



**Should Universities Manage Services Offering Institutional or Extra-Institutional Access to Locally-Created Electronic Teaching and Research Resources?: Final Report of the CATRIONA II Project**

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**Should Universities Manage Services Offering Institutional or Extra-Institutional Access to  
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**Contents**

	<b>Page</b>
<b>0. Executive Summary and Summary Recommendations</b>	<b>3</b>
<b>1. Project overview</b>	<b>6</b>
<b>2. Are quality electronic teaching and research resources being created at significant levels?</b>	<b>7</b>
<b>3. Could this material be better exploited to the greater benefit of the UK Higher Education community?</b>	<b>11</b>
<b>4. Would university management of services help improve the value obtained from this material and the effort that goes into creating it?</b>	<b>15</b>
<b>5. Is there a better alternative solution?</b>	<b>17</b>
<b>6. Are there other reasons why universities should consider managing services?</b>	<b>22</b>
<b>7. Is the service management issue perceived as important?</b>	<b>25</b>
<b>8. What are the implications of universities managing services?</b>	<b>26</b>
<b>9. Should universities manage internally and/or externally focused services? Will they?</b>	<b>35</b>
<b>10. What role should the University Library play?</b>	<b>37</b>
<b>11. Is there an ideal service design model?</b>	<b>39</b>
<b>12. Moving to a resource management and service-oriented culture – recommendations to JISC on external funding and other actions, and to institutions</b>	<b>42</b>
<b>Appendix A. How should individual institutions examine the managing services issue?</b>	<b>45</b>
<b>Appendix B. Glossary</b>	<b>48</b>

**Note:** A full record of all project activities and outputs, including survey reports, questionnaires, raw data and an inter-active guide to the issues is available on the project web-site at:  
<http://catriona2.lib.strath.ac.uk/catriona/>

## CATRIONA II Final Report: Executive Summary and Recommendations

CATRIONA II investigated the creation and management of electronic teaching and research materials in Scottish universities, examining the question ‘**Should universities manage services offering institutional or extra-institutional access to locally-created electronic teaching and research resources?**’ – together with related issues of policy, strategy, organisational infrastructure, service design, and the role of the University Library – from a UK-wide perspective. [1/6]\*

### Summary

Project surveys at Scottish institutions suggest that quality electronic teaching and research resources, of significant value or potential value to academics, universities, and the UK Higher Education community in general, are being created at high levels (90%) in all types of university (ancient, modern and new; large and small). [2/7] However, since they are not being created with the aim of wider access and use, they are mostly not networked, difficult to find, or in difficult to access electronic formats, when they are, and – at least in respect of teaching resources – are unlikely to be suitable for reuse by other institutions or even other departments in the host institution. There can also be other problems such as a lack of clarity on the copyright position of resources on university web-sites and a failure to protect potentially valuable university resources from copyright infringement. [3/11]

University management of services offering network delivery of these resources within and beyond the host institution would resolve these access, usability and control problems, stimulate awareness of the value of the resources, and thereby greatly improve the value that both the host institution itself and UK Higher Education as a whole obtains from this material and the effort that goes into creating it - particularly so if local efforts were co-ordinated nationally to ensure resource design standardisation and service interoperability. The case for university management of services is worth examining, therefore, as are the implications of such an enterprise, university attitudes to it, and the question of a strategic role for JISC. [4/15]

The case for university management of services is strong. There is a persuasive case for university management of internal services with a limited external remit – services whose primary aim is to design and deliver resources for the widest possible use within host institutions, but which also have a remit to exploit the material’s value beyond the host institution, usually via a mechanism other than the networked institutional service. Institutional management at this level is a necessary pre-requisite if universities and UK Higher Education in general are to maximise the value obtained from this material and the effort that goes into creating it, and the local case for doing so is strengthened if there are additional institution-specific reasons why a university should consider managing a service (such as a need to provide networked support for distance learning programmes or protection against internal or external IPR infringement). . The case for university management of *full* extra-institutional networked services is also strong, although there is a need for further investigation and deliberation to establish the best or preferred method of handling inter-institutional delivery and associated mechanisms. This would ideally be carried out by JISC, but small-scale local experiments are feasible also and might help illuminate some of the issues. [5/17, 6/22]

University attitudes to the issue are generally positive. Evidence from project survey results suggests that universities in general see the managing services issue as important [7/25], see the advantages of undertaking such management as outweighing the disadvantages, agree, in general that universities should manage both internal and external services, and claim in some cases to be in the process of moving towards this end. The implications of managing services are significant. Policy, strategy, organisational infrastructure, staff deployment and operational changes are required in areas such as: intellectual property rights, electronic publication, electronic formats, information management, resource and service design, quality assessment, metadata, access control, archiving, and inter-service integration. One key issue relates to Intellectual Property Rights. Institutions will wish to retain rights to commercially or strategically valuable materials, while ensuring that academics nevertheless have financial and other incentives for continuing to create them. [8/26, 9/35] Another is the role of the University Library - project survey results indicate that institutions are likely to expect it to take a key role in service and inter-service management and there are sound reasons why it should do so. [10/37].

Yet another is service structure. There is some indication that smaller institutions are likely to prefer a centralised service structure, and larger institutions a devolved one, although individual circumstances and the potential complexity of the devolved model may well be the over-riding considerations in particular instances. [11/39]

There are indications that university management of services may develop without central funding and help, and sound reasons why institutions should consider their own position on this matter sooner rather than later - and it is recommended that institutions investigate the possible value of setting up services regardless of the availability of external funding, and that JISC encourage them to do so. However, central funding to help 'kick-start' and direct service management activity may be the only way to ensure rapid, co-ordinated development, is essential to ensure inter-service integration and resource re-usability, is needed to resolve the external delivery question, and is also recommended to JISC in view of the potential benefits to UK Higher Education. Rather than focus entirely on financing one-off electronic resource developments that cease to be viable when funding ends, the Funding Councils could help shape an environment in which resources are created as part of the normal work of researchers and teachers - thereby both increasing development and accessibility levels and ensuring long-term viability. [12/42]

\*Note: Numbers in square brackets indicate section and page numbers in the full report

#### **Recommendations in full [12/42]:**

- (1) That regardless of action from JISC and the Funding Councils, individual universities should examine the issues, and take a local decision on whether or not to manage services as soon as possible, bearing in mind that such locally-created electronic materials are potentially of significant commercial and strategic value to the institution, and that failure to act sooner rather than later may leave some institutions at a strategic, and possibly, a commercial disadvantage
- (2) That JISC and the Funding Councils should encourage them to do so.

If institutions decide that they will manage services, then it is further recommended:

- (3) That academic staff should benefit if their institution benefits commercially or strategically from the resources they create. This will not only provide an incentive for the ongoing creation of such resources but will also compensate for any perceived or actual loss of control in respect of intellectual property rights brought about by action in this area taken by the institution in order to protect its interests,
- (4) That local service management efforts should be co-ordinated nationally to ensure both the cross-service interoperability required to ensure reliable UK-wide access, and the resource design standardisation, required to ensure wider usability of resources (particularly teaching resources). This might be done through encouraging discussion on the issue of managing services at the highest level within universities and also within associated inter-institutional bodies such as SCONUL and UCISA
- (5) That the University Library should take a key role in service and inter-service management. Library organisations such as SCONUL and SCURL should develop agreed policies on Library roles and contribute to inter-service standards. Libraries have a range of skills necessary for good service design and management and a good track record on the introduction and maintenance of the kinds of standards required to ensure service integration and resource re-usability.
- (6) That JISC or the individual Funding Councils should consider funding a project or projects that will stimulate the changes required in individual universities, investigate the various options for external delivery beyond the host institution with a view to recommending the best or preferred approach, establish standards in respect of both inter-service integration and interoperability and resource design, and direct local development to ensure rapid, co-ordinated development.

<p><b>NOTE:</b> The project web-site (<a href="http://catriona2.lib.strath.ac.uk/catriona">http://catriona2.lib.strath.ac.uk/catriona</a>) provides resources and guidance for institutions wishing to examine the management of services question locally. Advice on how to approach the issue can also be found in Appendix A of this report. Demonstrator services are also available via the web-site. These show sample resources and give guidance on service design.</p>
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**Should Universities Manage Services Offering Institutional or Extra-Institutional Access to  
Locally Created Electronic Teaching and Research Resources?**

## 1. Project overview

CATRIONA II is an investigation of approaches to the creation and management of institutional and departmental electronic resources in Scottish universities, looking in particular at:

1. the existence of quality, locally-created electronic teaching or research resources on individual campuses and their value both within and beyond the local institution
2. intentions regarding the provision of campus-wide and external access to such resources
3. associated questions relating to institutional policy, strategy, organisational infrastructure, and approaches to resource delivery and maintenance with particular reference to the role of the library if service management is to be undertaken
4. questions for institutions to consider and, where appropriate, guidelines for best practice when considering the various issues addressed by the project

Project activities within this remit encompassed four principal headings:

- Deliverables
- Evaluation
- Dissemination and Feedback
- Administration

The deliverables heading is sub-divided further into four major areas of activity:

- Resource creation and accessibility investigations (survey results, analysis and dissemination – relates principally to part 1 of the above remit, but also to 3 and 4)
- University intentions regarding the management of services investigations (survey results and analysis and lead sites activities dissemination – relates principally to part 2 of the above remit, but also to 3 and 4)
- Development of web-site and services demonstrators as:
  - an interactive guide to the issues, including institutional policy, strategy, infrastructure and roles and service management issues (includes CAIRNS, Z39.50, DC dot, DC harvester, resource illustration dissemination – relates principally to parts 3 and 4 of the above remit)
  - a record of the project
  - information dissemination tools
  - illustrators of the effects of dissemination activity
- Interim and final reports, discussion papers, questions to consider, guidelines for best practice (includes IPR guidelines and resource format conversion guidelines dissemination – relates to all of the above remit).

