41%		38%	43%
central control	35%	60%	43%		39%	55%	53%		63%	54%
common standards	38%	30%	43%		36%	33%	41%		0%	32%
budget cycles	55%	80%	29%		58%	63%	47%		75%	61%
effective IT department	60%	70%	86%		65%	61%	71%		63%	62%
effective forward planning	52%	60%	43%		50%	55%	82%		63%	59%
effective IT user advisory group	18%	30%	29%		20%	32%	35%		63%	34%
inc institutional effectiveness through IT	55%	50%	57%		56%	62%	76%		50%	63%
Q13 What are the key factors that influence major ICT capital expenditure in your institution?										
champion/representation on senior management team	65%	100%	57%		69%	49%	53%		75%	51%
developed business case	57%	70%	43%		58%	62%	65%		13%	58%
Risk management	47%	70%	14%		48%	37%	29%		0%	33%
estates projects	28%	40%	29%		30%	32%	29%		0%	30%
external funding initiatives	47%	30%	57%		48%	49%	41%		88%	50%
need to keep pace with technology changes	32%	20%	57%		34%	52%	65%		100%	58%
development of new courses	17%	20%	0%		15%	37%	41%		63%	39%

Summary (continued)	Averages					Further Education Institutions				
	Higher Education Institutions									
	England	Scotland	Wales	N.Ireland	Total	England	Scotland	Wales	N.Ireland	Total
Q14										
a) External funding impact – timing (1=Sig.-ve, 7=Sig.+ve)	3.8	4.3	4.7		4.0	4.5	4.1		5.1	4.5
b) - ongoing support problems (1=Sig.-ve, 7=Sig.+ve)	2.9	3.6	2.9		3.0	3.8	3.3		4.5	3.7
Q15 Environment/energy policies (%Yes)	55%	70%	71%		59%	45%	41%		25%	44%
(% No)	30%	10%			25%	26%	24%		25%	25%
- level of impact on ICT provision (1=Sig.-ve, 7=Sig.+ve)	4.1	4.3	3.8		4.1	4.5	4.5		4.0	4.4
- affect on ICT sustainability (1=Sig.-ve, 7=Sig.+ve)	4.0	4.3	4.0		4.1	4.3	4.8		3.7	4.3
Q16 What do you understand to be the main ICT sustainability concerns of each of the following groups of users?										
Academics										
system availability	73%	100%	71%		78%	80%	82%		88%	81%
equipment availability	38%	80%	57%		44%	83%	76%		63%	81%
ability to use from home/overseas	75%	90%	100%		80%	62%	47%		75%	61%
data access	35%	90%	43%		45%	54%	65%		38%	54%
access to e-sources	57%	70%	71%		61%	64%	41%		88%	63%
availability of appropriate software	53%	70%	71%		59%	62%	65%		100%	66%
storage capacity	50%	60%	71%		54%	42%	35%		50%	41%
provision of funding	25%	50%	43%		29%	37%	12%		13%	32%
coping with upgrades	15%	50%	29%		21%	33%	6%		63%	31%
reliability	65%	80%	57%		68%	68%	65%		88%	68%
access to course material	33%	70%	71%		41%	61%	59%		100%	64%
provision & support of specialist info systems	60%	60%	100%		65%	76%	65%		100%	76%
Management & Support										
system availability	85%	100%	100%		89%	79%	76%		100%	80%
equipment availability	35%	70%	57%		41%	51%	41%		50%	50%
ability to use from home/overseas	38%	60%	43%		44%	32%	53%		38%	36%
data access	70%	50%	71%		69%	77%	53%		100%	76%
access to e-sources	10%	10%	14%		10%	23%	24%		25%	23%
availability of appropriate software	45%	70%	71%		51%	48%	47%		63%	49%
storage capacity	37%	70%	100%		46%	55%	47%		63%	54%
provision of funding	45%	70%	86%		51%	73%	65%		88%	72%
coping with upgrades	48%	70%	57%		53%	62%	53%		38%	59%
reliability	77%	80%	100%		80%	71%	71%		88%	73%
access to course material	2%	20%	14%		5%	8%	0%		25%	8%
provision & support of specialist info systems	42%	40%	86%		46%	54%	47%		38%	52%
Students										
system availability	72%	100%	71%		76%	74%	71%		88%	75%
equipment availability	63%	70%	100%		66%	86%	53%		100%	82%
ability to use from home/overseas	65%	80%	100%		71%	65%	47%		88%	65%
data access	30%	50%	43%		35%	20%	29%		50%	23%
access to e-sources	65%	70%	86%		69%	64%	59%		100%	67%
availability of appropriate software	53%	70%	86%		58%	73%	53%		88%	71%
storage capacity	42%	30%	43%		39%	45%	35%		63%	44%
provision of funding	2%	20%	14%		5%	12%	6%		13%	12%
coping with upgrades	3%	30%	14%		8%	7%	6%		13%	7%
reliability	65%	70%	57%		65%	62%	76%		63%	64%
access to course material	83%	80%	100%		85%	83%	76%		100%	84%
provision & support of specialist info systems	68%	80%	86%		71%	68%	65%		88%	68%

See the ①-continue website: www.reading.ac.uk/imps/i-continue-questionnairereplies.htm for a summary of the text replies.