

Information Systems Management and Governance Survey Results Analysis



This report analyses the results of a survey undertaken as part of the JISC ¹ funded project on *Information Systems Management and Governance* in 2005. The project team is based at the University of Strathclyde, contact details are below.

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1. Introduction

The survey exercise, carried out as part of the project on Information Systems Management and Governance, alongside consultation with the expert advisers and the project steering group, constituted an extensive consultation with the whole UK HE sector. The survey of c.170 HEIs (higher education institutions) in the UK aimed to:

- Develop an informed understanding of the current IT management and governance procedures that are in place within HEIs
- Identify 'gaps' in current IT management and governance procedures.
- Canvas opinion on the type of tools and self-assessment frameworks that HEIs consider useful and practical.
- Gather broad benchmarking data that is not available from other sources.
- Identify best practice exemplars or case studies that can be referenced in the final outputs.
- Identify institutions that will be willing to comment on the final draft of the outputs.
- Raise awareness of the project and its outputs.

The survey was proactively managed in order to generate as high a response rate as possible.

2. Survey Design

The survey comprised a mixture of open and closed questions. The closed questions were check boxes for respondents to select, radio groups where respondents could select one response from a range of possible answers and drop down lists where they could choose the most appropriate response. Open questions allowed respondents to fill in a text box (either on paper or online) with as much information as necessary. The survey questions were arranged into 10 sections as listed below. For a full copy of the survey, please see the supplementary document: [survey_document.pdf](#)

- Section 1 – About You and Your institution
- Section 2 – Institutional Structure
- Section 3 – Planning
- Section 4 – Devolved Responsibility
- Section 5 – Governance of IT
- Section 6 – Investment in IT and Information Systems
- Section 7 – Emerging Issues
- Section 8 – Tools and Resources
- Section 9 – Format of Project Outputs
- Section 10 – Further Participation

3. Distribution

The survey was developed then tested at Strathclyde before being distributed. The project team utilised multiple distribution methods for maximum reach:

1. E-mail distribution via Toby Bainton of the Project Steering Group to SCOUNL mailing list members
2. E-mail distribution via Peter Tinson of the Project Steering Group to the UCISA IT Directors mailing list
3. Hard copy posted to 167 principals/vice chancellors or institutional heads at 166 higher education institutions in the UK.

The e-mail sent to the SCOUNL and UCISA mailing lists gave a short overview of the project and the survey exercise and linked to our project survey web page. This web page has more detailed information on the project and had a further link to the survey itself, which could be filled in and submitted online. The mailing to the principals/vice-chancellors comprised a letter with project and survey information, a supporting letter from JISC and a hard copy of the survey questionnaire itself with a stamped addressed return envelope. We also included a short note on how the data would be used, this information was also posted on the website.

We set a tentative deadline of 19 August 2005, and removed the online version of the survey from the web shortly after that date, although we did ask on our website until the end of August that any outstanding paper copies were still returned so that we could make use of information from late returns, even if they could not be included in the initial analysis. All returns received up to and including the 16th September 2005 are included in this final analysis. At the time of writing, we had received a small number of additional returns and enquiries. Those returns received after the 16th September 2005 have not been included in this report as full analysis was already underway. However those interested in further participation have been added to the relevant contacts lists.

4. Analysis Methodology

To analyse the survey results, a database was designed and created using Microsoft Access. Survey responses submitted online were automatically added as rows to the relevant tables in the results database. Unfortunately survey responses received in paper form (by post, fax or e-mail) had to be manually entered into the database by the project team. Although this was labour intensive, it meant that dynamic queries could be created in the database to give instant results at intermediate stages during the survey exercise and for this final analysis. The results analysis carried out shows the range of responses to the questions in each section. The potential for further breaking down and cross analysing results are huge, particularly given the number of 'open' questions in our survey, therefore we performed cross analysis where it was deemed to be of most interest, for example breaking down responses to a particular question by the type of institutions that respondents represented.

5. Results of Survey Analysis

Notes on Statistical Analysis

Analysis breaking down the UK countries and types of institution covered by the survey are based on a total figure which is the number of *distinct* institutions from which responses were received. All other percentage statistics calculated are based on the total number of individual responses received, even where not all respondents have answered a particular question. This is because the survey was designed to be

filled in by one or more individuals at the same institutions and individual responses to the same questions may vary across the same institution. For sections where responses have been shown as percentage values, where applicable, figures may not add up to exactly 100% due to rounding. In addition, since non of the questions were 'compulsory', the survey accepted sets of responses which were incomplete and therefore all responses for each question may not add up to the total of 100%. For cross-analysis, the totals used for percentages were the total number of respondents for each group being cross analysed. For example, if a set of results is being broken down by institution type, the total percentage response rate for each type of institution is based on the total number of responses received from each type of institution in the whole set of survey responses.

Overview of Results

There was a total of 111 usable survey responses received and analysed. Therefore the overall response rate based on 170 existing HE institutions as listed by HESA ² was 65%. Of these 111 responses, 98 distinct institutions were represented, i.e. there were 13 institutions from which we received 2 responses. The figure of 98 out of 170 HEIs gives a value of 58% for coverage of higher education institutions in the UK. Of the 111 responses received, 64 (58%) were submitted online and 47 (42%) were submitted in paper form, this is illustrated in Figure 1 below.

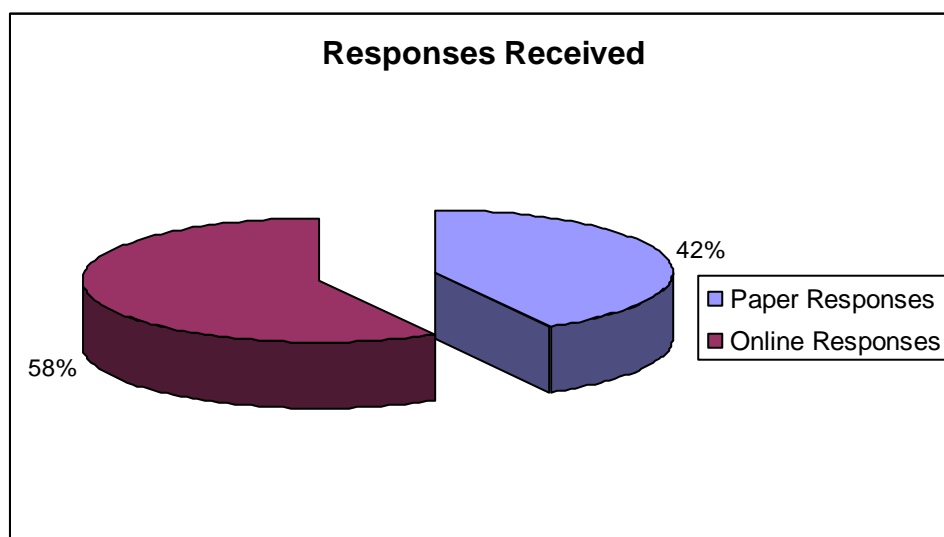


Figure 1: Responses Received

² Master list of UK HEIs was taken from the HESA website. (Higher Education Statistics Agency) URL: <http://www.hesa.ac.uk/manuals/04025/files/04025a01.rtf>

Section 1 – About You and Your Institution

The survey results are anonymous, however we have analysed the total number of responses by country and by HEI type to determine coverage of the survey. The table in Figure 2 shows the profile of distinct institutions by UK country. Our total average HEI coverage of 58% for the UK can be broken down into 4 figures; 54% coverage for HEIs in England, 50% in Northern Ireland, 75% in Scotland and 69% in Wales. This means that for every constituent country of the UK, at least half of HEIs are represented within our survey. All appropriate figures pertaining to geographical coverage are shown in Figure 2 and the profile of coverage is represented graphically in Figure 3.

Distinct Institutions by Country				
Country (No of HEIs)	Number of Responding Institutions	% of Responding Institutions in country	Country Response Rate	Percentage of Total UK HEIs in Country
England (133)	72	73%	54%	78.2%
Northern Ireland (4)	2	2%	50%	2.4%
Scotland (20)	15	15%	75%	11.8%
Wales (13)	9	9%	69%	7.6%

Figure 2: Profile of Distinct Institutions by Country

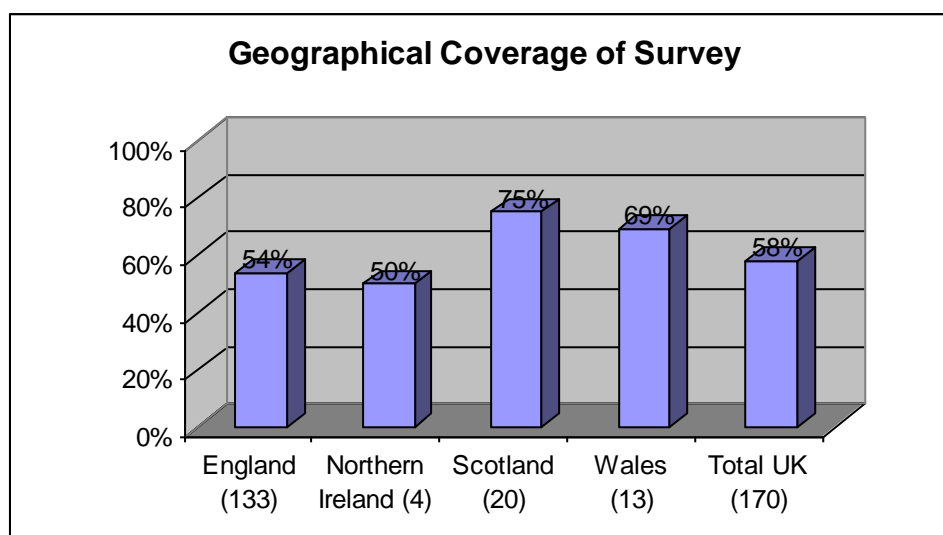


Figure 3: Coverage of HEIs by Country

Institutions represented by respondents were then classified by 'type'. The classification used was that from Noble's Higher Education Financial Yearbook.³ The institutions represented by respondents were classified A to F where known, or

³ Thomson, B. *Noble's Higher Education Financial Yearbook: A comprehensive financial guide to universities and colleges in the UK's higher education sector*. Edinburgh: Noble Financial Publishing, 1997

classified 'U' for unknown. The definition for each letter is given in Figure 4 alongside all data pertinent to the types of institution covered by the survey. Calculated figures are based on the total figure of 98 distinct institutions represented by respondents. The graph in Figure 5 plots the response rate for each type of HEI. Our survey has at least a 49% response rate for each type of HEI in the UK.

Distinct Institutions by Type						
HEI Type	Description	No of HEIs	% of HEIs	Total No of UK HEIs of that type	HEI Type Response rate	% of HEI Types in UK
A	Universities founded before 1750	3	3%	6	50%	4%
B	Universities founded between 1750 and 1940	20	20%	31	65%	18%
C	Universities founded after 1940	11	11%	18	61%	11%
D	Universities previously funded by PCFC and founded before 1940	6	6%	9	67%	5%
E	Universities previously funded by PCFC and founded after 1940	17	17%	26	65%	15%
F	All other institutions	24	24%	49	49%	29%
U	Unknown	17	17%	31	55%	18%

Figure 4: Profile of HEI Types

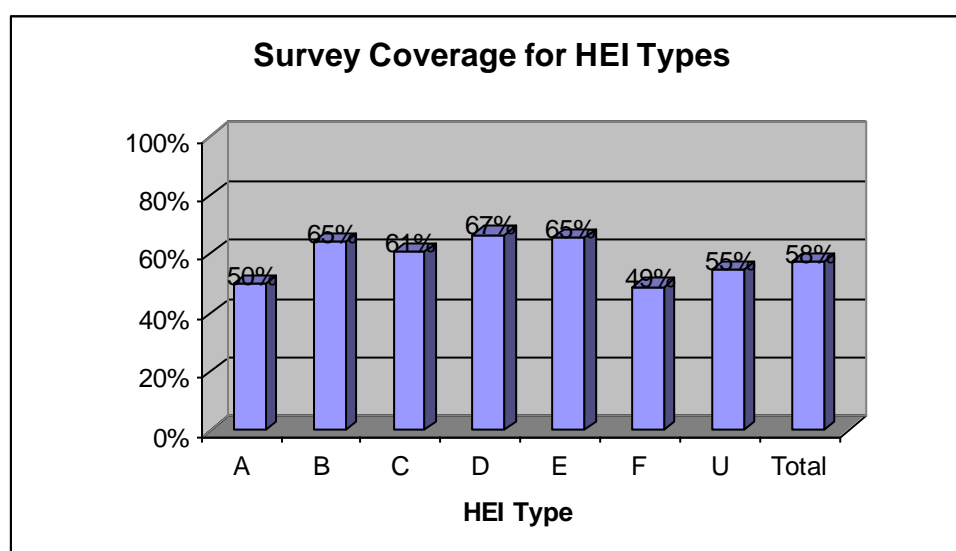


Figure 5: Coverage for HEI Types

The following table and graph in Figures 6 and 7 break down the total number of responses (111) by the type of respondent. In order to do this, each job title was examined and categorised accordingly into four categories as listed in the table in Figure 6. Most responses were from a director or head of service department (71%), with the smallest representation being from the chief or institutional librarian (3%).

The survey did, however, elicit responses from all main job types relevant to information systems management and governance.

Job titles by level			
Job Level	Description	Number of Responses	Percentage of Responses
Corporate	Central/Corporate Senior Management	15	14%
Director	Director or Head of an institutional area	79	71%
Librarian	Institutional Librarian/Chief Librarian	3	3%
Manager	Manager of an institutional area	14	13%

Figure 6: Responses by Job Type of Respondent

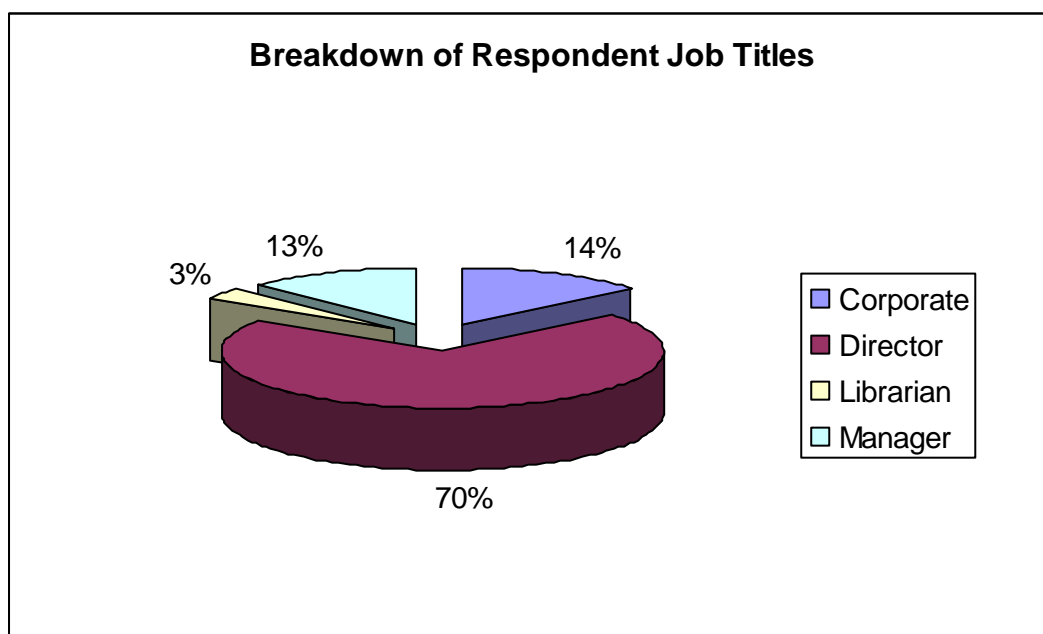


Figure 7: Profile of Respondent Job Titles

Respondents were then asked if there were any significant, unique features that affect the IT Governance and Management within their institution, for example, a unique mission or strategy, highly innovative use of technology, multiple campuses, or a focus on e-learning or distance learning. Only a small percentage of respondents (8.11%) considered that their institution had no significant unique features as shown in Figure 8. This figure does not include a small number of respondents who initially answered 'No' then continued with a 'but' or 'although' and carried on to explain how their institution did in fact have some unique features after all. It was considered that if the features were significant enough to mention, then the institution should in fact be counted as having unique features. In addition, the wording of the question may have caused this issue, as something significant that affects the governance of the institution, such as a high number of distance learners, may not technically be 'unique' as it could apply to more than one institution. In such cases we do still want to highlight it as a significant feature.

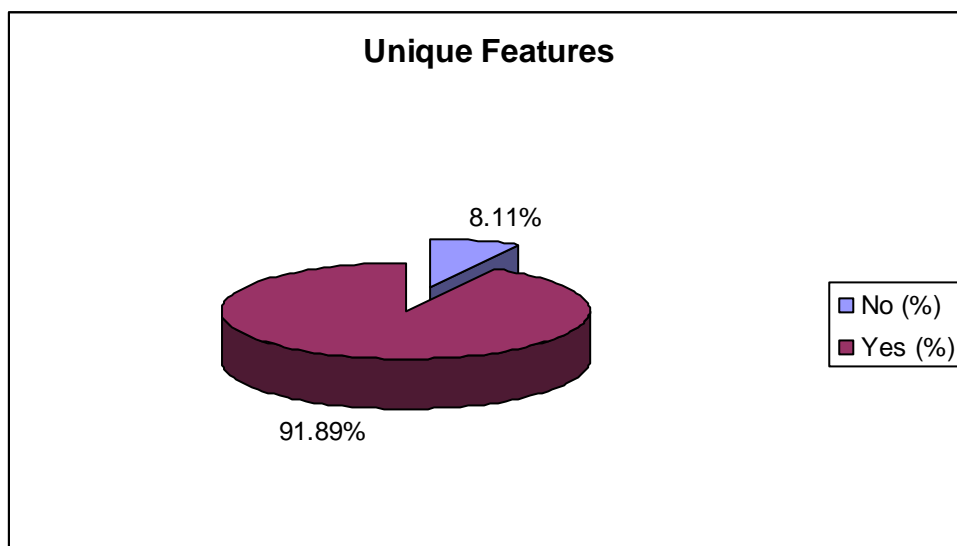


Figure 8: Respondents who reported unique features relating to their institution

From the significant features listed by institutions, we can conclude that HEIs are very individual and cannot be easily categorised. This was fed into the framework and toolkit; the project team was very aware that there would be no single set of processes that would meet the requirements of every institution. Rather the framework and toolkit would have to be modular and adaptable to be of practical use.