**This Final Report** relates to the last of these deliverables. The Interim Report, an initial draft of the Final Report, was discussed within the four project Steering Groups, amended and developed further in accordance with these discussions, ultimately becoming this Final Report, which also incorporates the results of later project activities. Note that it is not a report of the project and project activities as such – although key elements of all principal activities are included in the text. Rather it is a report on the conclusions that may be drawn from the results of the project and project activities, its specific focus being the question ‘**Should universities manage services offering institutional or extra-institutional access to locally-created electronic teaching and research resources?**’. The Summary and Recommendations (pages 3-4) are reached by a logical progression of questions and answers, beginning with the question dealt with in section 3 below, ‘**Are quality teaching and research resources being created at significant levels?**’

## 2. Are quality teaching and research resources being created at significant levels?

**Summary:** Yes. Project surveys show RAE level research resources and teaching resources respondents regarded as being of external value being created at high levels in all types of institution (av. 90%). These included refereed journal research papers, background materials, book chapters, software, images, video, databases, bibliographies, lecture notes, worked examples, case studies, CAL courseware packages.

**Details:** Quality electronic teaching material believed by its creators to be of value or potential value to others and RAE-level research material, is probably being created at significant levels in most, if not all universities. In random sample surveys of academic staff at six Scottish universities, 90%\* of respondents reported having electronic material in one or both of these categories. The institutions sampled were the largest and smallest of each of the 'ancient', 'modern' and 'new' universities in Scotland. There were no statistically significant differences between reported resource creation levels at the various institutions. Examples of the material can be found on the project demonstrator services at <http://cvu.strath.ac.uk/library/index.html> and <http://catriona.napier.ac.uk/>

[\*Note: This figure refers to the results for research and teaching material combined – see below under combined results]

### Survey Results

Resource creation surveys were conducted at six Scottish universities; Abertay, Edinburgh, Napier, St. Andrews, Stirling and Strathclyde. Of these two are 'new' universities (Abertay and Napier), two are 'modern' (Stirling and Strathclyde), and two 'ancient' (Edinburgh and St. Andrews). Based on numbers of full-time academic staff at the time of the survey Abertay is the smallest of the Scottish Universities with 229 staff and Edinburgh the largest with 2055. Further information on each of the Universities may be obtained at their respective web-sites:

- Abertay - <http://www.dct.ac.uk/>
- Edinburgh - <http://www.ed.ac.uk/>
- Napier - <http://www.napier.ac.uk/>
- St. Andrews - <http://www.st-and.ac.uk/>
- Stirling - <http://www.stir.ac.uk/>
- Strathclyde - <http://www.strath.ac.uk/>

Surveys were conducted using random samples of full-time academic staff at the six universities. In total 507 staff were surveyed of whom 437 (86%) responded to the survey.

### Question 1: Do you have research-level material that you have created on a computer?

Of all those who responded to question 1 (427), 74% answered yes, indicating that significant numbers of academic staff across all six institutions had RAE level research material in electronic format. 22% answered no, and 4% not sure. Responses for specific types of research material, although lower than the overall figure, were at notable levels nonetheless, in particular 'other research papers published or unpublished' (68%) and 'papers published in refereed journals' (62%).

	Research material in electronic format	
	Count	%
Yes	316	74%
No	94	22%
Not sure	17	4%

**Breakdown of Question 1 ‘yes’ responses: Presence of specific types of research-level material in electronic format at all universities surveyed**

Type of research-level material:	All universities	
	Count	%
Research papers published in refereed journals	270	62%
Other research papers, published or unpublished	299	68%
Research project resource material associated with papers published in refereed journals	210	48%
Research project resource material associated with other papers	232	53%
Books or book chapters	184	42%
Specially developed computer software that you have created	103	24%
Graphic images (e.g. photos, diagrams)	235	54%
Other material that may be of continuing value (e.g. bibliographies, databases of research value)	237	54%
Digital/electronic video	28	6%
Non-electronic video	27	6%
Something else	50	11%

(Missing values excluded)

**Question 1 cross tabulations**

The following factors which had a **statistically significant** effect on responses to question 1 are worthy of note here because they have a bearing on levels and patterns of resource creation:

- **University:** Research level material in electronic form was present amongst 90% of respondents at St. Andrews University, 89% at Edinburgh, 78% at both Stirling and Strathclyde, 66% at Abertay and 47% at Napier. (1%)
- **University type:** 90% of respondents at the Ancient universities had electronic research level material, as did 78% at the Modern and 52% at the New institutions. (1%)
- **Balance of duties:** Those with duties involving mostly research, or half teaching and half research were most likely to have research level material on computer, with 96% of respondents in each of these categories having such material. Research level material in electronic form was also present among 71% of those with duties falling into the category ‘Some other combination’ and 51% of respondents involved in mostly teaching. (1%)
- **Teaching material:** Those who said they had teaching material on computer which they felt would or might be of value outside their institution were more likely to also have research material in electronic format (76%). (1%)

Other factors found to have a **statistically significant\*** effect were: **Post (1%), Gender (5%), Age (1%), Desktop access regarded as important (1%), Work on demonstration server (1%), Networking facilities (Email outwith department, WWW access (Netscape or similar), Telnet, FTP, Departmental web server (all 1%)), Computing facilities (Unix) (1%)**

[\*Calculated by applying the chi-square test - see page 13. Significance levels - 1% or 5% - are shown in brackets after each factor]

**Question 2: Do you have teaching material that you have created on a computer that you think would be of value outside the university?**

Of all those who responded to question 2 (422), 35% answered that they had teaching material in electronic form that **would be** of value beyond the local institution, 34% indicated that they had material which **might be** of value, 30% said that they did not have such material in electronic form, and 1% gave some other comment.

Teaching material of value in electronic format		
	Count	%
Would be of value	146	35%
May be of value	144	34%
No	127	30%
Other comment	3	1%

The breakdown for specific types of teaching material was as follows:

	Yes		Currently in use as part of a course (in electronic format, e.g. web version)		In use at your institution (in electronic format, e.g. web version)		In use elsewhere (in electronic format, e.g. web version)		In use as part of a distance learning course (in electronic format, e.g. web version)		Includes multimedia (Applies to Question 5)	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Lecture Notes	270	62%	75	17%	66	15%	23	29%	9	2%		
Worked Examples	184	42%	71	16%	64	15%	18	4%	8	2%		
Case Studies	163	37%	50	11%	46	11%	9	2%	4	1%		
Background Material	206	47%	62	14%	58	13%	13	3%	4	1%		
Computer Assisted Learning Courseware (CAL material)	77	18%	59	14%	56	13%	28	6%	11	3%	25	6%

Missing values excluded

## Question 2 cross tabulations

The following factors had a **statistically significant** effect on responses to question 2 and were worthy of note:

- **University:** Teaching material in electronic format which would or might be of value beyond the local institution was present amongst 86% of respondents at St. Andrews, 84% at Abertay, 75% at Strathclyde, 71% at Napier, 68% at Stirling and 49% at Edinburgh. **(1%)**
- **Research material:** 70% of those who had research material in electronic material also had teaching material, 60% who did not have research material had teaching material, and 88% of those who were not sure if they had research material had teaching material. **(5%)**

Other factors found to have a **statistically significant** effect were: **Age (5%), Years of service (5%), Desktop access considered important (5%), Knowledge of other staff (5%), Factors that stimulate creation of electronic resources (More free time, Career recognition, Commercial exploitation (all 1%)), Publication rights, Work on demonstration server (1%), Know when results on web (1%), Networking facilities (FTP) (5%), Computing facilities (Macintosh) (5%)**

In contrast to the situation with question 1, there appeared to be no clear pattern as regards the effect of university type on the existence of teaching material in electronic form, but the results are complex. A full report of the surveys, together with a range of institutional reports, is available at <http://wp269.lib.strath.ac.uk:5050/Cat2/surveys.html>. More detail on this and other aspects of the results analysis can be found there.

## Combined Results

The above results can be used to obtain combined figures for research and teaching material creation levels. The surveys asked about research and teaching materials separately (see results below). However, it was possible to combine the results of the two questions - using, in effect, a Boolean OR - to give a measure of the extent to which useful electronic resources of all types were being created at the surveyed sites, a procedure that effectively equalised the various institutions in respect of one or other having a stronger focus on research or a stronger focus on teaching. The results show high percentages (83% - 97%) of electronic resources are being created at all six universities, that such differences as were found in these combined survey results are not statistically significant, and that they averaged out at 90%. This suggests strongly that once the teaching/research variable is removed from the equation all six universities surveyed are essentially similar. Each is creating electronic resources at essentially the same high level and the measured differences between them are not statistically significant.

### **Note: The chi-square test and significance levels**

The chi-square test has been used to help analyse the results of the surveys. This indicates the strength of relationship between two variables (e.g. Staff position and amount of electronic research material being created). For example, it may be expected (the null hypothesis) that the variables are independent of each other, i.e. that whether a staff member is a lecturer or a professor has no bearing on whether he or she is creating electronic research material. The sample provides observed frequencies of responses which are then compared with expected frequencies of responses. The larger the difference between the observed frequencies and the expected frequencies, the larger the value of chi-square. Chi-square is zero only when the differences between all observed and expected frequencies are zero. If the value of chi-square is larger than expected by chance, it is possible to reject the null hypothesis and say that there is a relationship between the two variables. In this way the chi-square test is used to guard against over-interpretation.

The result of a chi-square test is usually described as 'significant at 5%' or, indicating a higher level of statistical significance, 'significant at 1%'. A significance level of 1% (5%) indicates that there is a less than 1% (5%) chance that the results obtained were due to chance factors. An indication that a result is not statistically significant means that there is a more than 5% chance that the results obtained were due to chance factors.