Examples of unique features that were quoted by respondents are listed as follows under the four main framework headings:

Governance

- Undergoing review of IT governance
- Promote modern technological image
- Promote use of technology in teaching and learning
- High profile e-learning/focus on e-learning/blended learning
- Open learning at institution
- Distance learning at institution
- HE and FE provision
- Unique learning methods
- Unique mission, e.g. quality of learning, mobile computing, widening access
- Specialised subjects with associated issues, e.g. languages, vocational subjects
- Small specialist institution
- Cultural issues
- Key initiatives in place, e.g. transformational change

Organisation

- Highly centralised in theory but not in practice; lack of central control
- Highly centralised ICT Service, limited local control
- Very unified library and IT services
- Highly devolved ICT/management structure/development/support
- Multiple campuses, some very widespread, some international
- Provision for more than one institution on one campus
- Distributed organisation with deep historical traditions
- Multiple libraries

- Undergoing organisational restructuring
- Collaborative structures or developments, e.g. departments or services with or for other institutions or external organisations
- Overseas partnerships
- Large/multi layered/complex organisation
- Merged institution with associated issues

Services

- High level of service for users, e.g. industry standard, not traditional HE standard
- Undergoing new systems implementation
- Implementing new types of system (in-house/commercial)
- New developments in e-learning underway; at central or local level
- New technological developments, e.g. online systems access
- Highly used e-learning
- High security issues due to storage of sensitive external data
- Highly innovative institution, very technologically advanced

Resources

- Different types of customers, e.g. non-academics, mature students
- Small institution, staff have multiple roles
- High number of students
- High number of part time/mature/evening students
- Part time and full time students
- High level of remote users
- High number of students who carry out external placements
- Limited resources; finance and staff, but high expectations
- High level of investment in IT
- Innovative technology to support research

Section 2 – Institutional Structure

We intended that the responses to this section would elicit information on what kind of structures are in place to govern and manage information systems in UK HEIs. Unfortunately, due to the range of job titles and interpretations of the question, the results for this section could not be fully analysed in a meaningful way. The survey question did not explicitly state what level of responsibility was meant by the term 'senior manager', which could vary by institution and indeed by interpretation. Therefore, responsibilities for each department or function listed in the questionnaire were reported at many different levels by respondents, which would have made full analysis very difficult and time-consuming with very little potential benefit.

Examining the responses, however, we did discover that there was a huge range of overlap in responsibilities of departments and functions; for some institutions more than one department/function was covered by the same senior manager and in some cases more than one senior manager was responsible for a single department/function. Also evident was the fact that structure profiles are different for individual institutions across the UK, again highlighting the requirement for an adaptable, non-prescriptive framework and toolkit.

Although the information yielded by this section has been relatively less substantial than that for the other sections, the project team has made use of complementary data such as the Higher Education Information Technology Statistics (HEITS) data published by UCISA (Universities and Colleges Information Systems Association) ⁴ and statistical data from SCONUL (Society of College, National and University Libraries) ⁵ to inform development of the framework and toolkit.

⁴ http://www.ucisa.ac.uk/activities/stats/index_html

⁵ http://www.sconul.ac.uk/pubs_stats/

Section 3 – Planning

Respondents were asked, for each of the documents listed that may exist within an institution, to choose the most appropriate letter which best described the situation at their institution. A list of the planning documents and a list of response options are shown in Figures 9 and 10 respectively.

Document Name	Description
Info Strategy	Information Strategy
IT Strategy	Information Technology Strategy
E-learning Strategy	E-learning Strategy
Devolved Strategy	Policy for the rights and responsibilities associated with devolved IT provision, i.e. supported by academic units rather than a central IT unit
AUP	Acceptable use policy, i.e. a written policy detailing the rights and responsibilities of information systems users
Structured Planning	A structured approach to the development of business cases for new projects and services and to the evaluation of these business cases
Structured Implementation	A structured approach to the implementation of new projects and to their post-hoc evaluation

Figure 9: Planning Documents Queried

Response Letter	Response Description
a	This document/policy is actively used
b	This document/policy is used but is not applied consistently
c	This document/policy has been developed but is not actively used
d	My institution is in the process of developing this document/policy
e	My institution has decided that this document/policy is not required
f	This document/policy is not relevant to my institution
g	Don't know

Figure 10: Response Options for Section 3

The profile of responses for each of the documents/policies is shown in the following table and graph in Figures 11 and 12. For these results, the percentage values shown are the percentages of total survey respondents (111) who responded in a particular way, i.e. a to g.

Response	Info Strategy	IT Strategy	E-learning Strategy	Devolved Strategy	AUP	Structured Planning	Structured Implementation
a	25%	46%	23%	14%	86%	43%	37%
b	23%	18%	18%	12%	8%	19%	21%
c	17%	10%	7%	3%	3%	1%	2%
d	25%	18%	35%	20%	4%	20%	23%
e	8%	5%	7%	9%		5%	8%
f	2%	1%	4%	32%		3%	2%
g		2%	4%	9%		6%	5%

Figure 11: Percentage values Planning Document Responses

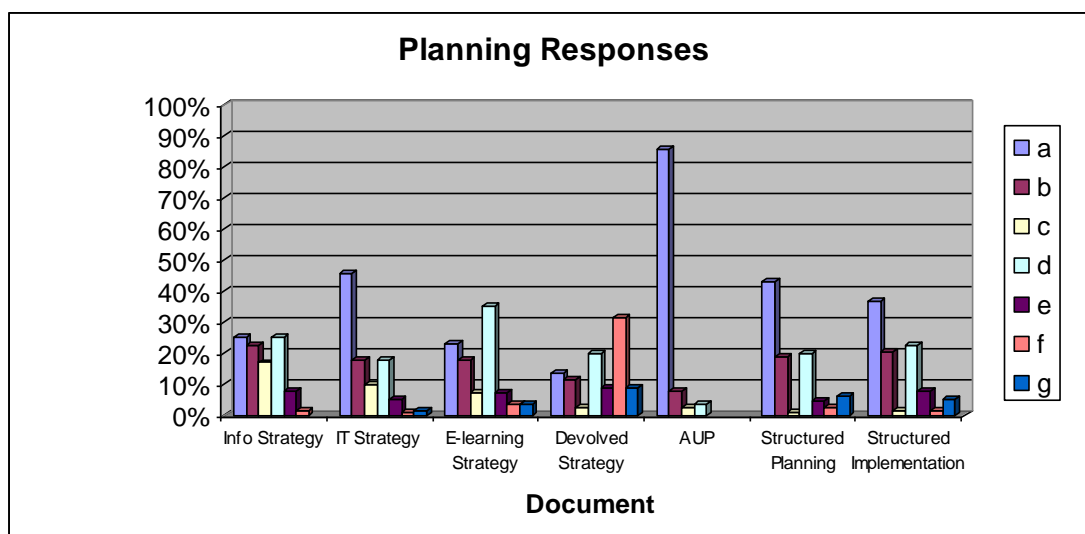


Figure 12: Profile of Responses for Planning Documents

The responses relating to each of the planning documents listed were then broken down by the type of institution at which the respondents work. This was to investigate whether certain types of institution were more or less likely to use certain strategies and policies. Due to the number of responses and number of HEI types, these results are given in table and chart form individually for each listed planning document. A reminder of the institution type classification is shown in Figure 13 below. The percentage values quoted are the percentage of respondents of institutional type A/B/C/D/E/F/U who responded with letter a/b/c/d/e/f/g to each planning document listed.

HEI Type	Description
A	Universities founded before 1750
B	Universities founded between 1750 and 1940
C	Universities founded after 1940
D	Universities previously funded by PCFC and founded before 1940
E	Universities previously funded by PCFC and founded after 1940
F	All other institutions
U	Unknown

Figure 13: Classification of HEI Types

Information Strategy

The table of percentage figures and the corresponding graph for responses on an institutional Information Strategy are shown in Figures 14 and 15.

Response		HEI Type	A	B	C	D	E	F	U
a	Actively used			27%	38%	14%	33%	16%	25%
b	Used but not applied consistently	33%		27%	15%	14%	38%	12%	20%
c	Developed but not actively used	33%		14%	15%	43%	14%	24%	5%
d	Under development	33%		14%	23%	29%	10%	44%	30%
e	Not required			18%	8%			4%	15%
f	Not relevant						5%		5%
g	Don't know								

Figure 14: Figures for Information Strategy by HEI Type

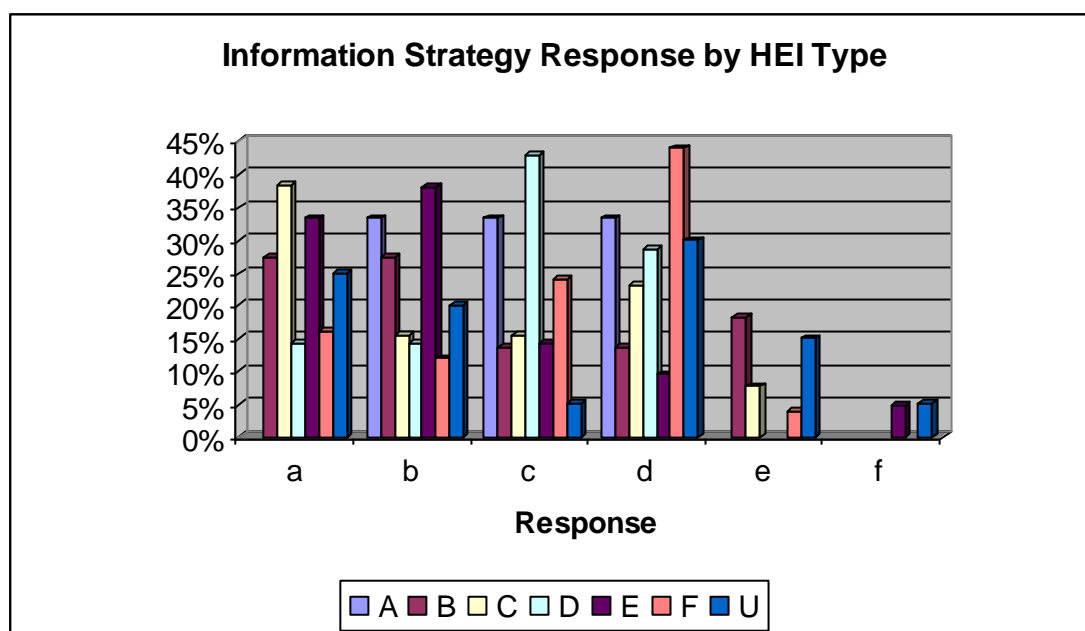


Figure 15: Graph for Information Strategy by HEI Type

IT Strategy

The table of percentage figures and the corresponding graph for responses on an institutional Information Technology Strategy are shown in Figures 16 and 17.

HEI Type Response	A	B	C	D	E	F	U
a		50%	54%	29%	43%	40%	60%
b		23%	15%	43%	19%	16%	10%
c	33%	9%	8%		29%	4%	
d	33%	9%	8%	14%	10%	36%	20%
e		9%	8%	14%			10%
f						4%	
g	33%		8%				

Figure 16: Figures for IT Strategy by HEI Type

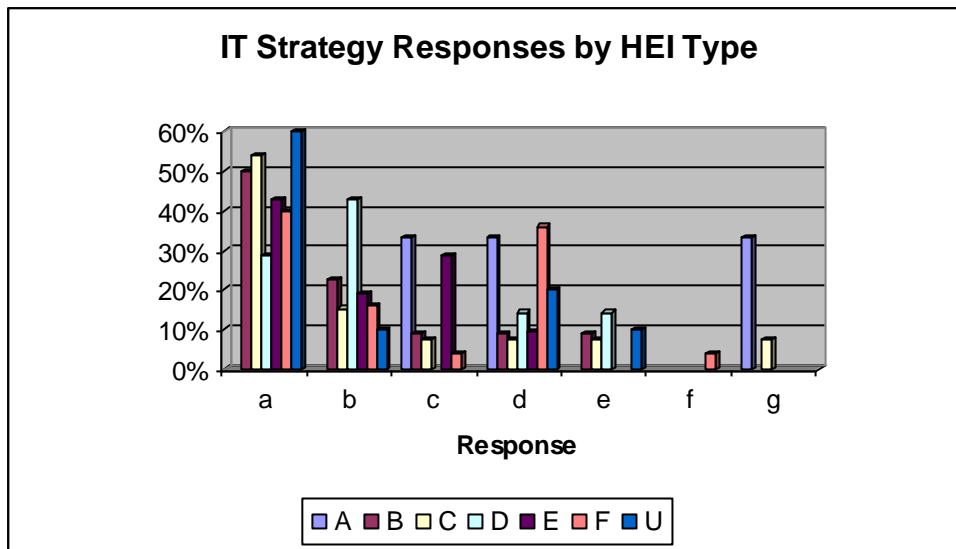


Figure 17: Graph for IT Strategy by HEI Type

E-learning Strategy

The table of percentage figures and the corresponding graph for responses on an institutional E-learning Strategy are shown in Figures 18 and 19.

HEI Type Response	A	B	C	D	E	F	U
a		5%	38%	29%	38%	24%	20%
b	33%	27%	15%	29%	19%	12%	10%
c				14%	10%	8%	15%
d	67%	50%	31%	14%	29%	32%	35%
e		9%	8%		5%	4%	15%
f		9%				8%	
g			8%	14%		8%	

Figure 18: Figures for E-learning Strategy by HEI Type

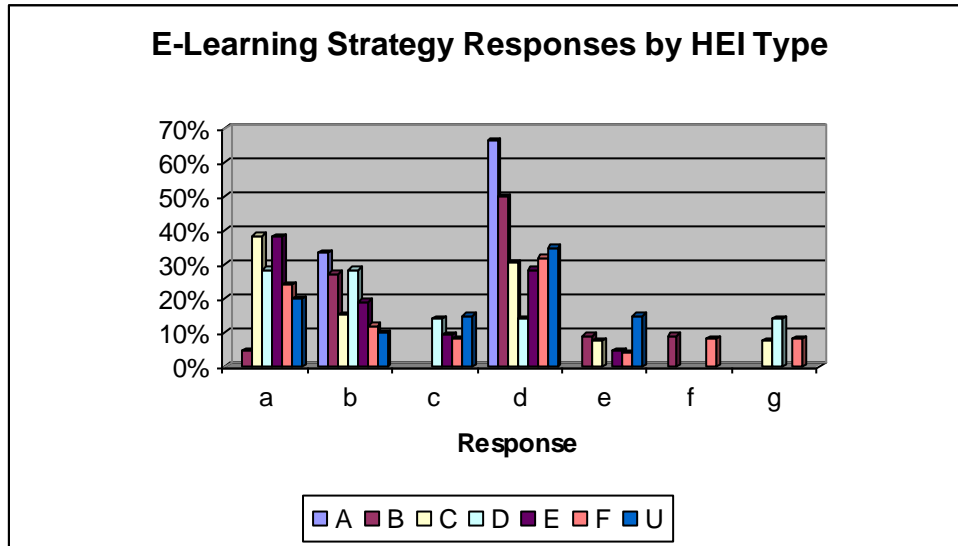


Figure 19: Graph for E-learning Strategy by HEI Type

Devolved Policy

The table of percentage figures and the corresponding graph for responses on a policy for the rights and responsibilities associated with devolved IT provision are shown in Figures 20 and 21.

Response	HEI Type	A	B	C	D	E	F	U
a			9%	23%		14%	16%	15%
b		67%	18%	15%	29%	10%		5%
c			5%			5%		5%
d			27%	38%	29%	5%	16%	20%
e			14%	8%	14%	14%		10%
f			14%	8%	14%	33%	56%	45%
g		33%	9%	8%	14%	14%	8%	

Figure 20: Figures for Devolved Policy by HEI Type

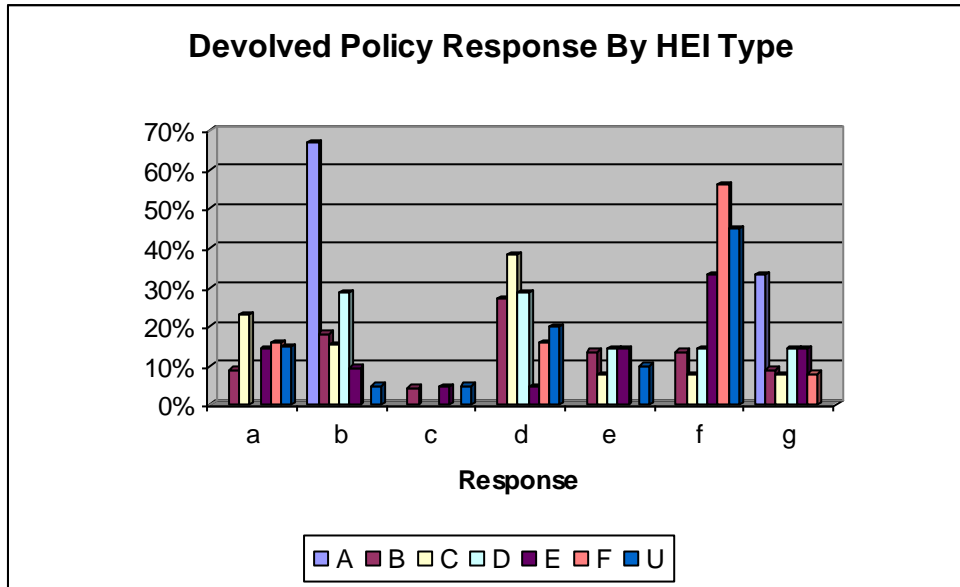


Figure 21: Graph for Devolved Policy by HEI Type

Acceptable Use Policy

The table of percentage figures and the corresponding graph for responses on an Acceptable Use Policy are shown in Figures 22 and 23.

HEI Type	A	B	C	D	E	F	U
A	100%	91%	85%	86%	86%	76%	90%
B		9%		14%	14%	12%	
C			8%			4%	5%
D			8%			8%	5%

Figure 22: Figures for Acceptable Use Policy by HEI Type

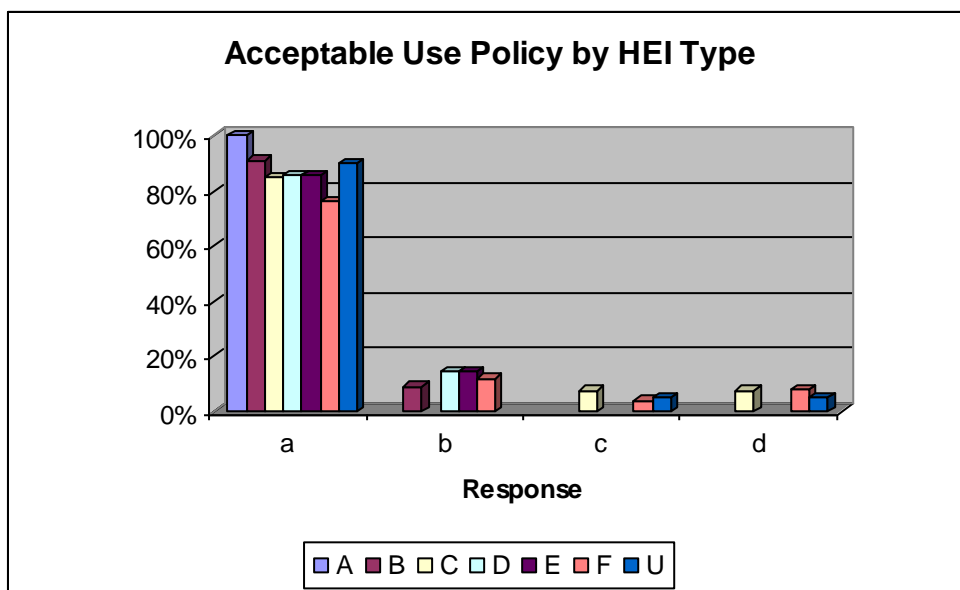


Figure 23: Graph for Acceptable Use Policy by HEI Type

Plan New Projects Policy

The table of percentage figures and the corresponding graph for responses on a structured approach to the development of business cases for new projects and their evaluation are shown in Figures 24 and 25.

Response	HEI Type						
	A	B	C	D	E	F	U
a	67%	36%	69%	43%	48%	32%	40%
b		23%	23%	14%	19%	24%	10%
c							5%
d		18%		14%	24%	24%	30%
e		9%		14%		4%	5%
f		5%				4%	5%
g		9%	8%			12%	5%

Figure 24: Figures for Planning Projects by HEI Type

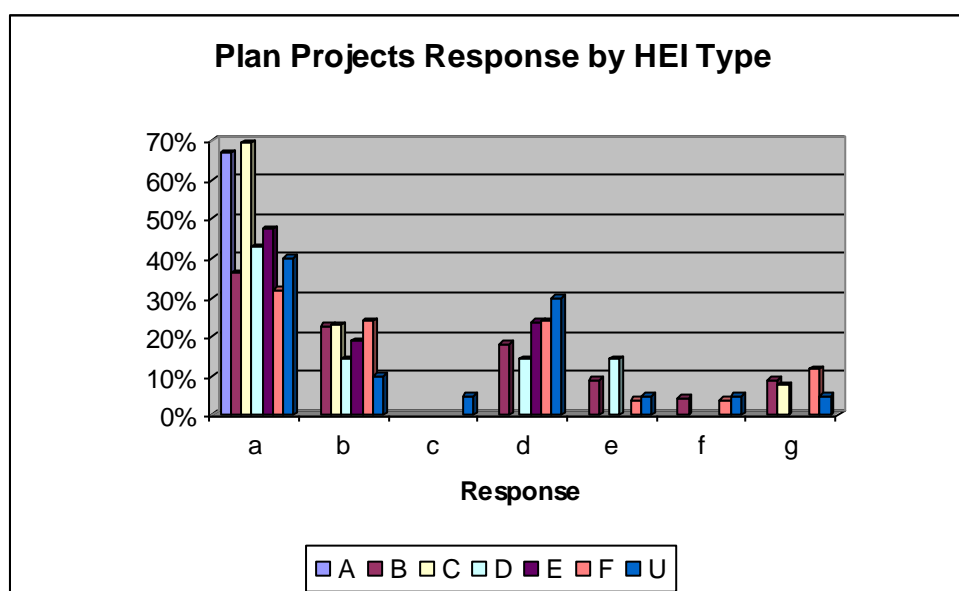


Figure 25: Graph for Planning Projects by HEI Type

Implement New Projects Policy

The table of percentage figures and the corresponding graph for responses on a structured approach to the implementation of new projects and services and to their post-hoc evaluation are shown in Figures 26 and 27.

Response	HEI Type						
	A	B	C	D	E	F	U
a	67%	41%	54%	29%	33%	32%	30%
b		9%	38%	29%	19%	16%	30%
c					5%		5%
d	33%	27%		14%	33%	32%	10%
e		14%		14%		8%	15%
f						4%	5%
g		9%	8%			8%	5%

Figure 26: Figures for Implementing Projects by HEI Type

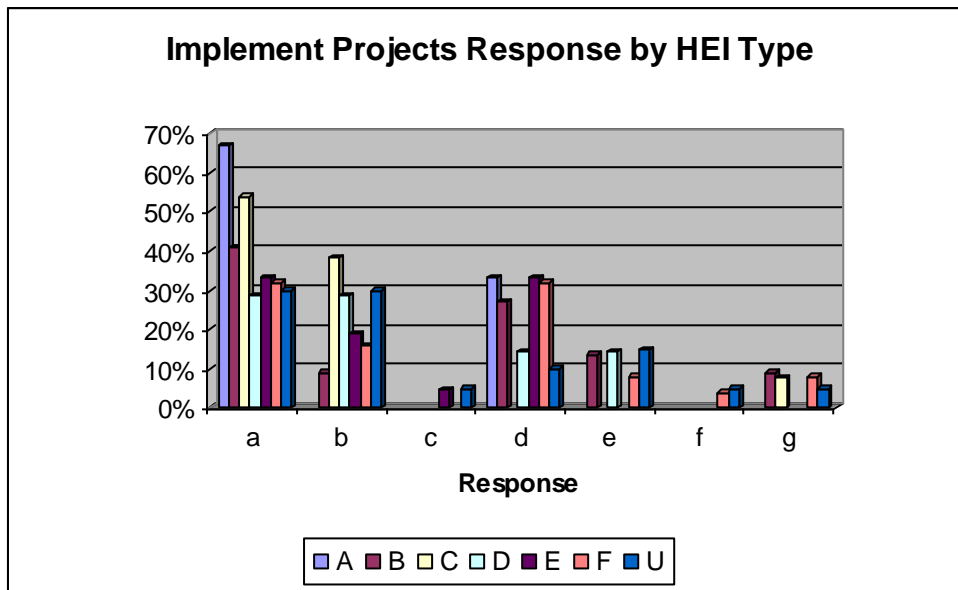


Figure 27: Graph for Implementing Projects by HEI Type

Section 4 – Devolved Responsibility

The responses to this section indicated that responsibility for IT is rarely completely centralised or completely devolved. Only one respondent reported that all of the listed functions were dealt with centrally at their institution and no respondents reported that all functions were devolved. 78 respondents reported that there were mixed responsibilities for at least one of the listed functions in their institutions, i.e. 70% of respondents. The complete table showing what percentage of respondents indicated which response for each function is shown in Figure 28. This is represented graphically in Figure 29.

Response Description	Network Components		Access Rights		Student Computing		Academic Computing	
	No:	%	No:	%	No:	%	No:	%
a Central	88	79%	83	75%	55	50%	53	48%
b Devolved	2	2%	5	5%	12	11%	17	15%
c Outsourced		0%		0%		0%	2	2%
d Mixture	21	19%	23	21%	39	35%	38	34%
e Not Relevant		0%		0%	5	5%	1	1%
f Don't Know		0%		0%		0%		0%

Response	Admin Computing		VLE		Web Pages		Subject Software		Books	
	No:	%	No:	%	No:	%	No:	%	No:	%
a Central	87	78%	74	67%	37	33%	26	23%	94	85%
b Devolved	6	5%	6	5%	20	18%	44	40%	5	5%
c Outsourced	3	3%	3	3%	1	1%	1	1%	1	1%
d Mixture	14	13%	20	18%	52	47%	40	36%	7	6%
e Not Relevant		0%	5	5%		0%		0%	1	1%
f Don't Know		0%	3	3%		0%		0%	3	3%

Figure 28: Figures for Responsibilities for Functions

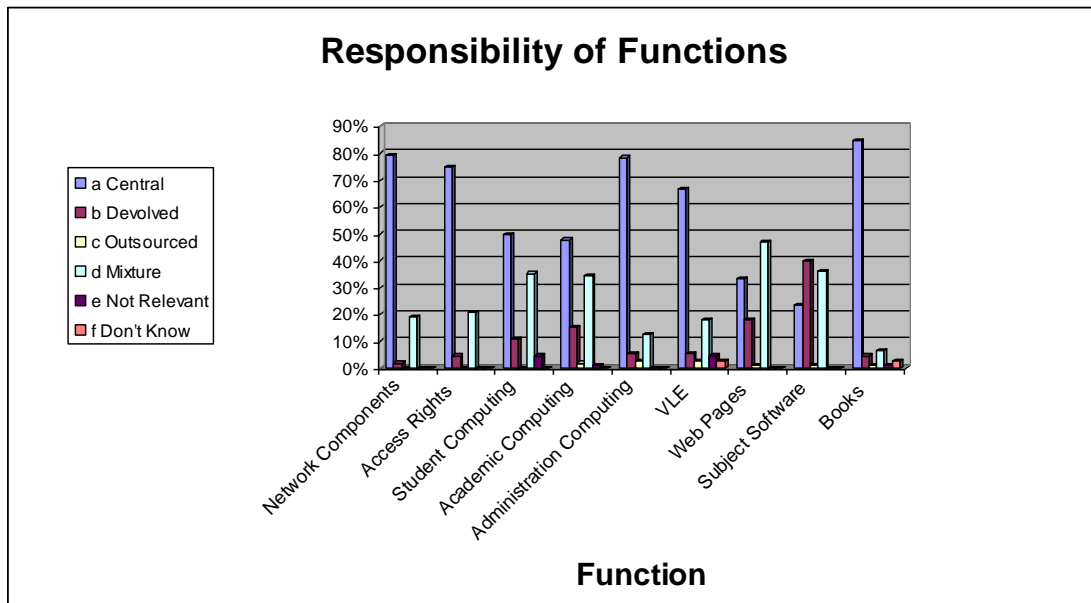


Figure 29: Graph of Responsibilities for Functions

For all of the responses to each of the listed functions, the results were then broken down further by HEI type; i.e. what percentage of respondents from each of the HEI types A, B, C, D, E, F and U responded in a particular way for each function. The results are shown separately for each function in the following nine graphs in Figures 30 to 38. Please see Figure 13 for a reminder of the definition of HEI ‘types’ – A, B, C, D, E, F and U.