**Conclusion:** Yes. Project surveys show RAE level research resources and teaching resources respondents regarded as being of external value being created at high levels in all types of institution (av. 90%). These included refereed journal research papers, background materials, book chapters, software, images, video, databases, bibliographies, lecture notes, worked examples, case studies, CAL courseware packages.

### **3. Could this material - much of which is not being created with the aim of providing wider electronic access and use - nevertheless be better exploited in these respects to the greater benefit of individual academics, individual universities, and the UK Higher Education community in general?**

**Summary:** Yes, the material could be better exploited, and the improvements would almost certainly be of significant benefit to individual academics, individual universities, and the UK Higher Education community in general. 69% of survey respondents reported having none of their material networked. 31% had some networked material, but examinations showed that networked resources on institution web-sites were often hard to find, in formats that made access difficult, lacked metadata, had an unclear copyright position, were not designed for wider use, even within the local institution, had no indication of status, value, or target population, were not archived or updated, were of widely differing design, and were usually not protected by access and authentication mechanisms. However, survey results indicate (see 2 above) that much of the material is useful or potentially useful beyond the local context, 85% of academics see UK-wide access to such material as important, very important or essential to their work, and the material – which represents a significant part of the output of working academics - is legally the intellectual property of the universities in most cases, is potentially very valuable to them and its creators *because* of its value or potential value in the wider community, and could, were it to be designed in future with wider as well as local use in mind be made even more valuable to all three groups, a point perhaps particularly true of teaching material.

#### **Details:**

#### **1. Could the material be better exploited?**

The results of project surveys and institutional web-site crawls show clearly that it could. For a range of reasons – most probably stemming from the fact that the material is not being created with the aim of providing wider electronic access and use – it is very poorly exploited at present. In the resource creation surveys at Abertay, Edinburgh, Napier, St. Andrews, Stirling and Strathclyde, network accessibility levels were much lower than creation levels. The average creation level was 90%, but 69% of respondents had no material networked. The position varied according to institution type: 60% of those surveyed at the Ancient universities had no network accessible material, as compared to 70% of those at the New and 77% of those at the Modern institutions. There was evidence that format was a barrier to accessibility in many cases. Although a majority of respondents (59%) had material in the relatively accessible Word for Windows format, material in HTML (the most accessible format) was reported by just over one fifth of respondents (21%). In addition, over 170 different formats were mentioned under the ‘Other’ heading with 26% of respondents having material which fell into this category. ‘Trawls’ of the web-sites at the lead institutions and less thorough investigations of other Scottish showed that there was a range of other barriers which effectively prevented access to or re-use of even those materials that were networked. Some of the material is in difficult-to-access formats like postscript. Moreover, most of the material is many levels down the web hierarchy, often on the home pages of individual members of staff, and there is an absence of mechanisms either to provide a clear path to the material or to gather the quality teaching and learning resources together. The use of metadata to aid reliable discovery is almost non-existent, and there may be a lack of clarity about the copyright position (e.g. have rights to electronic publication already been ‘signed away’ to a hard-copy publisher?). In addition, resources are not usually designed for wider use, even within the local institution, have no indication of status or value or target population, are not archived or updated, and are of widely differing design, and were not usually protected by access control and authentication mechanisms.

#### **Survey Results**

**Question 3: Is the electronic research or teaching material you have created: accessible only to yourself, accessible to others over a network in your institution or world-wide, accessible to others through some other mechanism? Please specify.**

Of all those who responded to this question, 64% reported that the material was accessible only to themselves and 6% that it was accessible to others but not networked, making a total of 69% with no networked material. The remaining 31% reported having some networked material.

### Question 3 cross tabulations

The following factors which had a **statistically significant** effect on responses to question 3 were worthy of note:

- **University:** The extent to which respondents reported that they had some material which was accessible over the network at the various institutions ranged from 13% at Abertay, to 43% at Edinburgh. (1%)
- **University type:** 40% of those surveyed at the Ancient universities had network accessible material. This compares with 30% of those at the New and 23% of those at the Modern institutions. (5%)
- **Format of material:** A range of formats had a statistically significant effect on whether or not material was accessible over the network, the most important being HTML (69%) (1%) and ASCII (63%) (1%), which had a positive effect on accessibility levels and Graphics formats (1%), Video (5%), CD-ROM (1%), and WordPerfect (5%), which had a negative effect.
- **Gender:** Male respondents were most likely to have network accessible material (34% as compared with 17% of females). (1%)
- **Networking facilities: WWW access (Netscape or similar)** - 34% of those with WWW access via Netscape or similar had material accessible over the network. **Telnet** - 44% of those with Telnet facilities had material which was accessible over the network. (1%) **FTP** - 53% of those with FTP facilities had network accessible material. (1%) It is perhaps surprising that of those with WWW access via Netscape or similar, fewer individuals had material which was accessible over the network than amongst those with Telnet or FTP facilities. This may simply indicate that those using Telnet and FTP facilities have more knowledge generally about electronic resources and network accessibility.
- **Departmental web server:** 41% of those who said their department had a web server also said their electronic material was network accessible. This compares with 22% amongst those who said they did not have a departmental web server. (1%)
- **Computing facilities: Unix** - 61% of those who had a Unix machine had network accessible material. (1%)

Other factors found to have a **statistically significant** effect were: **Knowledge of other staff active in the area (1%), Factors that stimulate creation of electronic resources (Improved training to produce materials (5%)), Age (1%), Years of service (5%), Retention of rights on publication (5%), Work on demonstration server (1%)**

### Question 4: What format is the material in (both research and teaching material)?

Of all those who responded to question 4 a majority (59%) had material in Word for Windows format. Material in HTML format was reported by just over one fifth of respondents (21%). Over 170 formats were mentioned under the 'Other' heading with 26% of respondents having material which fell into this category.

### Question 4 cross tabulations:

The following factors had a **statistically significant** effect on responses to question 4 and were worthy of note:

- **University: Word for Windows** - Use of Word for Windows by respondents ranged from 45% at Stirling to 91% at Abertay. Use of Word for Windows was found to be university policy at Abertay (1%). **HTML** - Respondents using the HTML format numbered 6% at Abertay, 12% at Napier, 20% at Strathclyde, 27% at both Edinburgh and St. Andrews, and 38% at Stirling (1%). **Graphics** - Respondents with material in Graphics format ranged from 26% at Napier to 58% at Edinburgh (1%).

- **University type: Word for Windows** - 77% of those from New universities had material in Word for Windows format. This compares with 59% at the Ancient and 46% at the Modern (**1%**). **WordPerfect** - 16% of those at the Modern universities had material in WordPerfect format. This compares with just 4% at the Ancient and 3% at the New (**1%**). **HTML** - 27% of those at the Ancient and 23% at the Modern universities had material in HTML format, as compared to 11% at the New (**1%**). **Graphics** - 56% of respondents at the Ancient universities had material in Graphics format. This compares with 33% of those at the Modern and 29% of those at the New (**1%**). **CD-ROM** - 9% at the Ancient, 5% at the Modern and 2% of respondents at the New universities had material in CD-ROM format (**5%**).

**Would this be of benefit to host institutions, UK Higher Education in general and funding bodies?**

The results from project survey and other investigations suggest that individual institutions, individual academics and UK Higher Education in general would benefit from improved exploitation of these materials in two ways:

- The material is clearly a valuable or potentially valuable resource that all three would find it useful to have access to:
  - The material in the surveys that 90% of academics asked reported having created was either RAE level research material or teaching material likely to be of value beyond the local institution. The material may be assumed to be useful to all three in that it represents a significant part of the output of working academics across the country
  - Project surveys found that 85% of academics see UK-wide access to such material as important, very important or essential to their work
- The material has a commercial or strategic value to individual institutions and UK Higher Education in general, and probably also to individual academics:
  - Since it is created by University employees, the universities own the material in most cases and could obtain direct commercial or strategic benefit from it
  - UK Higher Education in general could benefit commercially or strategically both by reducing duplication of effort and sharing skills across UK Higher Education and through selling access to the wider world or 'trading' access for strategic gain (e.g. sharing resources, skills, effort, internationally)
  - Since many universities have schemes that allow staff to benefit from sales of intellectual property created by them, the academics who created the materials are likely to benefit if their institution benefits, or that they could negotiate to do so. The project has no data on how widespread such schemes are but it seems reasonable to assume that competition between institutions will ensure that such schemes become the norm if universities begin to benefit commercially from locally-created electronic teaching and research materials in the way envisaged here.

**Survey Results**

**Question 10b: In your view, is access from your desktop computer to electronic versions of published and unpublished research and teaching material created at other UK universities essential, very important, important, not important or irrelevant?**

Of all those who responded to question 10b (425) 85% considered desktop access to be either essential, very important or important. 15% saw it as either not important or irrelevant.

	Importance of desktop access	
	Count	%
Essential	61	14%
Very important	105	25%

Important	194	46%
Not important	56	13%
Irrelevant	9	2%

### Question 10 cross tabulation with University type

Analysis of the results found a significant relationship to exist between differing university types and opinions on the importance of desktop access to electronic material at other UK universities. 89% of respondents at the New universities, 87% at the Modern, and 78% at the Ancient universities considered desktop access to be either essential, very important or important. When question 10b was re-coded so that Essential/Very important/Important were together and Not important/Irrelevant were together the value of chi-square (7.221, df = 2) was significant at the 5% level, indicating that type of university had a significant influence on how important respondents viewed desktop access to electronic material at other universities.