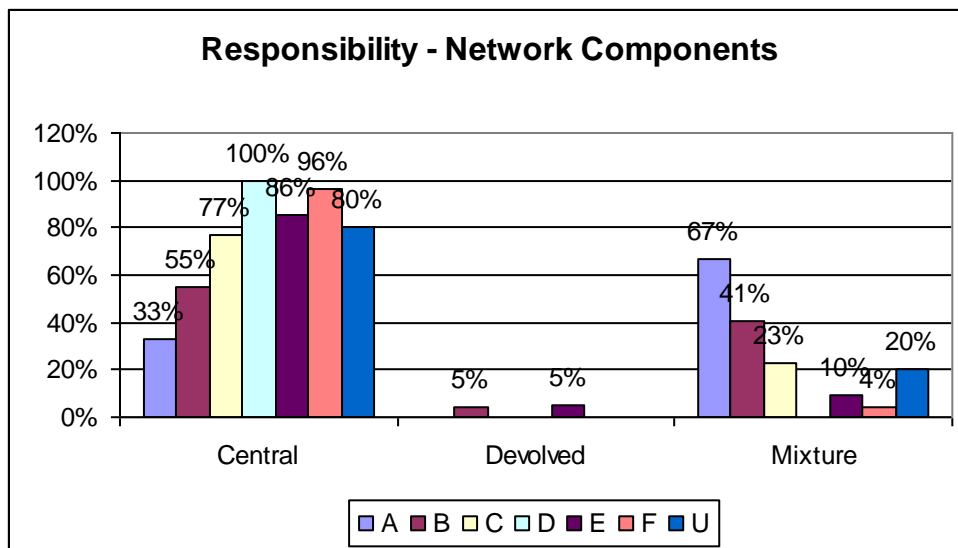


Figure 30: Responsibility for Network Components by HEI Type

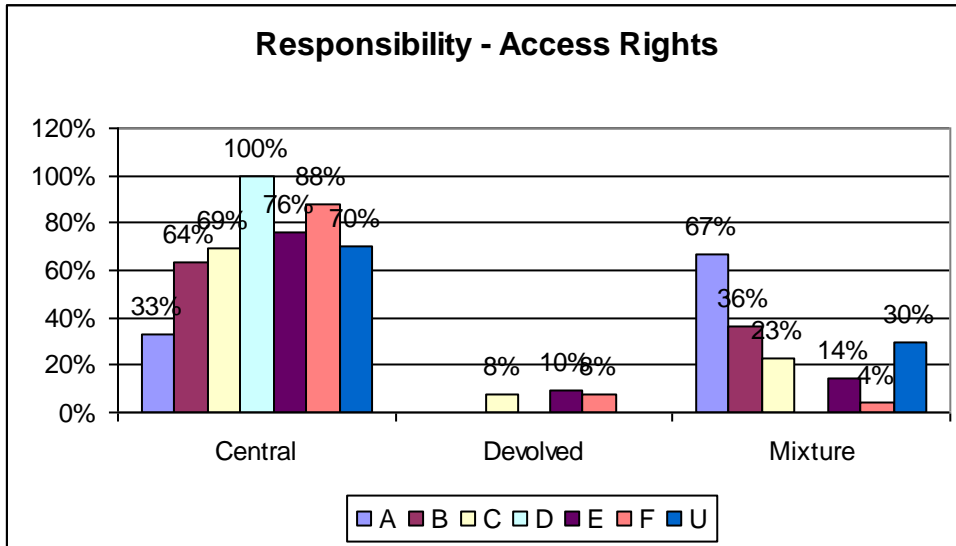


Figure 31: Responsibility for Access Rights by HEI Type

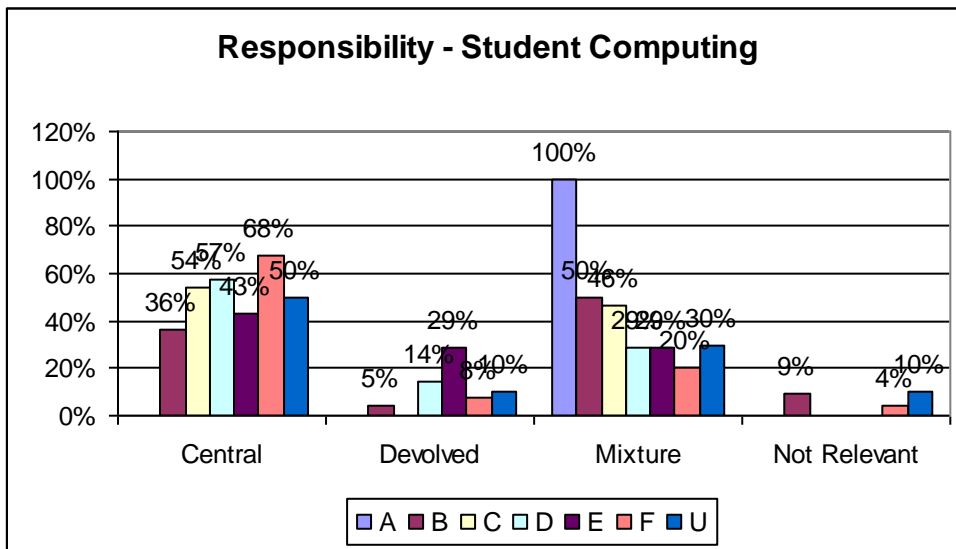


Figure 32: Responsibility for Student Computing by HEI Type

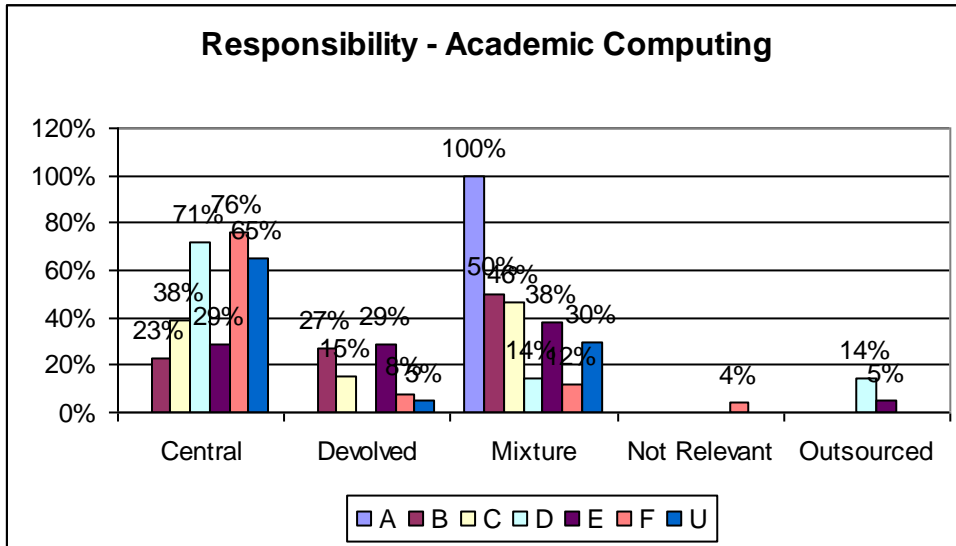


Figure 33: Responsibility for Academic Computing by HEI Type

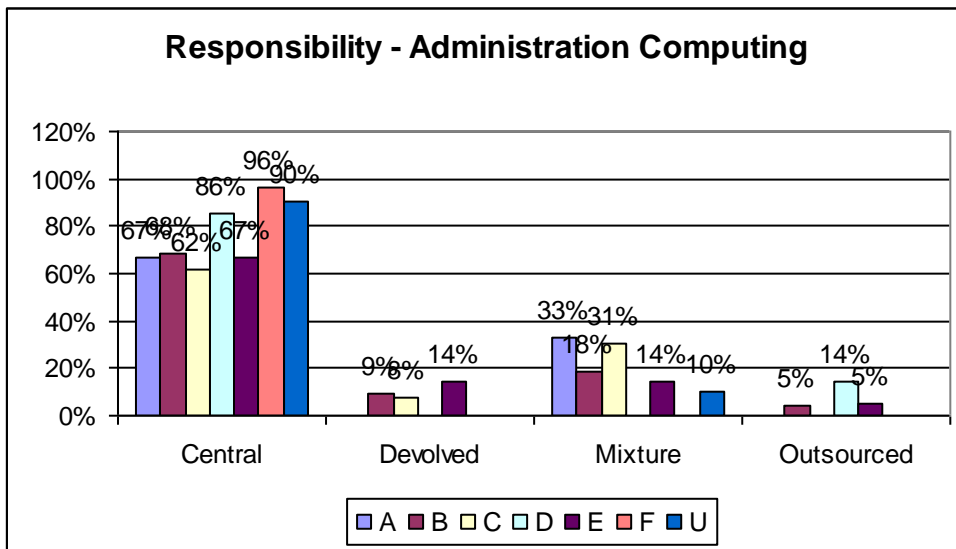


Figure 34: Responsibility for Administration Computing by HEI Type

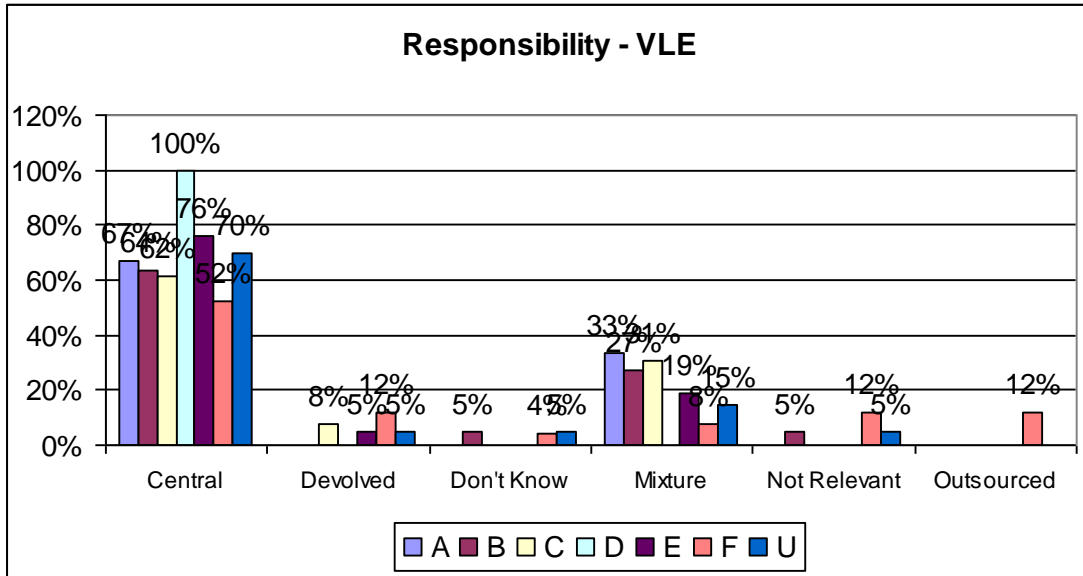


Figure 35: Responsibility for VLE by HEI Type

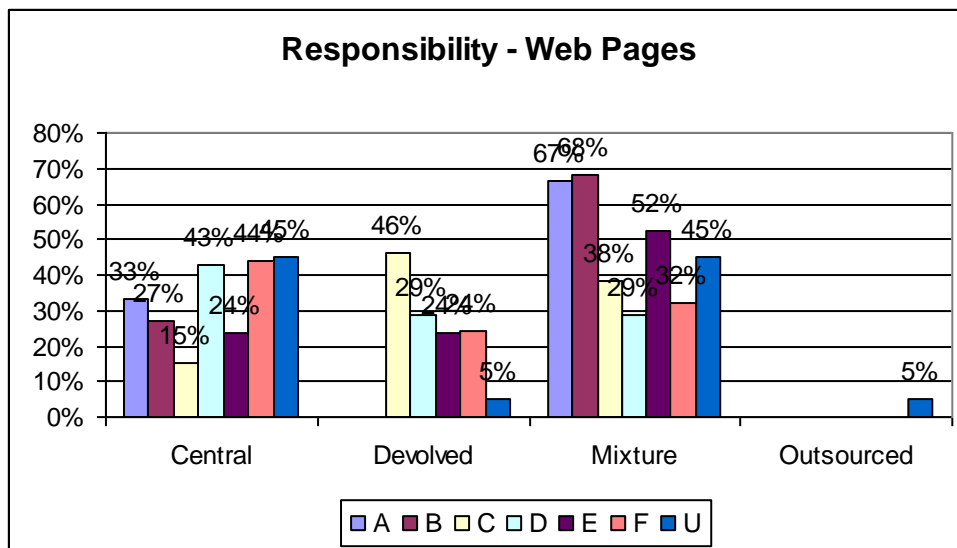


Figure 36: Responsibility for Web Pages by HEI Type

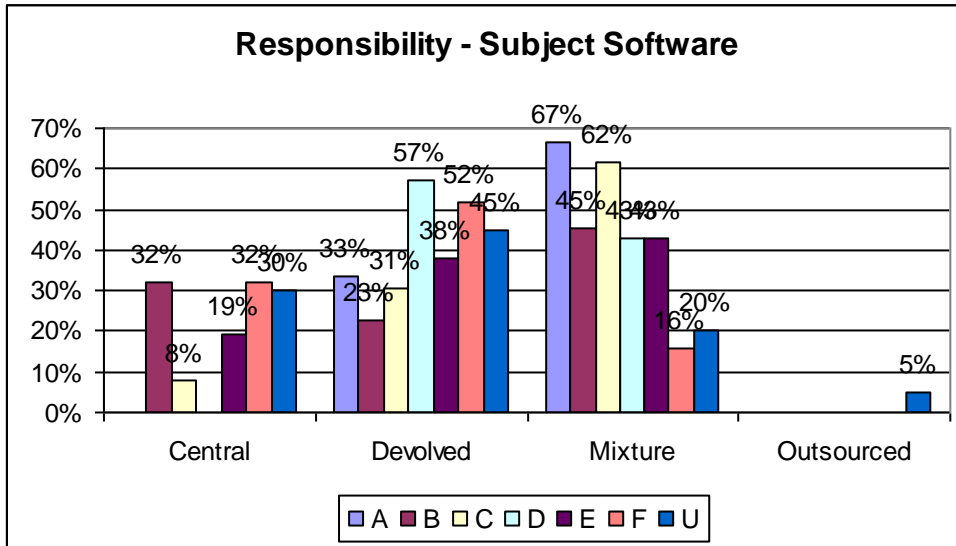


Figure 37: Responsibility for Subject Software by HEI Type

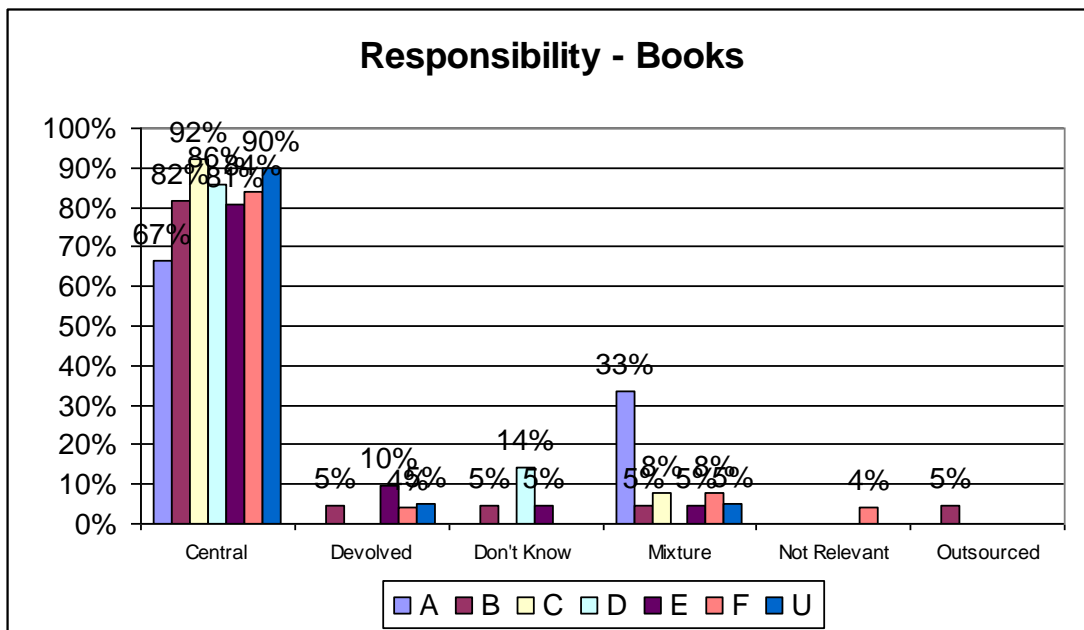


Figure 38: Responsibility for Books by HEI Type

Section 5 – Governance of IT

This section explored the *governance* of IT and information systems by investigating the procedures that institutions had in place to raise a 'red flag' in the event of four scenarios. Note that respondents were not being asked if the scenarios affected their institution, nor even how the institution would deal with each scenario, should it arise, rather, they were being asked what procedures existed which would prompt the institution to become aware that the scenario has actually arisen. For each of the four scenarios, we have listed best practice procedure headings that respondents' comments fell under.

Scenario A

Information systems are not sufficiently secure and there is a growing risk of data being compromised or inappropriately accessed.

The responses to Scenario A mapped onto a clear process which demonstrates that this area is one which is well covered with established processes/best practice. Elements of best practice quoted by respondents for Scenario A fell under the following process headings.

- Define Strategy
- Assign Responsibility
- Set IT Security Policy
- Implement Policy
- Audit Security Policy
- Test Security Policy
- Monitoring, e.g. of network for security breaches
- Evaluation
- Escalation
- Penalties

Scenario B

There is insufficient investment in IT and this may inhibit developments in teaching, learning and research activities in the next few years.

From the responses to Scenario B, there are some points worth emphasising:

- The difference in processes involved in annual recurrent budgeting and approval for projects or changes to baseline
- Proactive and reactive approaches to proving value for money
- The importance of mechanisms for adding services, but also for removing them

Elements of best practice quoted by respondents for Scenario B fell under the following process headings:

- Overview
- Line reporting
- Head of Department
 - Proposals/plans from Head/Director of Information Services/systems/technology, etc.
- Strategic planning/funding

- Annual planning and budgeting process
- Devolved budgeting
- Allocation
- Steering group structures
- Risk planning process
- Investment appraisal
- Audit and review process
- Strategic review
- Tools and mechanisms

Scenario C

The institution does not have a robust disaster recovery plan and there is a high risk that a network failure would cause severe disruption

Not all respondents reported that their institutions had a tested, co-ordinated disaster recovery plan, at other institutions they were under development. Institutions must consider the cost versus risk versus quality trade off.

- Preparation of plan
- Review of risk
- Roles and responsibilities
- Co-ordination
- Build in resilience
- Build in security
- Plans and strategies
- Approval
- Test to identify weaknesses
- Base development on experience
- Review (e.g. internal audit and/or external audit)
- Tools

Scenario D

The institution suspects that it does not receive good value for money from its investment in 'corporate' information systems.

Some institutions reported that there was work in progress in this area, other examples of good practice were quoted, the process headings for which are shown below. Again the merits of a proactive rather than reactive approach should be considered. Some institutions are using methods such as cost benefit analysis to prove values for money, others are relying on audit procedures.

- Governance structures/responsibilities
- Co-ordinated approach to achieving value for money
- Risk review
- Cost benefit analysis
- Steering group structures
- Investment approval
- Tools and good practice
- Economies of scale
- Periodic review, e.g. by steering group/committee
- Review by internal and/or external audit
- Management by exception

Section 6 – Investment in IT and Information Systems

The questions in Section 6 related to the management of IT investments. Respondents could select 'Yes', 'No' or 'Don't know' as appropriate for the following questions.

- **Approval** – Are major project proposals subject to a structured review and approval process?
- **Review** – Are projects subject to a post-implementation review?
- **Evaluation** – Does that post-implementation review entail an evaluation of success against stated objectives?
- **SLA** – Service Level Agreement – Are service levels defined for ongoing information and IT services?
- **Monitor** – Are these service levels monitored?
- **Reporting** – Is the level of performance against service levels reported to senior management?

Only 33% of respondents reported that their institution employs formal management techniques for each listed stage of managing IT investments, however 92% reported use of formal management techniques for at least one stage of the whole process. The full breakdown of responses by institution type is shown in the following table and graph in Figures 39 and 40. The table shows both the number of positive 'Yes' responses for each question (No) and the percentage (%) of respondents from each type of institution who responded positively. Again, for a breakdown of the classification of HEI 'types', please refer to Figure 13.

HEI Type	Approval		Review		Evaluation		SLA		Monitor		Reporting	
	No	%	No	%	No	%	No	%	No	%	No	%
A	3	100.00%	2	66.67%	2	66.67%	3	100.00%	2	66.67%	2	66.67%
B	19	86.36%	18	81.82%	16	72.73%	16	72.73%	13	59.09%	10	45.45%
C	13	100.00%	13	100.00%	12	92.31%	10	76.92%	9	69.23%	5	38.46%
D	6	85.71%	5	71.43%	5	71.43%	4	57.14%	6	85.71%	4	57.14%
E	20	95.24%	18	85.71%	15	71.43%	13	61.90%	16	76.19%	13	61.90%
F	24	96.00%	17	68.00%	12	48.00%	15	60.00%	15	60.00%	12	48.00%
U	17	85.00%	13	65.00%	11	55.00%	14	70.00%	15	75.00%	12	60.00%

Figure 39 Positive Responses to Investment Questions by HEI Type

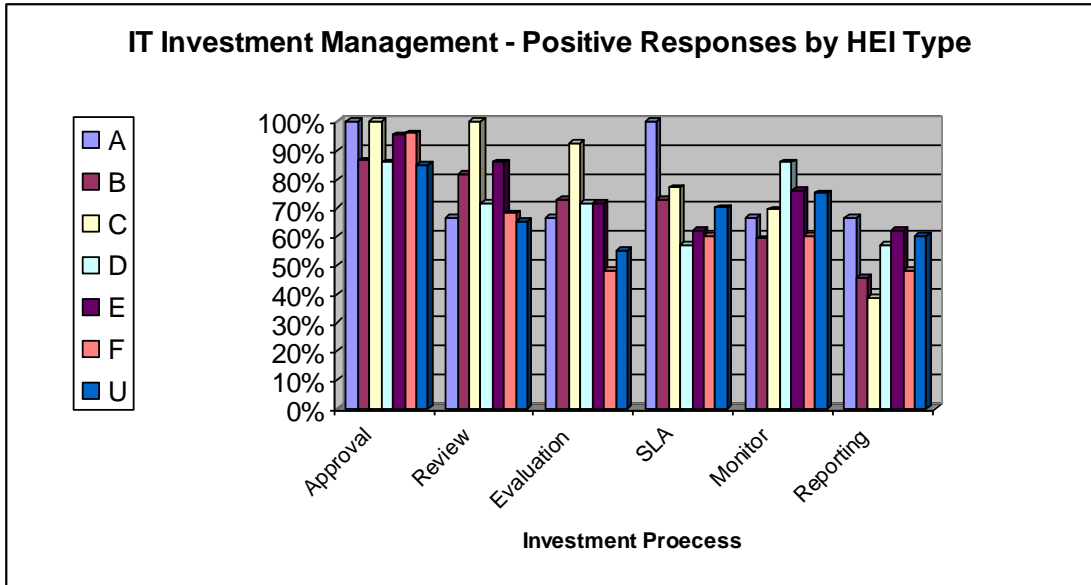


Figure 40: Graph of Positive Responses on Investment by HEI Type

Section 7 – Emerging Issues

Section 7 asked respondents to identify three emerging issues that in their view would have the greatest impact on the way in which IT and information systems are managed and governed.