	University type					
	Ancient		Modern		New	
Importance of desktop access	Count	%	Count	%	Count	%
Essential	15	12%	27	16%	19	15%
Very important	32	25%	42	24%	31	25%
Important	54	42%	81	47%	59	48%
Not important	25	19%	17	10%	14	11%
Irrelevant	4	3%	5	3%	0	0

(Total count: 425/437)

**Conclusion:** Yes, the material could be better exploited, and the improvements would almost certainly be of significant benefit to individual academics, individual universities, and the UK Higher Education community in general. 69% of survey respondents reported having none of their material networked. 31% had some networked material, but examinations showed that networked resources on institution web-sites were often hard to find, in formats that made access difficult, lacked metadata, had an unclear copyright position, were not designed for wider use, even within the local institution, had no indication of status, value, or target population, were not archived or updated, were of widely differing design, and were usually not protected by access and authentication mechanisms. However, survey results indicate (see 2 above) that much of the material is useful or potentially useful beyond the local context, 85% of academics see UK-wide access to such material as important, very important or essential to their work, and the material – which represents a significant part of the output of working academics - is legally the intellectual property of the universities in most cases, is potentially very valuable to them and its creators *because* of its value or potential value in the wider community, and could, were it to be designed in future with wider as well as local use in mind be made even more valuable to all three groups, a point perhaps particularly true of teaching material.

#### 4. Would university management of services help improve the value obtained from this material and the effort that goes into creating it?

**Summary:** Yes, especially if co-ordinated nationally. Local management of services would put in place mechanisms to resolve access and usability problems, would stimulate within institutions an increased awareness of the potential value of these electronic resources, and would ensure thereby that both the resources and the effort that goes into creating them were better exploited. National co-ordination would ensure both cross-service interoperability and standardisation, resulting in wider access, and resource design standardisation, resulting in wider usability of teaching resources in particular.

[case for re-usability here - do I even mention it in the text?]

**Details:** The situation identified in the surveys and associated examinations of web-sites may be summarised as follows:

- Quality resources of value or potential value are being created, are likely to be useful across the community and perhaps even within other parts of the host institution, are sought after, but are mostly not networked, even within the host institution
- Networked resources are difficult to find, have no metadata, are often in unhelpful formats, have no status information, and no indication of client-level
- Commercially and strategically valuable resources are being created but are not protected from unnecessary transfer of IPR. If they are networked access to them is generally not controlled and the copyright position is sometimes not clear
- Resources are of potential value in both the wider institutional context and beyond it but there is usually no common approach to design, a particular issue in respect of teaching resources
- Resources are of potentially on-going value but there is usually no maintenance policy and no archiving policy
- Resources at other universities are of significant importance to academics but university web-sites are not designed for easy retrieval and are not inter-compatible or cross-searchable, this despite the fact that a great deal of web-site related activity goes on at every institution
- There is a lack of awareness at both the institutional and individual level of the strategic, commercial and promotional value and potential value of these 'information outputs'

University management of services offering institutional and extra-institutional access to locally-created electronic teaching and research resources would - if co-ordinated nationally to ensure interoperability in respect of cross-service search and browse functions and standardisation in respect of both service interfaces and resource design – resolve all of these problems.

An institutional decision to manage a service offering institutional and extra-institutional access to these resources would:

- Raise awareness of the issues listed above across the institution, ensuring, in particular, an enhanced recognition at both an institutional and an individual level of the value and potential value of such information products as course materials and added-value research reports, and of the importance of designing, where possible, for wider use, particularly in respect of teaching materials
- Put in place service mechanisms and procedures to ease network publication in standard formats, ensure the creation of metadata, standardise web-site design and improve navigation to resources, offer search facilities, monitor and maintain resource currency, impose access control, implement appropriate back-up and archiving routines
- Put in place associated policy, strategy, organisational infrastructure, staff deployment and other changes in areas such as IPR policy, electronic publication guidelines, funding of hardware, software and support staffing for resource creation, staff training, and service provision standards

This would address all but two aspects of the situation described above:

- The need for resource reusability across the UK and beyond, particularly in respect of teaching resources
- The need for inter-service integration to allow cross-searching and inter-compatibility

These would need national co-ordination to ensure success

Without national co-ordination on integration and resource design standards, the value of the above changes would be limited. Even if standard approaches were taken within institutions, levels of resource accessibility and re-usability across UK Higher Education would be likely to be low. Full exploitation of these resources requires national co-ordination of such things as:

- Metadata standards, indexing standards, and inter-communication protocols (Z39.50, LDAP and WHOIS++ are all current possibilities)
- Preferred electronic formats, graphical, structural and directional standards for navigation, use level indicators (e.g. 1<sup>st</sup> year undergraduate, 2<sup>nd</sup> year undergraduate and so on), and other elements essential to resource design

Given such co-ordination, it is clear that university management of services would enable the value and potential value of such materials to be better exploited to the benefit of UK Higher Education in general.

**Conclusion:** Yes, especially if co-ordinated nationally. Local management of services would put in place mechanisms to resolve access and usability problems, would stimulate within institutions an increased awareness of the potential value of these electronic resources, and would ensure thereby that both the resources and the effort that goes into creating them were better exploited. National co-ordination would ensure both cross-service interoperability and standardisation, resulting in wider access, and resource design standardisation, resulting in wider usability of teaching resources in particular.

## 5. Is there a better alternative solution?

**Summary:** If the aim is to maximise the value that universities, UK Higher Education in general, and funding bodies obtain from these materials, and the effort that goes into creating them, both now and in the future, then - from the perspective both of individual universities and the Funding Councils - university management of locally focused services with at least some externally focused elements is an essential part of any solution. There is, moreover, a strong local and a stronger national case for university management of services with a full external focus, although the strength of the local case is likely to vary from institution to institution, and to depend on both local circumstances like the strength of the institution's existing or proposed commitment to networked distance learning programmes and external factors such as whether or not alternative mechanisms for external delivery are proposed or come into being. This latter possibility exists because it is possible to envisage alternative mechanisms for the delivery of resources beyond the local institution. A national case can also be made for a UK Higher Education funded central repository or a group of centrally co-ordinated regional or subject-based repositories for handling inter-institutional delivery, and the Funding Councils may also wish to investigate the case for approaches to external delivery based on commercial companies, although the case for this does not seem particularly persuasive. In summary, the case for university management of internal services with some external elements is conclusive, and the case for full external services strong, but there is a need for further clarification in respect of the best or preferred method of handling inter-institutional delivery and associated mechanisms. Since, in the initial phases at least, the requirements of running an externally-focused service do not differ greatly from those of running an internal service, it would be possible for institutions to seek to clarify their own local position on the issue by setting up small scale external delivery experiments when implementing internal services, and some institutions may elect to do this. In the main, however, institutional expectation is likely to be that such clarification should come from JISC, either through a policy decision or through further investigation of the issue as proposed below.

### Details:

#### **1. The management of locally focused services, with at least some externally focused elements is, at worst, an essential part of any solution from both a local and a national point of view**

If universities, UK Higher Education and the Funding Councils are to obtain maximum benefit from these resources and the effort that goes into creating them then institutional service management at some level is an essential prerequisite. The minimum requirement is for internally focused services with enough of an external focus to ensure that local resources are at least made available beyond the institution, that local creators have an awareness of what is of value in the outside world, and that the institution is able to obtain strategic or commercial benefit from locally created resources, even if the task of external delivery is not undertaken by the institution itself.

From the purely institutional perspective, maximising the value of these resources and the effort that goes into creating them means:

- Designing teaching resources in particular for wider use within the institution, where this does not conflict with department or course-specific requirements, and for wider use beyond the institution where this does not conflict with other institutional requirements
- Ensuring that the staff concerned have the understanding, training, skills, knowledge of external requirements, resources, advisory and other support to enable them to do this
- Encouraging inter-departmental and inter-faculty collaboration and thereby reducing duplication of effort and enhancing possibilities for re-use of electronic resources
- Ensuring the protection of locally created resources through IPR policy and access control mechanisms
- Ensuring that the resources are made readily available to the rest of the institution through networking them in an accessible format and putting in place reliable mechanisms, standardised across the institution, for description (metadata), retrieval, presentation, delivery, currency and archiving.

- Ensuring that mechanisms are in place to identify and exploit any potential for commercial or strategic value resources may have beyond the local institution

These are all issues that can only be dealt with through developing local understanding of the value of such resources and of associated issues, and of improving local control of their developmental cycle and associated processes and policies (creation, format choice, design, description, retrieval, presentation, delivery mechanisms, currency, archiving, access control, legal IPR protection etc.). Outside agencies may be able to encourage these developments but only the institution itself can implement them, and any mechanisms put in place to resolve all of the various issues would effectively amount to a local service whether it was called one or not. Moreover, the requirement to maximise value by designing where possible for wider use beyond the institution and to identify and exploit any potential for commercial or strategic value in the wider world means that the service would require some externally focused elements, even if they fell well short of a full service delivering resources directly to UK Higher Education and beyond.

This level of local service is also the minimum requirement from the perspective of UK Higher Education and the Funding Councils, for whom maximising the value of these resources and the effort that goes into creating them at all UK institutions is a prerequisite for maximising their value across the UK (the Funding Councils also have an additional interest in that they also presumably have a requirement to maximise efficiency within any given institution). Other requirements in this wider UK context are:

- Ensuring that the resulting resources are made readily available to UK Higher Education in general
- Maximising collaboration, skills transfer, and resource usefulness and minimising duplication of effort and costs across the community.

These requirements are also important at institutional level, of course, but they are not examples of requirements that can only be resolved locally.

**2. There is a strong local and national case for the management of nationally co-ordinated services with a full external (as well as internal) focus, although it is also true that:**

- (a) **A case can be made for a UK Higher Education funded central service or a group of centrally co-ordinated regional or subject-based services for handling inter-institutional delivery**
- (b) **A case can be made for a commercial organisation or organisations delivering wider services**
- (c) **Even if some universities deliver services, others may prefer to opt for the use of other mechanisms such as the use of regional services if these are available**

The question of how best to ensure that resources created at one institution are made available for re-use at other UK institutions and beyond, whether on a commercial or some other basis, is less clear cut than the question of internal services. A case can be made for either a nationally-funded central service or centrally-funded but distributed regional or subject-based services taking responsibility for resource delivery, resource maintenance, commercial or strategic transactions, and any associated access control and legal issues. It is also possible to envisage such considerations being dealt with by private companies, with a range of publishing companies buying the resources, converting them as appropriate, and selling them on to other UK Higher Education institutions and the world at large. There is, nevertheless, a strong local and a stronger national case for nationally co-ordinated university management of services with a full external (as well as internal) focus.

**Institutional Case**

If institutions are to obtain maximum benefit from locally created resources and the effort that goes into creating them then, as has already been argued, the minimum requirement is the management of locally-focused or internal services with at least two externally-focused elements:

- A mechanism to enable the institution to identify and exploit any potential for commercial or strategic value beyond the institution

- A mechanism to enable local staff to develop and maintain an awareness of the requirements of wider commercial or strategic value

This means that, since the majority of the requirements of an externally focused service are also requirements of an internally focused service, much of what would be required to manage an externally focused service would be required of the institution in any case in order to support the internal service outlined above. This is especially true if, as would be sensible, the internal service were built around nationally agreed standards, and is further strengthened by the fact that such a service would almost certainly have, or would soon develop, other externally focused elements. Thus:

- A requirement of any internally focused service would be access control to protect valuable resources networked within the institution against external access, a function that is effectively outward looking as well as inward looking
- Any internal service would almost certainly begin to develop (or would already have) other externally focused elements to cope with things such as distance learning programmes, collaborative inter-institutional research projects, and funding arrangements where the funding body specified that developed resources be made available within a particular inter-institutional community

It is possible, therefore, that an institution may discover that there is not much difference between running a service with a full external focus and running an internal service with some external elements, particularly if it was already strongly committed to a major network-based distance learning programme. Moreover, since running an external service would ensure that all resource revenue would come to the institution and its staff, as opposed to a situation involving a commercial company or companies where some revenue would go elsewhere, it is possible that some institutions at least might calculate that running a service with a full external focus would be worthwhile and would, in fact, help pay for an internal service.

There are, however, other factors to consider when deciding whether or not to offer a full external service. For example:

- Any additional computing and networking resources required to support an external service
- The implications for support teams, service promotion, and user training

These may be over and above local service requirements, although in many cases this may depend on other things like the strength of network-based distance learning efforts. The calculation may be a complex one in many instances, and may not be an immediate problem at the service start-up stage. The position taken may vary from institution to institution, depending on local circumstances, and may depend in many cases on the existence or otherwise of alternative delivery mechanisms:

- Commercial companies
- Regional consortia
- Larger institutions offering smaller institutions a service
- A national body set up for the purpose or given this function (e.g. in the latter case, the RDN/RDNC might be a possibility)

It is probable, moreover, that the position taken by institutions generally in respect of external services is likely to be a cautious one, and much may depend on the willingness of funding bodies to finance pilot service projects.

### **National Case**

At a national level, there are clear additional points in favour of university management of services with a full external focus when the comparison is with delivery of these resources via commercial companies:

- All revenues remain within UK H.E.

- UK Higher Education controls and influences the service and service development
- Adopted standards are appropriate to UK H.E.
- Resource sharing and collaboration are stimulated and facilitated and inter-institutional duplication of effort reduced
- A shared understanding and vision can develop

However, it is worth noting that these advantages would also apply to a UK Higher Education funded solution based on a central repository or a centrally co-ordinated but distributed regional or subject-based mechanism for handling inter-institutional delivery. Moreover, these options would offer economies of scale in respect of hardware, software, networking, support, training and promotional aspects of external delivery services.

Such approaches have their own drawbacks, however. For example:

- Additional 'top-slicing' to fund central or regional hardware, support staff and so on
- Resources not 'seen' in their institutional context
- Additional complexity in respect of resource and service updating mechanisms
- Duplication of local service elements at central or regional sites
- In time, resource volume may be too great for anything other than local or, at best, regional services to be practical
- Institutional resources may require support staff from the home institution
- Perceived or actual loss of institutional control

On the other hand, a central repository would not entail the fairly significant problems with service interoperability likely to be encountered with the institutional model, and the regional and subject-based options would probably have less problems with interoperability than the institutional model would. National co-ordination in respect of formats, resource design, content planning to avoid duplication (mainly teaching resources) would be of value to resource creators, institutions, and UK Higher Education alike, even if resource delivery beyond the local institution were undertaken by commercial companies willing to convert and re-work resources, in that it would enable institutions and funding bodies to plan more readily to ensure that resources created have a wider value, to identify strategic partners for collaborative developments, to minimise duplication of effort and develop a UK-wide strategy, and to benefit from a UK-wide skills pool and standardised training requirements. So, on the one hand, it is a cost against all of the options, including that based on private companies, and, on the other, it is a point against the private companies option, since this option would almost certainly make such national co-ordination more difficult, if not impossible, to manage. That having been said, an option based on private companies is likely to be less expensive to set up and maintain than the other options, and private companies may have better skills in respect of identifying needs, developing markets, and an understanding of international requirements.

In summary, there is a strong case for university management of external services, but:

- The strength of the case is likely to vary from institution to institution, depending on both, local circumstances, such as the strength of existing or planned network-based distance learning programmes, and external factors, such as whether or not alternative delivery mechanisms are proposed or come into being.
- A case can also be made for other external delivery options, such as a national repository, nationally co-ordinated distributed regional or subject based services, or a solution based on the use of private companies, depending on a range of national, institutional, and other requirements, aims, circumstances, policies, and financial and resourcing considerations.

It is impossible to make a recommendation at this stage on the best external delivery option. To do this requires further information not available to the project, information that can only be obtained in the context of further investigations and deliberations at both an institutional and a national level, looking, amongst other things, at:

- The advantages and disadvantages of each of the options in a range of different institutional and

national circumstances

- National and institutional policies, aims, requirements and priorities in respect of such services
- Costs for each option under different circumstances and how availability of funds impinges on the possible choices available
- Related local, regional, national, and perhaps international and even commercial circumstances
- Unique local or regional variations in circumstances
- Whether the requirements in respect of the above are different for teaching materials and research materials

Since, in the initial phases at least, the requirements of running an externally-focused service do not differ greatly from those of running an internal service, it would be possible for institutions to seek to clarify their own local position on the issue by setting up small scale external delivery experiments when implementing internal services, and some institutions may elect to do this. In the main, however, institutional expectation is likely to be that such clarification should come from JISC, either through a policy decision or through further investigation of the issue through the funding of a pilot project or projects as proposed in section 10 below.

**Conclusion:** If the aim is to maximise the value that universities, UK Higher Education in general, and funding bodies obtain from these materials, and the effort that goes into creating them, both now and in the future, then - from the perspective both of individual universities and the Funding Councils - university management of locally focused services with at least some externally focused elements is an essential part of any solution. There is, moreover, a strong local and a stronger national case for university management of services with a full external focus, although the strength of the local case is likely to vary from institution to institution, and to depend on both local circumstances like the strength of the institution's existing or proposed commitment to networked distance learning programmes and external factors such as whether or not alternative mechanisms for external delivery are proposed or come into being. This latter possibility exists because it is possible to envisage alternative mechanisms for the delivery of resources beyond the local institution. A national case can also be made for a UK Higher Education funded central repository or a group of centrally co-ordinated regional or subject-based repositories for handling inter-institutional delivery, and the Funding Councils may also wish to investigate the case for approaches to external delivery based on commercial companies, although the case for this does not seem particularly persuasive. In summary, the case for university management of internal services with some external elements is conclusive, and the case for full external services strong, but there is a need for further clarification in respect of the best or preferred method of handling inter-institutional delivery and associated mechanisms. Since, in the initial phases at least, the requirements of running an externally-focused service do not differ greatly from those of running an internal service, it would be possible for institutions to seek to clarify their own local position on the issue by setting up small scale external delivery experiments when implementing internal services, and some institutions may elect to do this. In the main, however, institutional expectation is likely to be that such clarification should come from JISC, either through a policy decision or through further investigation of the issue as proposed below.

## 6. Are there other reasons why universities should consider managing services?

**Summary:** Yes. Some aspects of locally focused services will ensure that locally created electronic teaching and research materials of potential or actual commercial or strategic value are protected both legally and through access control mechanisms, and updating and archiving mechanisms are also likely to be essential for such materials. Other service aspects will ensure institutional protection against staff infringement of copyright through electronic publishing after rights transfer has taken place. In addition, the service management will provide a focus for, and force the pace on, a practical implementation of information strategies in the mission-critical areas of teaching and research and will help obtain improved value from the large amount of relatively uncoordinated effort already being focused on University web-sites. Additional reasons for managing externally focused services include support for distance learners and advertising of the University and its services for promotional, strategic and commercial ends.