Although UCISA regularly monitors its member institutions on emerging issues via the IT Directors mailing list, the project team did feel that it would still be beneficial to probe issues on management and governance in our survey. Because our survey was aimed at a wider range of staff in HE, we were able to break down the issues quoted by respondent job type in order to compare the types of issues pertinent to directors, corporate management staff, librarians and managers.

The project team examined all issues raised by survey respondents and categorised them under the following 18 headings.

➤ **24/7 – Anytime/Anywhere/Any Device Computing**

The need to provide mobile, flexible and remote access to systems through technologies like wireless networking with the increased use, by staff and students, of heterogeneous, personally owned equipment and the implications this has for infrastructure design and support structures. Also ensuring that systems are available and supported for use 24 hours a day, seven days a week.

➤ **Collaboration**

The need for IT to support collaboration both within and between institutions and the issues that this raises; co-ordination, use of standards, identity management, etc.

➤ **Competition**

Operating successfully in an increasingly competitive HE market

➤ **Compliance**

The need to ensure that IT and information systems comply with relevant legislation, e.g. Data Protection and Freedom of Information.

➤ **Senior Corporate Management**

The need to have a better appreciation of IT issues at a senior management level, either by ensuring that senior managers are well briefed on IT and systems issues or by having the 'Chief Information Officer' sit on the executive body. This relates also to the need to recognise that systems and information itself are 'corporate' and have to be planned from an institution wide perspective.

➤ **Institutional Effectiveness**

Institutional effectiveness and adding value. Ensuring high quality of provision.

➤ **E-learning**

Increasingly pervasive use of e-learning and learning technologies with the teaching environment and the consequent impact on demand for support and provision levels.

➤ **Student and Staff Expectations**

Lifestyle changes and the implementation of top up fees (in some of the UK) mean that students have increasing expectations of their institution and its provision of IT. Staff expectations also have to be taken into account.

➤ **Staff and Student Expertise**

The need to ensure that staff and students have sufficient training and skills to exploit the information systems and technologies at their disposal.

➤ **Financial Issues**

This includes all issues related to cost; the difficulty in securing sufficient continued investment to maintain and develop information systems, the issues related to aligning institutional IT spend with the funding methods used by the funding councils and the pressure to deliver cost savings through the use of IT. This also includes cost effectiveness, achieving value for money and being able to demonstrate these.

➤ **Integration of Systems**

The need to integrate information and systems across the institution, and beyond.

➤ **Other**

Issues that do not easily fit into the other defined categories.

➤ **Technology Risk**

Issues related to the risks associated with use and governance of technology such as security and resilience; the need to protect systems and information from malicious attack and the need to review the resilience of IT against the potential risks of failure, particularly as institutions become increasingly reliant on IT.

➤ **System Selection**

Selecting the right information systems to meet the institution's requirements

➤ **Strategy Alignment**

The need to ensure that the institution's investment in IT is aligned to its mission and strategy.

➤ **Organisational Structures**

There are several strands under this category; the need to move towards a more centralised, co-ordinated approach to the deployment and support of IT and information systems, albeit in a devolved operational environment and the need to balance centralised and devolved services. There is also an increasing need to support autonomous users and systems within a centrally supported structure. Other traditional organisational boundaries are becoming increasingly blurred, for example those between academic and administration departments.

➤ **Technology Development**

Issues related to the ongoing development of technology, including current new developments such as GRID computing and generic issues such as storage and management of ever increasing data volumes. This category also takes into account the speed at which technology is evolving.

➤ **Management and Governance Tools and Processes**

The need or desire to utilise formal tools for information systems governance, e.g. benchmarking, Six Sigma, ITIL.

There were three possible issues for each of the 111 respondents; a potential total of 333. The actual total number of issues highlighted by respondents was 300 and the full list, arranged under the 18 category headings can be viewed in Appendix One. The following table and graph in Figures 41 and 42 show the percentage of total respondents who flagged up issues in each of the 18 categories. These are displayed in descending order of results. Note that for these results, the total

possible percentage value is 300% because respondents could enter up to three issues each. In the table in Figure 41, for each of the 18 issue categories, the corresponding subheading from the Information Systems Management and Governance Framework has been listed too.

Framework Subheading	Issue Category	No	%
Service Delivery	Anytime/Anywhere/Any Device Computing	47	42%
Finance	Financial Issues	45	41%
Technology	Technology Risk	35	32%
Technology	Technology Development	31	28%
	Other	22	20%
Policies	Management and Governance Tools and Processes	18	16%
Alignment	Strategy Alignment	15	14%
Systems	Integration of Systems	14	13%
Service Delivery	Institutional Effectiveness	9	8%
Structures	Organisational Structures	9	8%
People	Senior Corporate Management	8	7%
Systems	E-learning	8	7%
People	Student and Staff Expectations	8	7%
People	Staff and Student Expertise	8	7%
Structures	Collaboration	7	6%
Policies	Compliance	7	6%
Systems	System Selection	5	5%
Vision	Competition	4	4%

Figure 41: Figures for Issues Raised

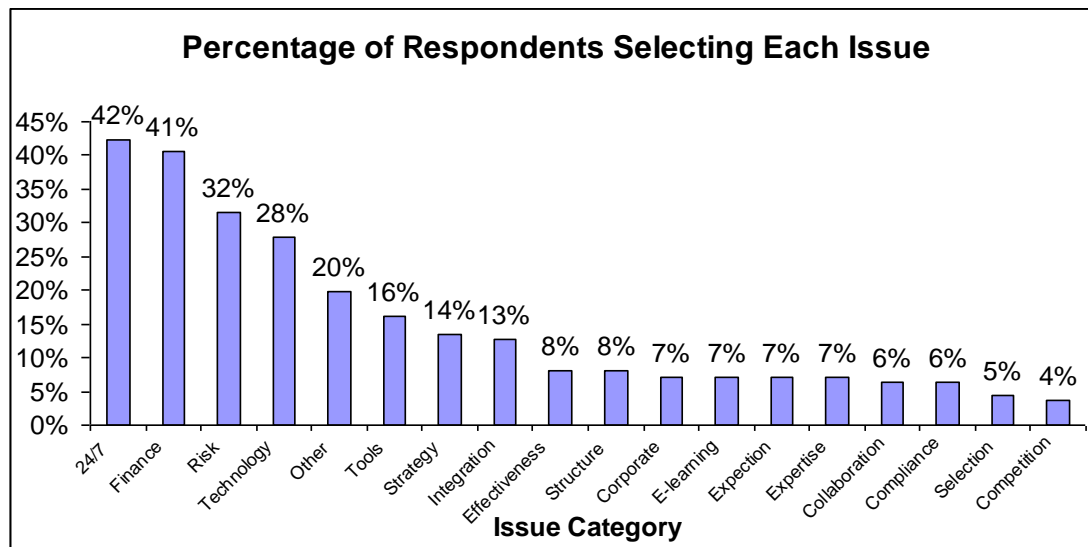


Figure 42: Graph of Issues Raised by Category

For a more in-depth analysis of this section of the survey, the range of issue categories emerging from the responses to this section were then broken down by the type of job that the respondent held. That is, we looked at the spread of issue

categories raised by the four job types covered by survey respondents; corporate staff, directors, librarians and managers. The raw data table in Figure 43 shows the results of this breakdown by job type. The percentage figures show what percentage of respondents from each job type raised issues in each of the 18 categories.

Issue Category	Corporate	Director	Librarian	Manager
24/7	40%	44%		43%
Collaboration	7%	5%		14%
Competition		5%		
Compliance		8%		7%
Corporate		9%		7%
Effectiveness	7%	10%		
E-learning	13%	8%		
Expectation	13%	6%		7%
Expertise	7%	8%		7%
Finance	40%	38%	100%	50%
Integration	13%	11%	33%	14%
Other	40%	18%		21%
Risk	40%	33%	33%	21%
Selection	7%	5%		
Strategy	13%	10%	33%	36%
Structure	7%	9%	33%	
Technology	40%	28%		21%
Tools		19%	67%	7%

Figure 43: Figures for Issues by Category and Job Type

This data is shown graphically in Figure 44 so that the range of levels in response for each category can be compared between respondent types

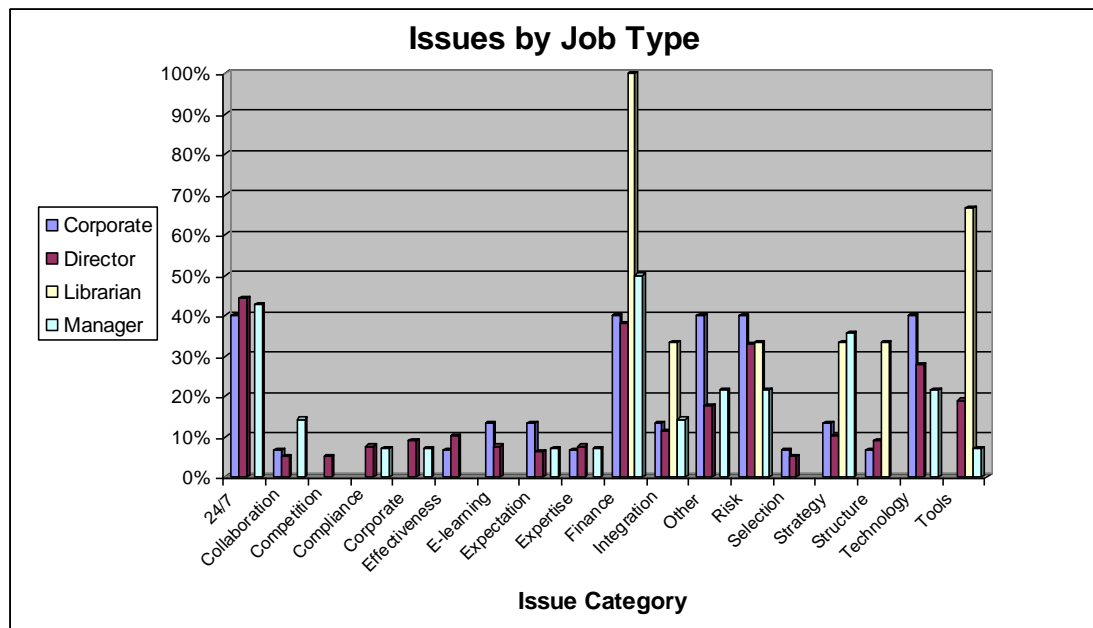


Figure 44: Graph of Issues by Category and Job Type

As the figures show, the profile of issues does differ for the different job types. The results for job type 'director' are in agreement with the latest UCISA 'Top Concerns' survey results, whereby anytime, anywhere computing was the top concern for 2004/05. For corporate respondents, this was in joint first place alongside Finance, Technology, Risk and Other issues. For both librarians and managers, however, Finance was the most highlighted issue, 100% and 50% of them raising it, respectively.

The broadest range of issues raised was from director respondents; at least 5% of directors raised issues from every single one of the 18 categories. This was followed by corporate respondents who covered 14 categories, managers with 13 and librarians with only 6. This observation, however, must take into account the spread of total responses from these different job types – as outlined in the results in Section 1, 71% of all respondents were directors, 14% were corporate level staff, 13% were managers and only 3% were librarians.

Section 8 – Tools and Resources

This section of the survey questioned the use of tools and resources that can be used to inform the management and governance of IT and information systems in higher education. For the following list of tools and resources, respondents could select a letter (a to e) to denote a response of 'used regularly', 'used occasionally', 'not relevant', 'too expensive' or 'don't know'.

- COBIT – Control Objectives for Information and Related Technology
- ITIL – Information Technology Infrastructure Library
- PRINCE – PRINCE2 or other formal project management techniques
- BM – Benchmark data
- ABC – Activity Based Costing
- CBA – Cost Benefit Analysis
- BS – Balanced Scorecard
- PI – Performance Indicators
- League – League tables published by newspapers

The results for this are displayed in the table and graph in Figures 45 and 46.

Response		COBIT	ITIL	PRINCE	BM	ABC	CBA	BS	PI	League
a	Used Regularly	3%	18%	43%	45%	18%	40%	8%	45%	45%
b	Used Occasionally	4%	25%	40%	47%	26%	40%	31%	39%	30%
c	Not Relevant	22%	9%	4%	3%	9%	2%	6%	3%	12%
d	Too Expensive	7%	10%	5%	2%	10%	2%	6%	2%	1%
e	Don't Know	50%	24%	6%	1%	29%	11%	35%	5%	9%

Figure 45: Figures for Use of Tools and Resources

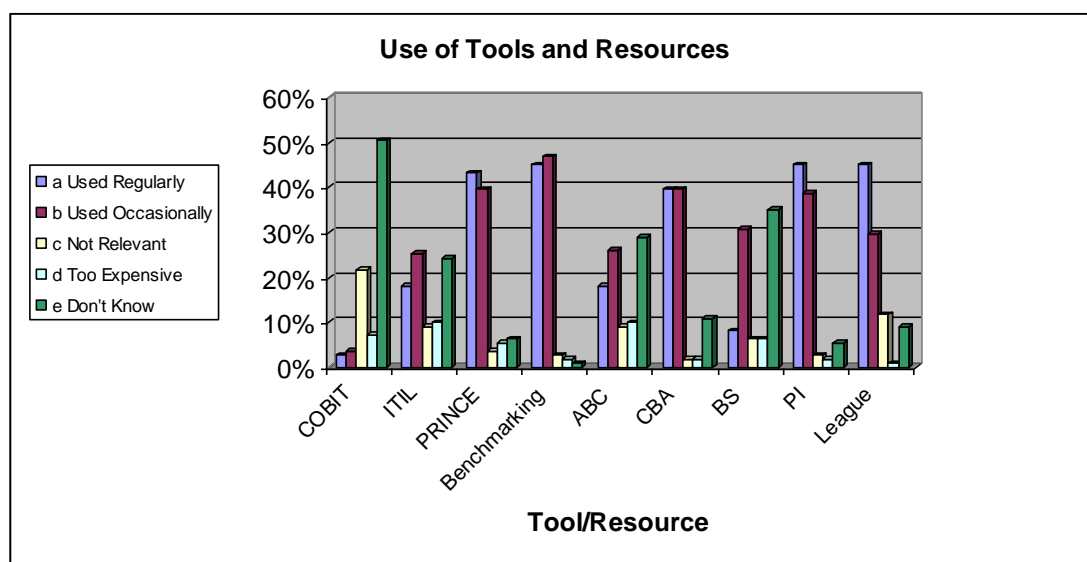


Figure 46: Graph for Use of Tools and Resources

The most common tools and resources used regularly at institutions were benchmarking and league tables, both were reported to be used regularly at

institutions by 45% of respondents. Furthermore, benchmarking and league tables were reported to be used regularly or occasionally by 92% and 75% of respondents, respectively. PRINCE2, Cost Benefit Analysis and Performance Indicators were also popular, being used regularly or occasionally at the institutions of 83%, 80% and 84% of respondents respectively.

It should be noted that use of the listed tools by institutions may be at different levels of formality, for example, many institutions use project management techniques based on PRINCE2, but don't actually follow the methodology rigidly. Other terms used, such as cost benefit analysis, can apply to very formal, in-depth analysis techniques or equally to much more basic, loosely defined methods.

The use of the listed tools and resources was then analysed by HEI type. For each tool/resource, the percentage of respondents indicating each response (a to e) was broken down by the type of institution on behalf of which they were responding. The results for this can be viewed in the following tables and graphs.

COBIT

The use of COBIT was broken down by the types of institution that the respondents came from. The results are displayed in the table and graph in Figures 47 and 48.