**Details:** Discussions within the project have identified support for local service management with some external elements from institutional activities and concerns not directly related to a wish to improve exploitation of locally created electronic materials. University views on these were sought within the context of a wider investigation of the advantages and disadvantages of managing services, itself part of a more extensive investigation of institutional perspectives and policies relating to the managing services issue conducted early in 1998. A questionnaire (CATRIONA II: Questionnaire on University Management of Electronic Resources) was compiled and sent to all thirteen Scottish universities, eleven of whom replied. Nine provided institutional responses to the in-depth questionnaire, two provided responses from senior members of staff. One indicated that they felt unable as yet to comment on what was a 'developing area'. One other declined to respond. A full listing of all of the survey results is on the project web-site at the URL <http://wp269.lib.strath.ac.uk:5050/Cat2/surveys.html>. The significant results are detailed and analysed in sections 7, 8, 9 and 10 of this report, with the advantages and disadvantages of managing services covered in section 8. This shows that there was general, and sometimes unanimous, agreement from responding institutions that the following additional activities and concerns provided support for the idea of managing a local service:

- Concern that a great deal of relatively uncoordinated effort is going into the maintenance of university web-sites in any case
- Intranet developments, which were seen as having significant overlap with the needs of a local service
- The view that a service would improve dissemination of information throughout the university from both internal and external sources
- The concern that strategically important course materials that were available on institution web-sites should be protected against access and use not in the institution's best interest
- Concern that such materials be clearly identified as the intellectual property of the university and not that of staff (who may well move to other institutions as their careers develop)
- Concern to ensure that materials were not being published on the web-site illegally, the electronic rights having been signed over at the time of hardcopy publication
- The link between service management and distance learning activities, a 'local' concern, but with implications for remote access
- The need for the University to 'advertise' on the network for promotional, strategic and commercial ends, another outward-looking 'local' concern
- The view that service management could provide a focus for, and force the pace on, a practical implementation of information strategies in the mission critical areas of teaching and research activities

This last point is worthy of further comment. Arguably, service management can play an important role in 'kick-starting' the process of the practical implementation of information strategies, a point recognised by institutions, at least in respect of internal services. One of the outcomes of the project's survey of Scottish institutions regarding the management of services mentioned was the finding that the

issue of service management and associated policy, strategy and organisational infrastructure questions is perceived to have an overlap with the development of an information strategy. 10 out of the 11 institutions who responded took the view that a local service is a logical extension of developing an information strategy. This may be because they recognise the potentially vital role that service management can play in fostering an 'information culture'\*\* in this key area of university activity – effectively forcing the pace on the practical implementation of an institutional information strategy and thereby transforming the efficiency with which the university carries out its mission-critical functions of teaching and research.

In fact, the development of a service management culture is not just a logical extension of developing and information strategy, it is itself potentially an agent for change. Managing a service to create and deliver electronic teaching and research resources, together with a range of associated support information\*, means developing a coherent and robust practical strategy for the handling, creation, discovery, transformation, dissemination and evolution of these particular types of information. It is therefore the practical implementation of at least a part of an institution's information strategy. Moreover, since teaching and research are the mainstream functions of a university, and information creation, discovery, dissemination and evolution is central to these functions, managing a service is the practical application of what must be the central and most significant part of the institution's information strategy. Once an information strategy is in place for teaching and research information, it can be safely assumed that the management of other kinds of information in the university will – since the function of these other areas of information management is to support these key activities – rapidly begin to fall into place.

Thus, the importance of the development of a service-oriented environment is not just that it is a logical extension of developing an information strategy, it is a means of beginning to move towards its practical implementation through focusing on particular practical requirements in a key area. It is not uncommon to struggle with the problems of mapping out an information strategy in the abstract, so focusing on its practical application in a specific area is likely to be an effective way of bringing an information culture into being, improving awareness and understanding as well as identifying specific implementation requirements.

Nor is the link simply with the development of a local service. Managing teaching and research information in universities, together with associated support information, means managing its flow into and out of the institution, as well as within it. The disciplines involved in managing an externally focused service have the same potentially vital role to play in the implementation of information strategy in this area as those involved in managing an internally focused service have in the implementation of an internal information strategy.

Indeed, the two are inextricably linked. A good internally focused service/information strategy is a prerequisite for a good externally focused service/information strategy – and, since the university's revenues come in large part from the imparting of teaching/research information/resources to the outside world, and a large part of its costs come from buying in information in one form or another (including in the form of staff), a good externally-focused service/information strategy is a prerequisite for the continuing existence of an internal service, a point also recognised by the senior staff consulted in our survey, 10 out of 11 institutions affirming that a commercially or strategically successful external service could help pay for an internal service.

\*Supplementary or support information needed in a service (other than resources themselves):  
descriptions of research facilities or teaching facilities  
information about information (metadata)  
related information (e.g. other papers in same field)  
descriptions of research projects  
descriptions of researchers/teachers and other resource creators  
contact information of various kinds  
reference information  
information about related channels of communication (e.g. e-mail discussion lists)

**\*\*Information Culture:** A shared perception within the institution of the importance, value and function of information and information products within the organisation, and a consequent translation of this into both individual and institutional actions and mechanisms for handling information in its various forms in ways appropriate to this shared perception of its importance, value and function. If such a culture were in place in institutions the various accessibility problems mentioned at 4 above would be resolved.

**Conclusion:** Yes. Some aspects of locally focused services will ensure that locally created electronic teaching and research materials of potential or actual commercial or strategic value are protected both legally and through access control mechanisms, and updating and archiving mechanisms are also likely to be essential for such materials. Other service aspects will ensure institutional protection against staff infringement of copyright through electronic publishing after rights transfer has taken place. In addition, the service management will provide a focus for, and force the pace on, a practical implementation of information strategies in the mission-critical areas of teaching and research and will help obtain improved value from the large amount of relatively uncoordinated effort already being focused on University web-sites. Additional reasons for managing externally focused services include support for distance learners and advertising of the University and its services for promotional, strategic and commercial ends.

## 7. Is the service management issue perceived as important?

**Summary:** *Yes.* Of 13 Scottish institutions, 11 regard it as an important issue requiring short (3), medium (6), or long (2) term examination. 2 did not reply.

**Details:** As indicated at 6 above, 11 out of 13 Scottish universities responded to a questionnaire-based survey on university management of resources in early 1998. The aim of the survey was both to ensure that institutions were aware of the implications of managing services (see key service elements in section 8 below) and to find out whether or not Scottish universities would nevertheless see operational, strategic, or commercial benefits in managing services to deliver locally-created electronic teaching and research resources to desktop computers within and beyond the local institution. The questionnaire incorporated 102 questions under the following 5 main headings/questions:

1. Is the issue an important one?
2. Should universities manage a local service?
3. Should universities manage a service to other universities?
4. Key Service Elements
5. Current Position at Your Institution

The full questionnaire can be found on the web-site ([http://wp269.lib.strath.ac.uk:5050/Cat2/all\\_q.html](http://wp269.lib.strath.ac.uk:5050/Cat2/all_q.html)).

Section 1 of the questionnaire dealt with the perceived importance of the managing services issue. Asked to indicate how important the issue was, all respondents indicated that it was an important issue requiring consideration in either the short term (3), the medium term (6), the long term (1) or as time allows (1). Options indicating that the issue was unimportant or that universities should not manage services were not ticked by any respondent. In summary, 9 thought it an important issue in the short or medium term, 2 thought it important in the longer term, and the remaining 2 gave no response.

Additional evidence of the importance attached to this issue was found in the extent to which respondents felt that universities, including their own institutions, should manage services to deliver locally-created electronic teaching and research resources both within and beyond the institution (see results in section 9 below)

**Conclusion:** *Yes.* Of 13 Scottish institutions, 11 regard the service management issue as important - requiring short (3), medium (6), or long (2) term examination. 2 did not reply

## 8. What are the implications of universities managing services?

**Summary:** The work involved is significant. Policy, strategy, organisational infrastructure, staff deployment and operational changes will usually be necessary in areas such as: intellectual property rights, electronic publication, electronic formats, information management, resource and service design, quality assessment, metadata, access control, archiving, and inter-service integration. Nonetheless, in the 11 (out of 13) institutions responding to our survey, the advantages of managing a local service were seen as outweighing the disadvantages by a factor of 8.4 to 1. For external services, the figures were 2.7 to 1, perhaps because the benefits of the additional effort involved in inter-service integration and resource re-usability are not yet proven.

[academics and IPR]

**Details:** The management of a service to deliver resources requires the development, maintenance and implementation of policies (and associated mechanisms) on a range of issues, some of which may already be in hand as part of Web site or Intranet development programmes or information strategy plans. A list of key service elements is presented below, with key questions to consider in respect of these service elements listed first. As will be clear from a consideration of these elements and questions, the implications for universities of a decision to manage services are not insignificant. Nevertheless, institutions appear to believe that the effort involved would be worthwhile. Despite having been made aware of the significant effort likely to be involved, the 11 institutions responding to our survey of the 13 Scottish universities saw the advantages of managing a local service as outweighing the disadvantages by a factor of 8.4 to 1, ignoring 'don't knows' at 15%. For external services, the figures were 2.7 to 1, ignoring don't knows at 18. Full details of this survey result, including lists of the perceived advantages and disadvantages of managing internal and external services, are presented below, following the list of key service elements.

### 8.1 Key Questions:

- Are appropriate policies and mechanisms in place for the **Key Service Elements** listed below?
- If so, are they adequate to the requirements of service management in an electronic age?
- Which persons or agencies are or should be responsible for formulating policies and implementing and managing mechanisms?
- Can service management be put in place with existing resources?
- If not, how much additional funding or resource is required?
- Are there additional costs involved in running an external service?
- What is the attitude of other universities to service management?
- Taking into account all of the various issues, do the advantages of running a local service outweigh the disadvantages? What about an external service?

### 8.2 Key Service Elements

#### Resource Creation Guidelines

Service provision requires that the service provider (the University) offers potential authors guidelines and advice on a range of issues relating to resource creation. For example:

1. The best electronic formats to use when producing works
2. Guidelines on copyright and other considerations when producing joint works with other institutions
3. Structure, quality control, currency control, navigational aids, general content in respect of electronic resources created for the service; supplementary or support information as specified on page 27 above.