Response	A	B	C	D	E	F	U
Don't Know	33%	55%	46%	86%	57%	40%	45%
Not Relevant		18%	23%		10%	32%	35%
Too Expensive		5%	15%	14%	5%	12%	
Used Occasionally	33%	5%			5%	4%	
Used Regularly		5%				4%	5%

Figure 47: Figures for Use of COBIT by HEI Type

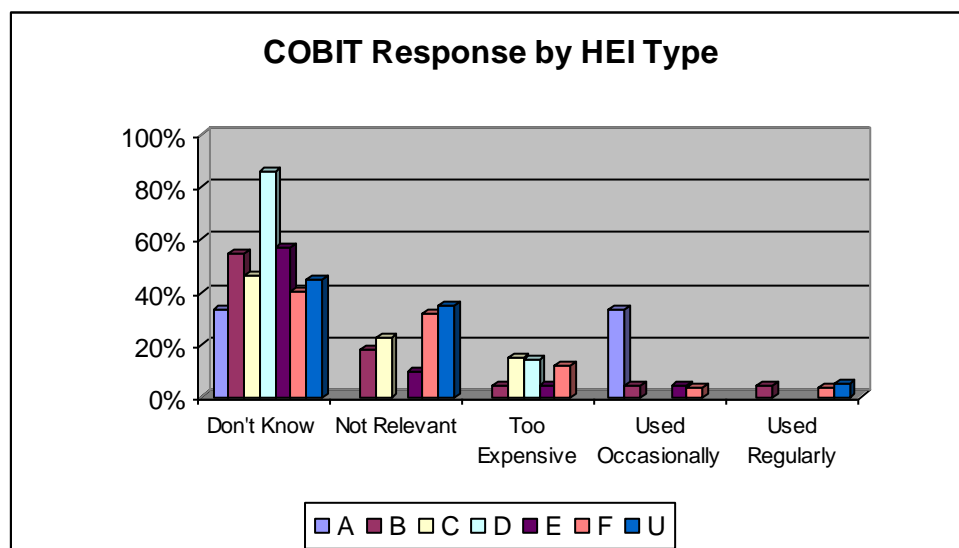


Figure 48: Graph of Use of COBIT by HEI Type

ITIL

The use of ITIL was broken down by the institution types represented by respondents. The results are displayed in the table and graph in Figures 49 and 50.

Response	A	B	C	D	E	F	U
Don't Know		27%	15%	29%	19%	28%	30%
Not Relevant		5%	8%			28%	5%
Too Expensive		9%	8%	14%	10%	16%	5%
Used Occasionally	67%	18%	23%	29%	38%	16%	25%
Used Regularly		23%	31%	14%	24%	4%	20%

Figure 49: Figures for Use of ITIL by HEI Type

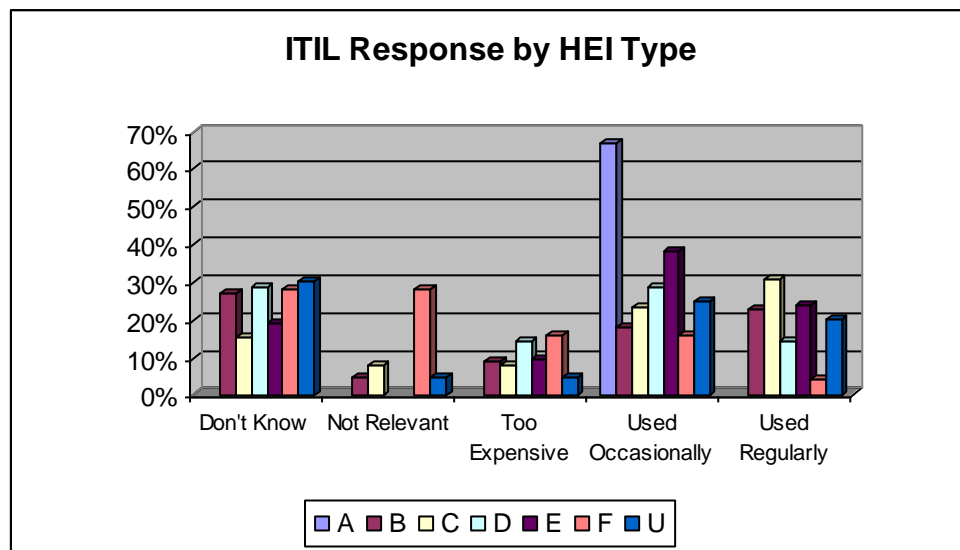


Figure 50: Graph of Use of ITIL by HEI Type

PRINCE2

The use of PRINCE2 was broken down by the institution types represented by respondents. The results are displayed in the table and graph in Figures 51 and 52.

Response	A	B	C	D	E	F	U
Don't Know				29%	5%	12%	5%
Not Relevant						12%	5%
Too Expensive		14%				4%	10%
Used Occasionally	33%	36%	31%		38%	52%	50%
Used Regularly	67%	45%	69%	71%	52%	20%	30%

Figure 51: Figures for Use of PRINCE2 by HEI Type

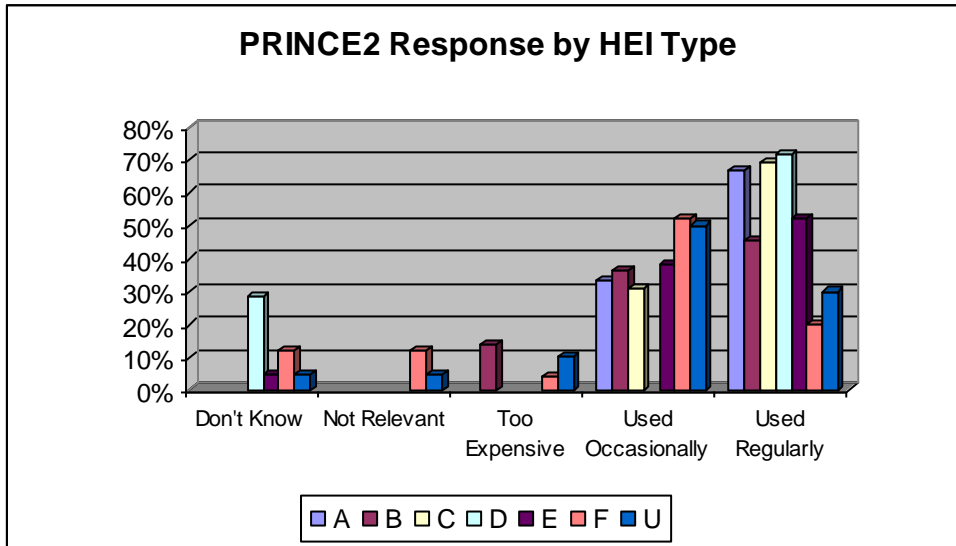


Figure 52: Graph of Use of PRINCE2 by HEI Type

Benchmarking

The use of benchmarking was broken down by the institution types represented by respondents. The results are displayed in the table and graph in Figures 53 and 54.

Response	A	B	C	D	E	F	U
Don't Know					5%		
Not Relevant		5%				4%	5%
Too Expensive	33%						5%
Used Occasionally		45%	54%	43%	57%	44%	45%
Used Regularly	33%	50%	46%	43%	33%	52%	45%

Figure 53: Figures for Use of Benchmarking by HEI Type

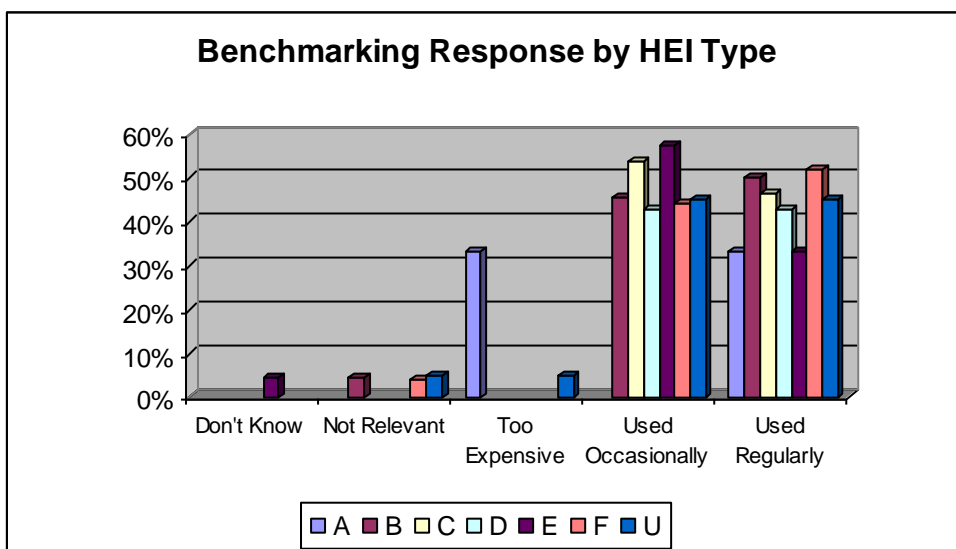


Figure 54: Graph of Use of Benchmarking by HEI Type

Activity Based Costing

The use of activity based costing was broken down by the institution types represented by respondents. The results are displayed in the table and graph in Figures 55 and 56.

Response	A	B	C	D	E	F	U
Don't Know		27%	23%	43%	19%	40%	30%
Not Relevant	33%	5%	8%		14%	8%	10%
Too Expensive	33%	14%	8%	29%	14%		5%
Used Occasionally		36%	23%		29%	32%	20%
Used Regularly		14%	31%	29%	10%	16%	25%

Figure 55: Figures for Use of Activity Based Costing by HEI Type

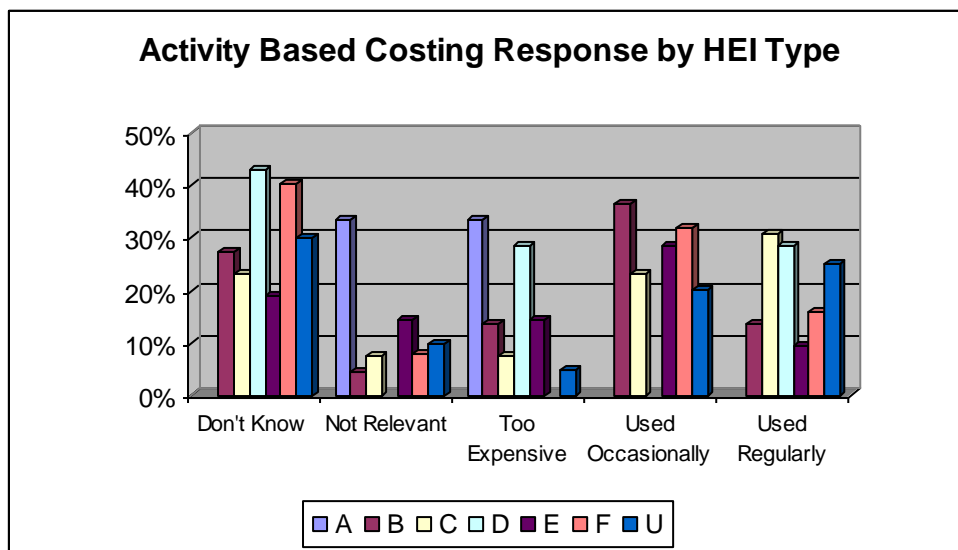


Figure 56: Graph for Use of Activity Based Costing by HEI Type

Cost Benefit Analysis

The use of Cost Benefit Analysis was broken down by the institution types represented by respondents. The results are displayed in the table and graph in Figures 57 and 58.

Response	A	B	C	D	E	F	U
Don't Know		9%		14%	10%	20%	10%
Not Relevant					5%		5%
Too Expensive	33%	5%					
Used Occasionally	33%	27%	38%	43%	52%	52%	25%
Used Regularly		50%	54%	43%	24%	24%	60%

Figure 57: Figures for Use of Cost Benefit Analysis by HEI Type

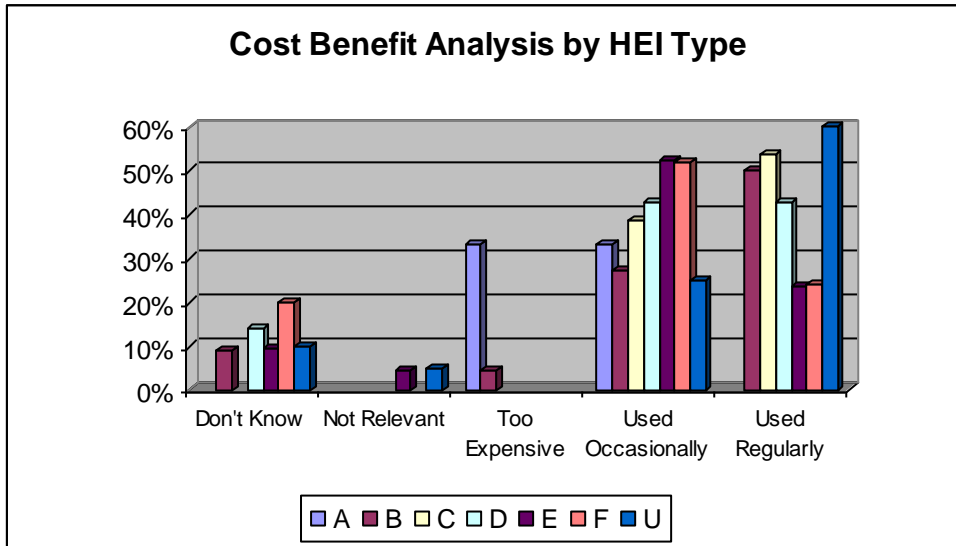


Figure 58: Graph of Use of Cost Benefit Analysis by HEI Type

Balanced Scorecard

The use of Balanced Scorecard was broken down by the institution types represented by respondents. The results are displayed in the table and graph in Figures 59 and 60.

Response	A	B	C	D	E	F	U
Don't Know		41%	23%	29%	24%	48%	40%
Not Relevant			15%			12%	10%
Too Expensive	33%	9%		14%	10%	4%	
Used Occasionally	33%	32%	31%	29%	43%	20%	30%
Used Regularly		5%	15%	29%	10%	8%	

Figure 59: Figures for Use of Balanced Scorecard by HEI Type

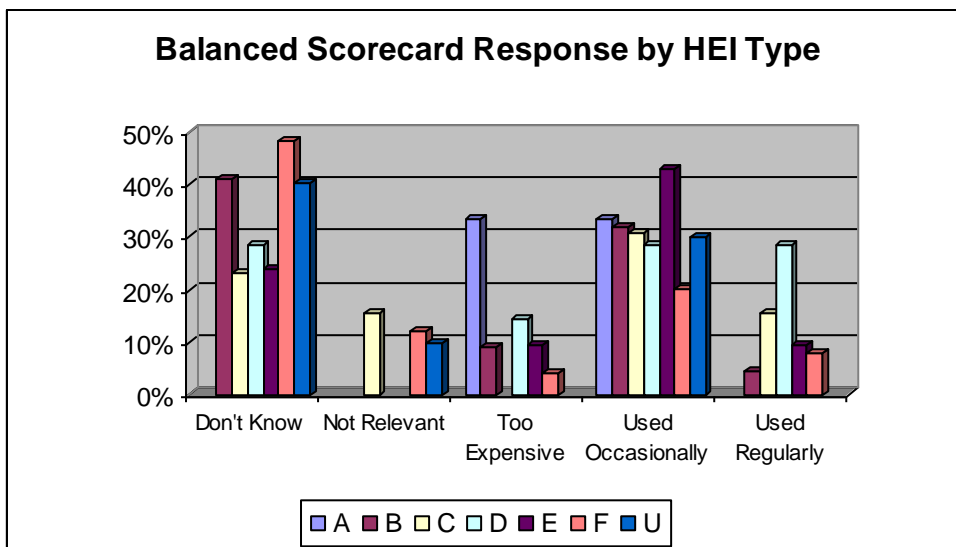


Figure 60: Graph of Use of Balanced Scorecard by HEI Type

Performance Indicators

The use of Performance indicators was broken down by the institution types represented by respondents. The results are displayed in the table and graph in Figures 61 and 62.

Response	A	B	C	D	E	F	U
Don't Know		5%		14%	5%	12%	
Not Relevant						8%	5%
Too Expensive			8%		5%		
Used Occasionally	33%	45%	23%	29%	38%	44%	40%
Used Regularly	33%	41%	69%	57%	48%	36%	40%

Figure 61: Figures for Use of Performance Indicators by HEI Type

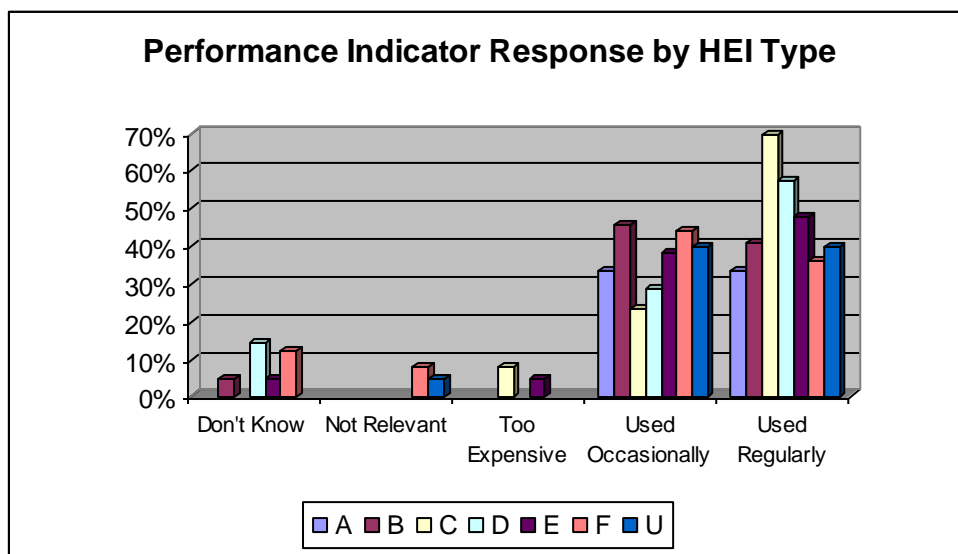


Figure 62: Graph for Use of Performance Indicators by HEI Type

League Tables

The use of league tables was broken down by the institution types represented by respondents. The results are displayed in the table and graph in Figures 63 and 64.