The University's position on Intellectual Property Rights in respect of works created by staff as part of their duties ?? [fit in bit on academics and IPR]

#### 4. Dealing with external publishers in respect of copyright on electronic versions of works

**Note 1:** a draft model policy document covering 4 and 5 above has been developed by the project and is available on the web-site at [http://wp269.lib.strath.ac.uk:5050/Cat2/ipr\\_draft.htm](http://wp269.lib.strath.ac.uk:5050/Cat2/ipr_draft.htm). The aims of the guidelines set out in this document are to:

- Provide a structure for the protection and exploitation of intellectual property created by University employees and to clarify the position with respect to ownership
- Preserve academic freedom whilst protecting intellectual property rights
- Encourage and stimulate innovative work by University employees by providing a framework for rewarding work of strategic or commercial value to the University.

**Note 2:** a model document on formats has also been prepared and is available on the web-site at <http://wp269.lib.strath.ac.uk:5050/Cat2/formats.html>

### **Quality and Value Assessment**

Service provision implies objective and practical mechanisms to ensure and assess resource quality and to assess local and also commercial, promotional and strategic value.

### **Distributed or Centralised Service**

One service design issue would be whether or not the service would be based on a centralised model run by a central service such as the Library or the Computer Centre, or a distributed model with resources stored and catalogued on distributed servers. The devolved nature of many institutions may make a distributed service more attractive, but complicates the nature of many of the issues, such as the creation of a single catalogue for the service, ensuring secure backup and archiving mechanisms, and overall service design. See section 12 for more details.

### **Resource Description and Index Creation**

There are a number of issues here. Who will ensure accurate and efficient retrieval through the search interface by ensuring that resources are adequately catalogued, and all catalogued to the same standard? If this is done at departmental level, who will advise on and monitor standards and how will the service ensure that it is possible to search the whole site in a single operation?

### **Overall Service Design and Maintenance**

Service design and maintenance is a complex issue and failure to get it right can mean the failure of the service itself. Who will be responsible for guidelines in respect of resource displays, catalogue description displays, design of the browse interface, design of the search interface, and so on? Information specialists? Information Technology specialists? Users? All of these?

### **Access Control**

If a service is to be offered only internally, access control is required to ensure that there is no external access to valuable resources. If an external service is to be offered also, access control is required to ensure that only those external users with whom the service has a commercial or strategic agreement have access. Setting up and maintaining secure access control mechanisms is therefore crucial if any type of service is to be offered.

### **Currency of Information**

It is important that mechanisms are implemented to ensure the currency of the information offered by the service. Issues here are: currency of the resources themselves, currency of cataloguing information, currency of locational information (URL), etc..

### **Help and Training Services**

Any service should offer on-line help and a service to train both users and authors. If an external service is offered additional problems may arise in respect of user training arise

### **Archiving**

Arguably, offering a service will at some point entail implementing policies and mechanisms for archiving valuable but non-current material. Who will decide to archive, discard or keep on-line? How will archiving be dealt with technologically? Which formats will be used? How will archived material be accessed when required? How can the service ensure that archived material will not become inaccessible as access technologies go out of date? Is there a role for national bodies such as the National Library for Scotland?

### **Service Administration**

A service must be managed by some group within the institution. In different institutions this might be the Library, the Computer Centre, an Information Services department entailing both, or some other body. A mix of technological and information skills would be required.

### **Service Promotion, Income Generation and Funding**

If a service is made available to other universities the associated areas of service promotion, income generation and funding are of key importance

### **Cross-Service Integration**

If a service is to be offered externally for strategic or commercial reasons, issues related to integration with services elsewhere become important. A service which integrates readily with other widely available services will be important. For example, if the service catalogue was accessible via the library Z39.50 standard then users of the proposed cross-Scotland CAIRNS service would be able to search it in conjunction with all the library catalogues in Scotland - making users more likely to use the service and to find resources they wished to access. Another issue might be co-operation with other institutions intending to offer a service so that similar service designs could be agreed and usability of all services therefore enhanced.

### **Incentives to encourage resource creation**

Given the high level of resource creation in the universities surveyed by the project, the problem for most institutions, if there is a problem, may be incentives to ensure that the resources which are created are of value, either in the direct sense of being re-useable in other areas of the University, or in a strategic, commercial or promotional sense (or, indeed, all four of these). Incentives to encourage resource creation as such will only apply if an institution should find that it is not creating resources at these high levels and decides that this is a matter for concern. In either case, it may be necessary:

1. To survey staff in order to discover which, if any, of the following are most likely to be important factors:
  - Career recognition incentives
  - Internal funding incentives
  - External funding bid support
  - Free time for development
  - Training and support services
  - Financial rewards
  - Enhanced rewards for externally valuable resource creation
  - Extra-institutional factors: publishers' attitudes; professional and career-related considerations; the position taken by other institutions; the position taken by funding bodies?; relationship to RAE?
  - Facilities for publishing e-resources on the university server or servers that are straightforward and easy to understand and use?
  - Increased availability of equipment, software, training, advice, awareness, support
  - The existence or non-existence of an on-campus or an off-campus service? The success/popularity/importance of such services
  
2. To implement incentive schemes in line with the survey results and other internal considerations such as the resources available (Note: A summary of survey results on the relative importance of some possible incentives is presented in the box below. Full details are in the Surveys section of the project web-site at <http://wp269.lib.strath.ac.uk:5050/Cat2/surveys.html>).

**Note: Question 9 of the CATRIONA II resource creation surveys carried out at six Scottish universities asked academics ‘Would you be stimulated to do more to create electronic resources for teaching or research if the university or the funding councils or some other agency provided incentives?’**

The breakdown of their responses were as follows:

- **Improved training to produce materials** - Of those who responded on this factor (427) 30% saw it as very important, 47% as important, and 23% as not important.
- **Improved and easily accessible technical support and advice** - Of those who responded on this factor (428) 46% saw it as very important, 40% as important, and 14% as not important.
- **Software packages suited to your needs** - Of those who responded on this factor (426) 32% saw it as very important, 46% as important and 22% as not important.
- **Improved computing and networking facilities** - Of those who responded on this factor (422) 26% saw it as very important, 40% as important, and 34% as not important.
- **More free time to create resources** - Of those who responded on this factor (427) 62% saw it as very important, 24% as important, and 14% as not important.
- **A mechanism to ensure academic or career recognition for such work** - Of those who responded on this factor (423) 34% saw it as very important, 39% as important, and 27% as not important.
- **A mechanism to ensure your work could not be easily tampered with or plagiarised** - Of those who responded on this factor (421) 30% saw it as very important, 39% as important, and 31% as not important.
- **A mechanism to allow commercial exploitation by yourself where appropriate** - Of those who responded on this factor (426) 15% saw it as very important, 44% as important, and 41% as not important.

#### **Question 9 cross tabulations**

The following factors which had a **statistically significant** effect on responses to question 9 were worthy of note:

- **University type: Improved training to produce materials** - 86% of those surveyed at the New, 76% at the Modern, and 71% at the Ancient universities considered improved training to produce materials to be either very important or important (**5%**). **Improved computing and networking facilities** - 81% of respondents at the New universities saw improved computing and networking

facilities as either very important or important. Figures at the Modern and Ancient institutions were 64% and 54% respectively (**1%**). **More free time to create resources** - More free time was considered very important or important by 91% of respondents at the New universities, 88% at the Modern, and 78% at the Ancient (**1%**). **A mechanism to ensure your work could not be easily tampered with or plagiarised** - A mechanism ensuring work could not be easily tampered with or plagiarised was viewed as very important or important by 75% of respondents at the New universities, and 71% at the Modern. This compares with 59% at the Ancient (**5%**).

Other factors found to have a **statistically significant** are recorded in the survey report

### 8.3 Survey Results – Advantages and Disadvantages of Managing Services

As indicated above, a questionnaire (CATRIONA II: Questionnaire on University Management of Electronic Resources) was compiled and sent to all thirteen Scottish universities. A key aim of the survey was both to ensure that institutions were aware of the implications of managing services (see key service elements above) and to find out whether or not Scottish universities would nevertheless see operational, strategic, or commercial benefits in managing services to deliver locally-created electronic teaching and research resources to desktop computers within and beyond the local institution.

Sections 2 and 3 of the questionnaire dealt with the advantages and disadvantages of managing services. The results of these sections are summarised below:

#### What are the advantages of managing a local service?

Universities were asked to mark **AGREE**, **DISAGREE**, or **DON'T KNOW** against a list reasons in favour of **universities in general** managing a **local** service. The results\* were as follows:

<b>UNIVERSITIES (in general) SHOULD MANAGE A LOCAL SERVICE BECAUSE:</b>	<b>Agree</b>	<b>Disagree</b>	<b>Don't Know</b>
A great deal of relatively uncoordinated effort is going into the maintenance of university Web sites in any case.	<b>11</b>	<b>0</b>	<b>0</b>
Most sites are developing an Intranet in any case.	<b>8</b>	<b>0</b>	<b>3</b>
A service to deliver resources locally would increase the possibilities of cross-fertilisation of research within an institution.	<b>7</b>	<b>2</b>	<b>2</b>
A service to deliver teaching resources would enhance possibilities for home-based and distance learning.	<b>11</b>	<b>0</b>	<b>0</b>
A service would save time and effort by making teaching resources created by one department available to others.	<b>9</b>	<b>0</b>	<b>2</b>
A service would improve dissemination of information throughout the University from both internal and external sources.	<b>10</b>	<b>0</b>	<b>1</b>
Teaching resources are being published on the Web site in any case in a more or less haphazard fashion. A service management approach would ensure quality control, protection of course material, value assessment for commercial or strategic exploitation and currency control.	<b>11</b>	<b>0</b>	<b>0</b>
Service management would ensure a controlled approach to the protection of University Intellectual Property Rights.	<b>10</b>	<b>0</b>	<b>1</b>

<b>UNIVERSITIES (in general) SHOULD MANAGE A LOCAL SERVICE BECAUSE:</b>	<b>Agree</b>	<b>Disagree</b>	<b>Don't Know</b>
Service management would ensure a controlled approach to safeguarding the University against copyright infringements.	<b>9</b>	<b>0</b>	<b>2</b>
On-line overview of teaching and research output offers greater strategic control.	<b>4</b>	<b>3</b>	<b>4</b>
There are strategic and commercial advantages because creating a local service makes offering an economic service to the wider community easier.	<b>11</b>	<b>0</b>	<b>0</b>
There are possible RAE and TQA advantages.	<b>10</b>	<b>0</b>	<b>1</b>
It would provide improved accessibility of information on staff expertise across the University.	<b>7</b>	<b>1</b>	<b>3</b>
A local service is a logical extension of implementing an information strategy.	<b>10</b>	<b>1</b>	<b>0</b>

Invited to list additional reasons in favour of universities, in general, managing local services, respondents volunteered the following:

- There may be cost savings for the institution e.g. photocopying costs. However, any efficiency gains will be passed to students.
- Could identify then reduce duplication of effort.
- It would assist the sharing of good practice and the adoption of accepted standards.