Response	A	B	C	D	E	F	U
Don't Know		9%			14%	20%	
Not Relevant	33%	5%		14%	10%	12%	25%
Too Expensive							5%
Used Occasionally		36%	23%		38%	28%	35%
Used Regularly	33%	45%	77%	86%	29%	40%	35%

Figure 63: Figures for Use of League Tables by HEI Type

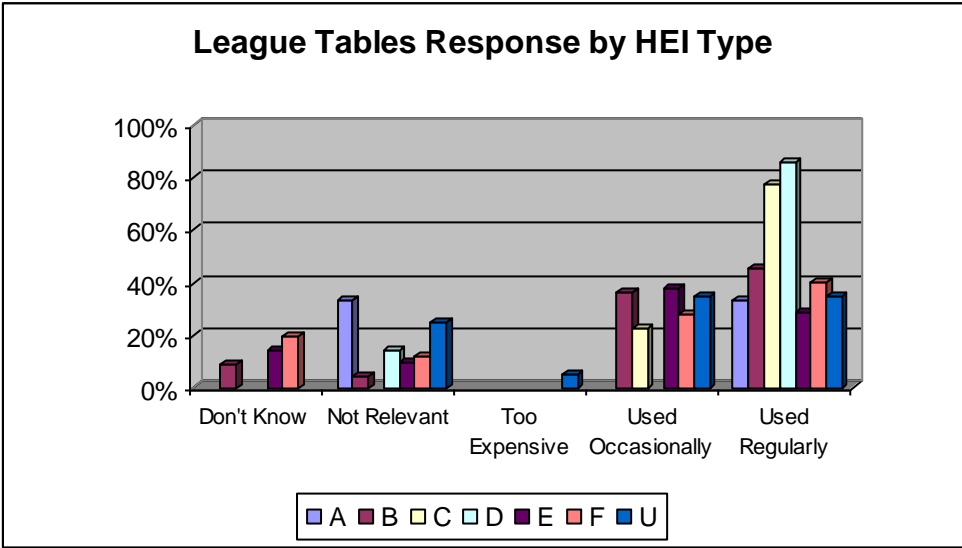


Figure 64: Graph of Use of League Tables by HEI Type

Section 9 – Format of this Project's Outputs

In this section, respondents were asked firstly who might benefit from an IT Governance and Management Toolkit at their institution, and secondly how the Framework and Toolkit might supplement existing management and governance processes. Each response to these questions was examined individually by the project team to inform the outputs of the project.

On who might benefit from the IT Governance and Management Toolkit being developed, aside from 6 respondents (5% of the sample), all respondents suggested one or more people within their institution. There were a small number of suggestions which were supplemented with cautionary comments, these are listed as follows:

- “ISS Director, Librarian, Deans, Faculty IT Managers, Finance Director. But major risk of HE re-inventing the wheel again.”
- “Possibly the Director of IT Services but this would be largely dependent on the outputs of the project. Would only consider using something that has immediate practical use.”
- “That will depend what the toolkit comprises; if it is yet another thing to beat up the Director with I am not interested!”

Overall, there was a huge range of job areas suggested as potentially benefiting from the toolkit, they are listed below:

- Pro Vice Chancellor
- Deputy Vice Chancellor
- Principal
- Assistant Principal
- Registrar
- IT Manager
- Internal Audit
- Head of Administration
- Dean
- Faculty IT Manager
- All Senior Managers
- Directors and Heads of Information Resources/Information Services/Information Systems/Computing/Computing Services/IT Services/Learning Resources/Strategy/Corporate Services
- Librarian
- Director of Finance
- Director of Operations
- CIO
- Chair/members of committee for IT Governance/Information Policy/Information Strategy/Resources

88 respondents (79%) then gave feedback on how the framework and toolkit might supplement existing management and governance processes. The suggestions have been placed into the following categories, listed and described in Figure 65.

Name	Description
Checklist	Provide a checklist of areas that should be covered, institutions can use this to evaluate what already exists, confirm processes or identify weaknesses and fill gaps in the current set up, i.e. supplement work that is already being done.
Benchmark	Provide benchmarking information for the HE Sector
Best Practice	Provide best practice exemplars/a best practice guide
Structure	Provide a formal structure for governance/a consistent approach/a standard measure for the sector
Development	Provide information on new developments for IT governance and give institutions a view of existing tool and methods in order to reduce their development effort and avoid 're-inventing the wheel'
Guidance	Provide general guidance/information in the area
Promote	Promote the need for such practice, raise the profile and raise awareness
Don't Know	Don't know/difficult to say/it depends on the outputs
Negative	Negative response – i.e. the framework/toolkit would not be beneficial
Other	Other suggestions that do not fit into above categories

Figure 65: Framework Use categories

The results for each of these categories is shown graphically in Figure 66. For each category, the chart shows the percentage of respondents who suggested that the framework and toolkit could be used in that way.

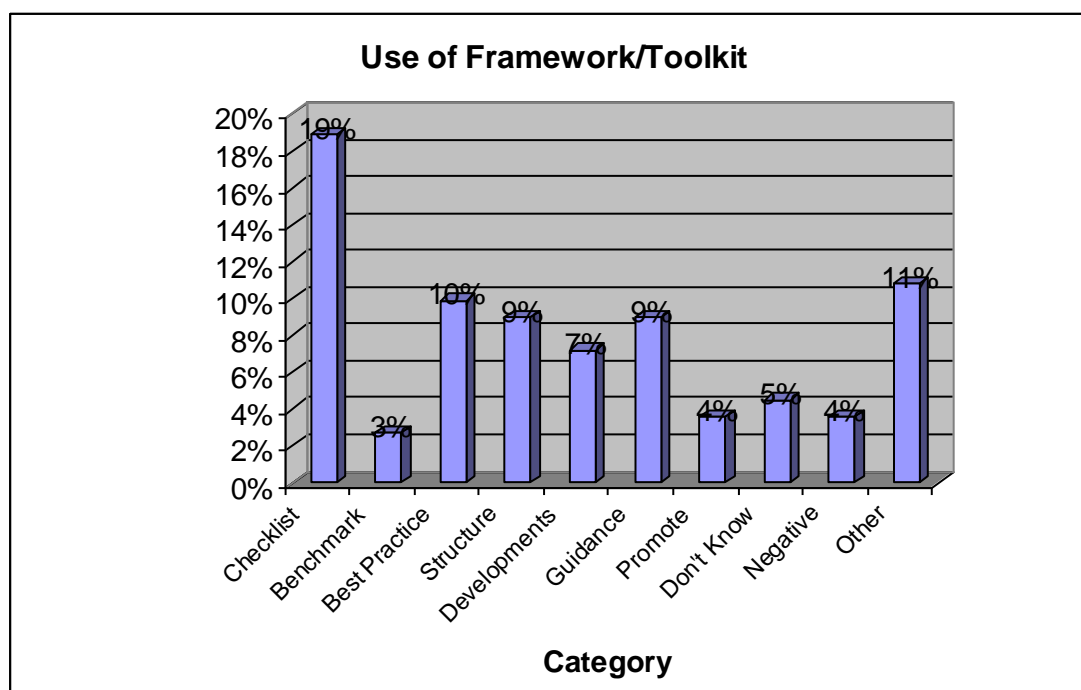


Figure 66: Categories of Use for Framework/Toolkit

It is worth commenting on the negative responses; 4% of respondents felt that the framework and toolkit may not be of benefit to institutions. These negative

responses noted concerns that the framework/toolkit would create work for institutions and add to the existing bureaucracy and administrative overhead without providing much benefit, particularly when other standards already exist, for example, ITIL, PRINCE2, BS7799 and the HEFCE Best Practice Guide. However, some of these comments did add that the framework and toolkit *could* be useful – if carefully constructed, and if they supported a ‘light touch’ methodology. This would mean that rather than a one-size fits all approach with high overheads, the framework/toolkit would provide a set of processes to be applied in a ‘fit for purpose’ manner, i.e. only where relevant to individual institutions. These comments were taken on board when developing the project outputs. Given the diversity of the types of HEI, and the individual circumstances of each, the framework and toolkit are not prescriptive and can be adapted to fit the individual profile of an institution. There were only 4 responses to this question categorised as negative, i.e. from 4% of respondents. The project has benefited from these as together with all the other comments, we have been given a balanced viewpoint, i.e. the survey elicited responses from all viewpoints, not just those particularly interested in new approaches for IT Governance.

The last part of Section 9 allowed respondents to select one or more preferred formats for this project’s outputs. The results are shown in graphic form in Figure 67 below.

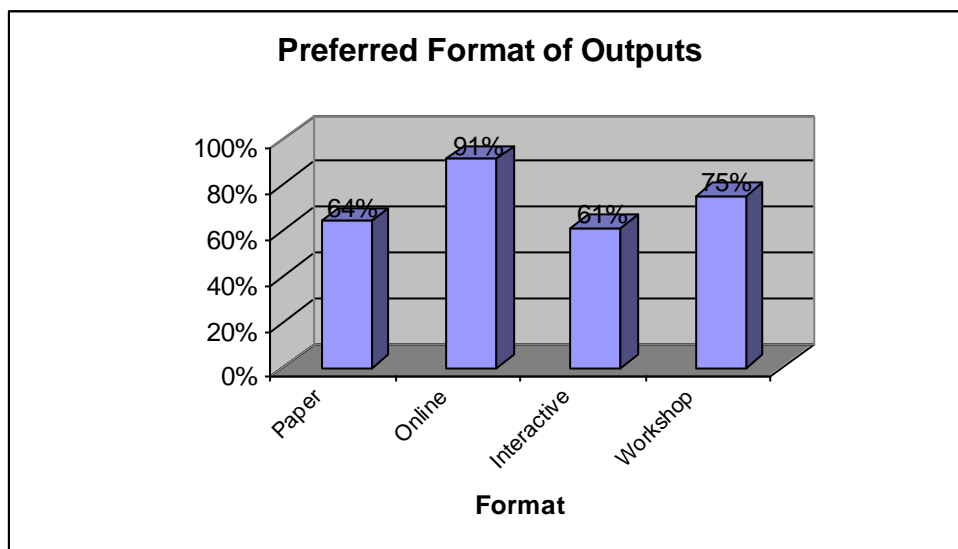


Figure 67: Preferred Format of Outputs

The responses to the questions in Section 9 helped with the shaping of the project outputs for this phase, and will be particularly useful for future phases of the project, especially when combined with potential further participation as outlined in the following section.

Section 10 – Further Participation

The project team was very encouraged by the level of response to this section which asked for volunteers to participate in exercises potentially involved in future work on the project; both during this phase and possible subsequent phases. A significant number of offers were made by respondents for the various potential forms of further participation as shown in Figure 68. We also received a supplementary letter of interest from an individual HEI explicitly offering to help with further work in this area.

	Number of responses	Percentage of Responses %
Participate in telephone interview	63	57%
Prepare written summary of case study information	12	11%
Review and comment of drafts of project outputs	37	33%
Participate in pilot exercise in future phase of project	32	29%
Be kept informed of project outputs	100	90%

Figure 68: Further Participation Offers

From these results, the vast majority of respondents stated that they wished to be kept informed of the project outputs and since the final analysis was undertaken, we have also received an additional number of contacts who wish to be kept informed as well. The project team can conclude that should additional phases of the project be undertaken, there will be no shortage of willing volunteers to participate as case studies and pilots in the sector.

6. Conclusions

The survey achieved a very high level of response – 111 individual usable responses from 98 distinct higher education institutions in the UK. Based on a total of 170 UK HEIs (the number listed by HESA) the coverage of UK HEIs was 58%. This would be an excellent outcome at any time but was particularly exceptional given that the survey had to be conducted during the summer months when many HE staff are away and the remaining IT staff can be very busy. The team felt that such a high response rate was due in part to a good targeting strategy but also reflected the high level of institutional interest in the project and its subject matter. Good coverage of different types of institution and of the four constituent countries in the UK was achieved.

The amount of qualitative information forthcoming was excellent and very useful, however it did make processing the survey results much more difficult and time consuming for the project team, particularly within the time scale for the project. There are therefore some sections which could benefit from further analysis or closer inspection of responses to open questions. However, the high number of responses and this large amount of qualitative information did mean that the project team was able to develop an informed understanding of the current IT management and governance procedures that are in place within HEIs, both from responses to closed questions where respondents indicated their use of listed tools and procedures, and from open questions where respondents were able to be much more descriptive.

Of particular use in shaping the outputs for current and future work on this project was Section 9 where we were able to canvas opinion on the type of tools and self-assessment frameworks that HEIs consider useful and practical.

Aside from the framework and toolkit, which are the main outputs of this project, the project team feels that the survey outcomes will also be of use to institutions who wish to be informed of what tools and procedures are used in other UK HEIs. The survey results will allow those in HE to be aware of practice and opinion related to management and governance in the rest of the sector.

With regards to dissemination of the project outputs and raising awareness of the project and its outputs, we already have a contact list comprising 90% of survey respondents who wish to be informed of the project outputs. Those 100 responses came from 92 distinct UK institutions, therefore initial dissemination alone will instantly cover almost 55% of all higher education institutions in the UK.

The survey results very usefully fed into development of the framework and toolkit and are referenced in the corresponding documents where appropriate. We have a large number of potential case studies and pilot sites willing to participate in potential future phases of this project, should they go ahead.

Appendix One – Issues

This appendix contains a list of all of the issues raised by survey respondents, that they felt would have greatest impact on the way in which IT and information systems are managed and governed in HE in the next five years. The issues listed in this appendix are displayed exactly as entered by the individuals responding, except where the information would reveal the identity of the respondent or institution, in which case, the response has been edited as appropriate to keep the response anonymous. The issues as reported by respondents have been listed under the appropriate category headings, as devised by the project team, namely:

- 24/7 – Anytime/Anywhere/Any Device Computing
- Collaboration
- Competition
- Compliance
- Senior Corporate Management
- Institutional Effectiveness
- E-learning
- Student and Staff Expectations
- Staff and Student Expertise
- Financial Issues
- Integration of Systems
- Other
- Technology Risk
- System Selection
- Strategy Alignment
- Organisational Structures
- Technology Development
- Management and Governance Tools and Processes

24/7 – Anytime/Anywhere/Any Device Computing

- Access - 24/7 external/internal access to services
- Anytime, anywhere computing - ensuring that staff and systems get access to information when they want it and where they want it.
- Availability as more reliance on these systems.
- Customer-focus; 'the customer is king', increasing ownership of portable learner profiles by students, e-portfolios etc will need a 'distributed' approach to data management, with all of the associated security issues.
- Delivering the web enabled campus (or the 'virtual' estate strategy) including mobile and wireless computing.
- Demand. Demand for services will grow, and in particular, the need for delivery 24/7 and from any location. Few University IT services have sufficient resource to match the potential growth in requirements. Underlying resources are seldom a key consideration
- Dependency of technology infrastructure 24x7x52. World time zones, distance learning, designing/affording resilience in technology providing support 24x7. Content (pedagogy) support 24x7
- Distributed learning

- diverse and mobile staff and students + collaborative initiatives involving sharing information etc
- Extending support to 24/7
- Failure to enable users use of personal and nomadic computing
- Growth in the distance learning / e learning model away from the campus based model increased demand for resilience and bandwidth
- Impact of lower cost, mobile, personally owned computing devices on the type, quality and management and oversight of the services being provided.
- Increase in student owned equipment on our network.
- Increased remote access to systems holding corporate data and security considerations.
- Increased use of mobile technology
- Increasing student ownership and use of mobile devices
- Interoperability; who will have control of directory services for authentication at a global level. Also mobility issues for seamless ubiquitous computing for anytime, anywhere, any device access, e.g. the supporting architecture which is required.
- Issues related to accessing computing anywhere , wireless technology and mobile computing
- Issues surrounding the ability to serve personally-owned PCs and sundry devices, yoked to the need for secure mobile computing. Plus all the derived problems – licensing, records management, etc.
- Location independent working and access to services/systems
- Mobile and ambient computing and related security.
- Mobile consumption of services, learning, research, and mobile wireless interaction on campus; Remote but secure working by staff, students and faculty
- Mobile technology
- Mobile technology: provision of "devices" by students themselves. Ensuring appropriate level of resources available to all students independently of their income.
- Mobility - Delivery of student centred services through a range of remote devices
- Mobility of users - flexible wireless access
- Mobility/wireless etc. (an extension of 1. but will mean specifically needing to ensure our 'rules' can keep up with a population the is not in fact under our control)
- Nature of student/mode of attendance is changing - much more web-based service provision to a wider range of locations/times.
- Pressures of 24by7 delivery. Both operational, staffing and funding.
- Prevalent use of laptops, need to support these and ensure data residing on them is secure.
- providing support for anytime / anywhere computing by developing use of mobile devices, extended hours support, network authentication, etc)
- Provision and management of out-of-hours support and flexible working hours.
- Rapid changes in wireless and portable technology and in the expectations of students for universities to be providing the latest services.
- Rapid expansion of flexible learning: wireless (our student residences are now 100% wireless enabled), mobile hardware, &c. May lead to a more fluid situation in organisation and governance of ICT.
- Regional Networks - opportunities for students to access lectures/tutorials/advice./guidance/information/pay fees etc. on line.
- Remote access facilities for staff and students.
- Remote access to everything, any time, anywhere by students, staff and others

- Secure access to our online facilities from anywhere.
- Students' desire to use mobile technology anywhere, and at almost any time.
- The demand and dependence on more available and accessible IT systems will continue to grow and institutions will need to find the means to provide assured 24x7 availability.
- The growth in the use of the web at both intra and extra net levels to form system non-specific access portals whilst moving away from the constraints of an o/s bound client structure
- The means of access to IT networks and services will become user owned e.g. laptops and this should be encouraged. The need for fixed workstations provided by institutions will diminish over time and make for better space utilisation.
- The need to provide 24/7 services to students at any location they choose.
- Use of students' own devices on institution's network (i.e. security issues resulting)
- Wireless Technology
- Wireless technology.

Collaboration

- Breadth of support required, including partnerships between organisations
- Collaboration with other institutions
- Identity management and collaborative working across institutions, and the increasingly blurred line as to membership of an institution (Life long learning, collaborations etc)
- Institutional Goals in terms of International Links
- Institutions will need to collaborate on issues like Disaster Recovery, Digital Archiving, Repositories etc if costs are to be contained.
- More collaboration/partnerships developing both within and between institutions/organisations call for much more "joined-up" approaches and a need for systems to talk to each other more readily (and people too at times!).
- Pressure from the government for universities to merge/collaborate?

Competition

- Competition for applicants post 2006 will require more sophisticated CRM systems.
- Increased competition between institutions.
- Increased competition will demand improved levels of service to students who will be increasingly technically savvy.
- The changing market in HE and associated focus on revenue and cost streams.

Compliance

- Changes in law/legislation - IP - Freedom of Information
- Compliance to FOI act - relating to e-mail systems and record keeping
- Ensuring compliance with IT security issues and other legislative requirements, including FoI, particularly in distributed systems where central IS departments have no control over the IT activities of academic departments and whose behaviour in these are
- Information Legislation; compliance and cost of compliance
- Legal compliance

- Legislation - Data Protection Act, Freedom of Information Act
- The additional ICT challenges of complying with increasing legislation in such areas as data protection and freedom of information

Senior Corporate Management

- Ensuring a University-wide view is taken in a highly devolved organisation - we're making some governance changes to facilitate this
- Ensuring institutional developments take sufficient account of IT requirements which are embedded in plans and budgets and not bolted on as an afterthought.
- Given ICT underpins most areas of a University access to the top table is vital
- Increased engagement of management board with IT governance issues
- Making a post-graduate management qualification a requirement for academics who take on managerial roles at a senior level.
- Need to gain acceptance that systems such as Finance, Student Records or even Sports Management are CORPORATE and not the exclusive province of the main user.
- Recognition that ICT should be represented at Senior Management level (ie the CIO role) as a tool to manage/deliver strategic change, not just operational infrastructure.
- Senior management buy-in

Institutional Effectiveness

- Benefits realisation from investment in new Information Systems, supporting the strategic aims of the institution.
- Efficient business driven Service management delivering visible value for money
- Ensuring business systems are appropriate to the evolving needs of the institution.
- Institution: Besides utilising information better to meet academic as well as improve administrative efficiency goals, MIS goals include business process improvement objectives.
- Need to add value (improving business processes & reducing costs rather than just providing a utility service)- because of tightening of budgets, increasing sense of the student as a customer, etc.?
- Quality
- Quality of provision with increasing dependence and growing demands for quality from students and staff
- Quality of service provision
- The need to operate more like business world with the tools to be more professional such as CRM and more cost-effective in marketing.

E-learning

- Development of VLE/MLEs
- E-Learning environment and its impact on performance teaching. Cultural change and progression
- Further developing eLearning
- Increasingly pervasive use of e-learning and learning technologies within the teaching environment and the consequent impact on demand for support and levels of provision
- Significant Reliance on VLE/MLE

- The growth of online learning (use of VLEs, distance learning etc) and associated innovations in technology (improvements in video streaming, mobile phone technology).
- Use of technology in learning
- VLE and network capacity

Student and Staff Expectations

- Increased expectations of the student as a paying customer
- Increased student expectations and new technologies (VOIP) will impact Universities ability to invest in IT
- Increasing student expectations, especially for e-Learning
- Increasing student expectations, particularly because of top-up fees.
- Service Level Performance will be expected to satisfy commercial levels of expectation as fees increase and the relationship of student and institution evolves more closely to a customer / supplier model.
- Staff and student expectations
- Student lifestyle changes, plus expectations post the introduction of variable tuition fees, mean that we must know what our students want and need from us in IT terms - and we need to find out this out directly from them.
- Variable fees and the demands of users for the latest technology

Staff and Student Expertise

- Changes to student learning styles and platforms
- Developing staff and student capabilities in relation to 'communicating in the information age' to support above strategies and to enhance student employability.
- Education/better appreciation of information technology possibilities and limitations by senior managers.
- Establishing the quality of leadership for the information services functions that their importance to the University's success and operation requires
- Human issues associated with IT services - skills, uptake of services etc
- Persuading academics to change their delivery style/method to suit e-learning, at least for part of their courses, rather than just putting lecture notes online. Investing in staff development to achieve this culture change, and encouraging partnerships
- Staff expertise to support and develop key systems and deliver accurate management information
- Training staff and students for changes in technology as well as bringing them up to our existing levels.

Financial Issues

- Availability of continued investment
- Budget
- Budget restrictions
- Budgetary constraints !
- Changing funding regimes for teaching and research
- Cost
- Cost control and operational efficiency, alongside the recognition that HE must equip

itself with expensive state-of-the-art applications in order to carry out its business effectively.

- Cost reduction pressures
- Cost. Increasing costs, lack of financial resources
- Costs of running it all and the move from M/F 9/5 to 24/7 to support e-learning
- Demonstrating value for money from IT expenditure.
- Deriving value from interconnecting corporate systems (i.e. MLE)
- Ensuring value-for-money
- Establishing ongoing funding and identifying priorities for implementation of the new ICT Strategy
- Financial issues requiring better value
- Funding - especially in relation to the uncertainties which will attend the move to differential fees.
- Government capital funds for IT too often have strings attached and are inflexible.
- Growing dependence on IT for all aspects of the business means its importance is continuously growing. Greater financial investment is needed along with very effective strategic and operational management, supported by clear institutional priorities guiding
- Increasing demands against static/declining resources
- Increasing expectation of industrial-strength services on make-do-and-mend budgets
- Increasing need to demonstrate VFM, and to attain higher levels of compliance with legislation as well as best practice.
- Increasing pressure to ensure value for money and compliance with commercial and business technology standards.
- Levels of spend in IT and Systems
- Mechanisms to demonstrate value for money, return on investment (ROI) and increased activity based costing
- Meeting financial demands of high quality e-learning in parallel with other capital spend priorities - e.g. new building
- Need for greater efficiency in the use of corporate resources
- need for value for money with increasing financial pressure on universities
- Need to maintain spending levels to ensure increasing expectations of IT are met
- On going Investment but not without understanding of costs and improved planning, monitoring. Review Budgeting model- the traditional annual balance budget causes considerable decision making difficulties.
- Ongoing costs, replacement of ICT equipment
- Political drivers (and therefore financial drivers) for reconfiguration of HE will demand improved value-for-money in delivering ICT services.
- quantifying benefits from IT-related projects and services
- Reducing cost of core services (e.g. corporate desktop), so that funds can be targeted towards projects with business benefit.
- Relatively poor investment in IT systems and technology
- Resource to keep up with demand
- Resources available for investment
- Speed of change of technology requiring updates to hardware or software. The cost is very high for a small institution.
- Spend
- Spend - availability of capital

- Spending allocation Vs technology depreciation
- The increasing relative cost to the institution of keeping up with technology as core activities are increasingly based on it
- Total cost of ownership
- Value for money
- Value for money - more structured arguments on VfM will probably be required
- Value for money will need a different approach in a more converged technology environment

Integration of Systems

- As number of interfaces increases, difficult to manage integration
- Co-ordination of web-based services into a coherent service
- Developing comprehensive integration of systems for staff and students (MLEs and beyond).
- Increasing complexity of interaction between IT and data systems and the staff resources and skills needed to manage this
- Integrated applications: complexity of managing. VLE->MLE. Traditional boundaries blur responsibilities less clear between 'administrators' and academics.
- Integration and Interoperation of data systems and integration of Web portals
- Integration of systems
- Integration of systems for strategic advantage
- Partnership working and integration of systems issues
- Strategic importance of "joining up" disparate data sources into a complex, but working, information system, so that the influence of the data is brought to bear on the decision-making processes of the institution. This requires that all data are up to date
- System integration especially of student records systems with Virtual Learning and Research systems.
- Systems integration issues resulting from a 'best of breed' acquisition policy for major software platforms
- The integration of IT Services across multiple purposes within the institution (e.g. linking document management with course information, finance with payroll, diary management, etc.)
- The complexity of fully integrated corporate systems needed to deliver a full MLE.

Other

- Deployment / culture change
- Ease of access to information for staff and students. This will be based in part on an increasing awareness of what is available and how to get it and in part on new and more effective indexing and streaming systems of meta and data levels
- Ensuring efficient and effective use of technology
- Ensuring full benefit of IT in business practices
- Ensuring that academic information is handled as rigorously and securely as corporate information
- Ensuring that financially poor students are not disadvantaged by the technology rich.
- Enterprise content management applications - the edges are blurred even more in respect of responsibilities

- Establishing a clear Web Strategy to promote and support the Institute's activity
- Extension of e-business activity
- Full Economic Costing
- Government: The OGC and other reviews drive towards improving overall institutional "efficiency". The better of information in its widest sense will to this.
- Increasing speed of changing business needs
- IT/IS support for growth in Applied Research work in project mode - comprehensive project support environment
- Major relocation project underway of which IT will be an integral part. This is really THE emerging issue.
- Resource Allocation, as we move from traditional bricks to mixed physical/virtual campus. The flip side is demonstrating VFM.
- Smart working in use of business IT to drive down cost and improve quality of support functions
- The growth of e-business in other areas: procurement, financial transactions, etc.
- The increasing autonomy of users (e.g. all undergraduates with their own computing environments) means there will have to be an adjustment (enlargement) of the standards allowed, the 'governance'/AUP will have to ease up a bit
- The University's desire to work smarter, be more efficient and less bureaucratic - will need robust and resilient systems and indeed, a major culture change to recognise the dependency on IT.
- Use of JANET by the public - if JANET becomes more accessible and usable by all this will greatly affect the management and governance of IT
- User management and delivery, particularly to 2 institutions.
- We are a new institution with ambitious plans for growth. Priority 1 is to harmonise, rationalise and modernise IT services

Technology Risk

- Authentication
- Changing the provision to remove some of the services that have become accepted as core provision to allow for growth of new services - often culturally unacceptable
- Continuing to improve resilience and availability of critical network services.
- Enterprise Information Architecture. Essential to manage an increasingly complex (and hence expensive and risky) environment.
- Explosion in data volumes under management in the scientific research and health sectors
- External threats to network security
- Funding contingency and continuity plans - if these are to be realistic there must be investment ahead of "events" (e.g. running fibre to alternative locations, having spare capacity among servers etc).
- Increased dependency on IT and threats to availability from malware will require much more formalised, and potentially centralised, management of IT
- Increasing dependency on IT
- Increasing security threats and potential areas of penetration.
- Information Security
- Issues of data quality and ownership
- Issues relating to information security (collaboration Vs protection) and compliance with regulation

- IT Security/Impact of increasing regulation.
- Maintaining security
- Maintaining data quality
- Network security
- Records management: easy to create electronic records in immense volumes. Complexity of cataloguing, finding, securing. Legislation such as FOI, data protection. Difficult to ensure compliance across devolved management structures
- Related to (1), records and knowledge management: organisation of data across different systems environments
- Risk analysis - it may be that in future IT resources will be forthcoming more easily only when the risk of not investing can be articulated better
- Risk Management - in particular the costs associated with ensuring business continuity balanced against the risk of loss of data and services.
- Security
- Security - identity, access and authorisation
- Security and access to information
- Security and integrity of data (backup, access rights, reliability, etc.)
- Security and integrity of systems and data, and the provision and management of an appropriate level of data and system backup.
- Security and resilience issues
- Security of IT Systems, particularly as such systems become more widespread.
- Security vs. Accessibility
- Security/Disaster Recovery
- Systems resilience
- Systems security in relation to mobile and web access, etc.
- Systems security vs. open access
- The "data deluge" - both volumetric problems and the management challenges. Volumetric - storage, processing, searching. Management - long-term preservation, aging/wasting processes, records management, legal compliance, historical record. This refers to
- The need to maintain 2 machine rooms to reduce the affects of major disaster recovery is the most important issue. At this institution this work is in hand.

System Selection

- Choice between in-house and commercial systems
- Cost effective information systems which provide a robust framework, while allowing flexibility to adapt to rapidly changing technology and the needs of a diverse user community.
- In house Vs contract services, issues of value for money, service levels and control
- The idea that outsourcing provides better value for money
- The use of 'Open source' software in the context of sustainability

Strategy Alignment

- Change in thinking; IT to align to Business Strategy rather than the other way round
- Conflicting priorities
- Connecting IT Governance to institutional goals

- Connecting IT to institutional aspirations. The danger is that we implement mechanistic IT systems that do not support the growth of human thought and creativity
- Connecting IT to institutional strategies.
- Creation of a transparent alignment of IT spend with the institutional business plan.
- Definition of business goals by the business and linkage of these to IT Service delivery
- Ensure capital resources are most appropriate against institute core mission
- greater synergy between institution's strategy, information strategy and IT strategy and governance
- IT Governance: relationship to institutional objectives: legal framework.
- Linking IT Strategy to business/institutional goals
- Matching IT provision to the institution's strategic direction
- Positioning and developing information services as a key partner and enabler for success, well connected to, and able to secure benefits for the university from, its external network and outward focus
- Realisation of more connections between IT infrastructure and investment and the achievement of the strategic goals of the institution
- Securing forward investment in information services, as part of the university's strategic plan, directed at 'new futures' rather than past priorities or 'norms'

Organisational Structures

- Clarifying Central/School roles and moving to a more consistent model across the institution for the support of ICT
- Convergence of administrative and learning and teaching systems.
- FeC (TRAC) may result in increased autonomy for research groups (who will also increasingly collaborate *outside* our governance, e.g. if using GRID technology)
- Further merger of information services (e.g. library and ICT and Registry etc)
- Getting the balance right between devolved and centralised services
- Greater focus on the need to harness costs, security, compliance, auditability across the University rather than have only this for central IT services.
- Internal governance factor: as from this year, we move to a different structure. This may lead to some devolution of ICT services and governance, with consequent advantages and disadvantages.
- Move towards centralising IT support and governance within a highly devolved environment
- Need for a more coordinated and strategic institutional wide approach to the adoption and deployment of learning technology and IT infrastructure (as opposed to continuing with central initiatives with a strong element of devolvement to Schools/Department)

Technology Development

- Academic: Development of digital archiving tools is vital to maintaining long term research capabilities.
- Archiving of e-mail – storage
- Backup and storage will become more major issues
- Connectivity
- Content and Document Management

- Customer empowerment through self service, integration of services to support customer life cycle, from provide side
- Data management i.e. significant increase in space requirements, document management, etc.
- Delivering smart administration (online and self service processes) especially focussed on flexible learners.
- Delivery of customised forms of information specific to the needs of the individual
- Developing a flexible student learning environment on and off site
- Developing management information systems and reporting
- Ensuring that small/medium sized institutions continue to have the financial and technical resource to ensure that their researchers have reasonable access to large-scale, e-science computing and network facilities
- eScience, Grid and other developments which are expensive to set up; danger of diverting funding to apparently "exciting" developments while neglecting the infrastructure which is essential to support operation of the institution.
- Evolving technology capability
- Increase in demand for high capacity research computing/GRID access.
- Increasingly rapid change in technologies and hence need for investment in replacement cycles as well as new requirements
- Knowledge Management and Electronic Document & Record Management
- Meeting increasing need for sophisticated and well integrated information systems at a time when recurrent funding is constrained.
- MIS - the increasing need to provide timely and accurate information, both to staff within the college and to external bodies (e.g. statutory returns to the Higher Education Statistics Agency)
- More effective use of infrastructure and desktop technologies and a greater awareness of how to engage to obtain the most appropriate end results
- Need to provide "world class" IT and library facilities
- Portals
- Provision of better MIS to deliver appropriate information to support institutional decision-making.
- RAE pressures and related rapid expansion in network capacity.
- Records management
- Shift in investment from hardware to software. And open systems.
- Storage
- Technology, especially in terms of student use of such & format of information (e.g. books to Internet)?
- The need to understand what could help staff most in aspects of MIS reports, cross-application reports, etc. so they can be developed and used.
- Users requiring more resources online --> whilst needing to keep very simple to use. Document Management
- Web enablement

Management and Governance Tools and Processes

- Ability of small institutions to manage complexity and maintain the capacity to make key strategic choices
- Adoption of ITIL
- Benchmarking - not yet fully developed but I think it will come

- Best Practice
- Change management - In the delivery and support of student focussed services
- Consistency of system management across institution
- Convergence of technology bringing the need to manage digital assets in a more holistic way
- Formal quality procedures: ITIL, Six Sigma, etc.
- Governance
- Governance. The creation of a unified approach to project planning and development will become increasing essential to the provision of complex services with limited resources
- HE must adopt best practice from wherever it can be found and accept that technology alone delivers very little.
- Improved (clearer, more executive management and informed debate) IT governance. Essential to decrease waste, improve alignment and deliver more.
- Information Lifecycle Management
- IT Governance
- More formal approach to the operation of the computing and related services. Improved governance; implementation of standards to ensure best practice is embedded into the services.
- requirement to deliver value for money will drive approach to project initiation, conduct and review
- The delivery of processes and services rather than ICT systems; service-oriented architecture approaches will demand a different approach to ICT management & governance.
- The management of IS/IT delivery and projects inside the programme of change required to meet corporate goals.