#### **What are the disadvantages of managing a local service?**

Universities were asked to mark **AGREE**, **DISAGREE**, or **DON'T KNOW** against a list reasons against **universities in general** managing a **local** service. The results\* were as follows:

<b>UNIVERSITIES (in general) SHOULD NOT MANAGE A LOCAL SERVICE BECAUSE:</b>	<b>Agree</b>	<b>Disagree</b>	<b>Don't Know</b>
Even if effort is being put into Web sites, Intranets and information strategies anyway, service management requires significant extra resources.	<b>4</b>	<b>6</b>	<b>1</b>
Most of the advantages listed above are of minimal importance	<b>0</b>	<b>10</b>	<b>1</b>
Service management is not a practical proposition where there is devolvement of control to departmental level.	<b>1</b>	<b>9</b>	<b>1</b>
Service management is not necessary - individual departments will make their own decisions about services.	<b>0</b>	<b>9</b>	<b>2</b>
Staff don't have the time to create electronic resources at a level that would make the exercise worthwhile.	<b>2</b>	<b>9</b>	<b>0</b>
The control implied by service management would be an infringement of academic freedom.	<b>1</b>	<b>9</b>	<b>1</b>

There would be too many copyright problems and conflicts with commercial publishers.	<b>1</b>	<b>6</b>	<b>4</b>
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Invited to list additional reasons against universities in general of managing local services, respondents volunteered the following:

- The resources to establish and maintain such a service would have to come from University funds; the limited value of materials created by one department to another department; a service management approach wouldn't necessarily ensure quality control...would require QA processes.
- The power of Faculties and Departments in the University is considerable, and "top-down" central initiatives may be ignored if not appropriate within the local context. The initiative will only work if seen as relevant.
- However, the responses given do not mean to imply that these issues are insignificant.[The responding institution disagreed with all of the claimed disadvantages.]
- It may be difficult to co-ordinate separate local services if delivery of national services (i.e. from TLTP projects) is required. However, adherence to standards, e.g. Z39.50, would help.

### What are the advantages of managing an external service?

Universities were asked to mark **AGREE**, **DISAGREE**, or **DON'T KNOW** against a list reasons in favour of **universities in general** managing an **external** service. The results\* were as follows:

<b>UNIVERSITIES (in general) SHOULD MANAGE AN EXTERNAL SERVICE BECAUSE:</b>	<b>Agree</b>	<b>Disagree</b>	<b>Don't Know</b>
CATRIONA II Survey results show that academics want access to research and teaching resources in other UK Universities but currently these are not generally accessible.	<b>7</b>	<b>3</b>	<b>1</b>
Services of this kind offer the possibilities of inter-institutional strategic alliances through sharing teaching resource creation.	<b>9</b>	<b>1</b>	<b>1</b>
Services offer the possibility of commercial advantage through sale of access to resources.	<b>10</b>	<b>0</b>	<b>1</b>
Consultancy/staff expertise databases could be offered to potential customers or to the media.	<b>10</b>	<b>0</b>	<b>1</b>
There is potential for promotional advantage, impressing funding bodies, potential employees and potential students.	<b>11</b>	<b>0</b>	<b>0</b>
Commercially or strategically successful external services could help pay for an internal services.	<b>10</b>	<b>0</b>	<b>1</b>
Commercially successful services would help recoup expected future increases in networking costs.	<b>7</b>	<b>1</b>	<b>3</b>
External services would help improve overall teaching and research through strategic co-operation and cross-fertilisation.	<b>9</b>	<b>0</b>	<b>2</b>
If more research material were available on the Web, the cost to universities of purchasing journals would decrease.	<b>1</b>	<b>5</b>	<b>5</b>

Invited to list additional reasons in favour of universities in general managing external services, respondents volunteered the following:

- Facilitate wider access to HE.
- It is possible that SHEFC may encourage institutions to make their resources more widely available in the aftermath of their consultation paper on Communications and Information Technology. Other universities are likely to do this. This university may need to follow suit to maintain its competitive position.

### What are the disadvantages of managing an external service?

Universities were asked to mark **AGREE**, **DISAGREE**, or **DON'T KNOW** against a list reasons against **universities in general** managing an **external** service. The results\* were as follows:

<b>UNIVERSITIES (in general) SHOULD NOT MANAGE AN EXTERNAL SERVICE BECAUSE:</b>	<b>Agree</b>	<b>Disagree</b>	<b>Don't Know</b>
The additional effort entailed in ensuring high profile, high quality services would require significant investment with no guarantee of substantial return.	<b>4</b>	<b>3</b>	<b>4</b>
External services would entail additional problematic access control problems.	<b>6</b>	<b>5</b>	<b>0</b>
Copyright disputes are more likely if services are offered beyond local institutions.	<b>6</b>	<b>4</b>	<b>1</b>
Rival institutions could exploit UK research or teaching ideas.	<b>5</b>	<b>4</b>	<b>2</b>
Training and promotion would be a major problem.	<b>1</b>	<b>7</b>	<b>3</b>
Inter-service integration would be a major difficulty.	<b>1</b>	<b>3</b>	<b>7</b>

Invited to list additional reasons against universities in general of managing external services, respondents volunteered the following:

- Competition between universities could well make external services difficult to operate.
- General teaching resources are not high quality; resources are oriented towards specific groups; competing priorities; lecturers become "access facilitators" - potentially changes the structure of the University towards an Open University model.
- Unless properly costed could become a drain on core resources. If all do it, potential for variations in practice, with associated difficulty of locating resources.
- These are all problems. They do not provide reasons for not managing services.

### On balance, is service management advantageous or disadvantageous?

It is possible to assess the overall perspective of the respondents on whether or not service management is advantageous or disadvantageous by:

- Adding together the numbers of those who indicated 'agree' against the advantages listed, added their own advantages, or indicated 'disagree' against the disadvantages listed to give the advantageous total
- Adding together the numbers of those who indicated 'agree' against the disadvantages listed, added their own disadvantages, or indicated 'disagree' against the advantages listed to give the disadvantageous total
- Excluding 'don't knows' as neutral

On this basis, in the 11 (out of 13) institutions responding to our survey, the advantages of managing a local service were seen as outweighing the disadvantages by a factor of 8.4 to 1, ignoring 'don't knows' at 15%. For external services, the figures were 2.7 to 1, ignoring don't knows at 18%. This is a crude, but nevertheless helpful indication of the general perspective of institutions on the managing services issue.

**\*Note:** There is an element of ambiguity about the exact meaning of some of these answers, but it does not effect the basic meaning of each reply. **Agree** always means **we agree** with the general statement that universities should manage a local service because we agree with the specific statement and agree that it is a point in favour either of managing or of not managing a service. **Disagree** always means **we disagree** with the general statement that universities should or should not manage a local service, although it is never clear whether this is because the institution disagrees with the specific statement and therefore with the general one or whether the institution agrees with the specific statement but disagrees that it is a reason in for managing or not managing a service. **Don't know** always means **we don't know** whether we agree with the general statement or not, but it is never clear whether the institution agrees with the specific statement, disagrees with it, or doesn't know.

**Conclusion:** The work involved is significant. Policy, strategy, organisational infrastructure, staff deployment and operational changes will usually be necessary in areas such as: intellectual property rights, electronic publication, electronic formats, information management, resource and service design, quality assessment, metadata, access control, archiving, and inter-service integration. Nonetheless, in the 11 (out of 13) institutions responding to our survey, the advantages of managing a local service were seen as outweighing the disadvantages by a factor of 8.4 to 1. For external services, the figures were 2.7 to 1, perhaps because the benefits of the additional effort involved in inter-service integration and resource re-usability are not yet proven.

## 9. Should universities manage internally or externally focused services? Will they?

**Summary:** From the perspective of both individual universities and the Funding Councils, there is a strong case in favour of universities managing internally focused services with some externally focused elements, and a significant case in favour of a cautious but positive approach to universities managing services with a full external focus, particularly if the institution concerned is already committed to a significant level of support for network-based distance learning. There is, however, a need for further clarification from the centre in respect of the best or preferred method of handling inter-institutional delivery and associated mechanisms. On the question of whether or not institutions will choose to manage services, the answer is that there is some indication that they may. Of the 11 responding institutions in our survey, 9 said universities in general should manage internally focused teaching services, with internal research, external teaching and external research service figures being 8, 8 and 7 respectively. 9, 10, 7 and 9 respectively included their own institution in this. However, given the significant implications for universities of such a decision as described above, the requirement to resolve the issue of the preferred mechanism for external delivery, and the need for central co-ordination to ensure inter-service integration and resource reusability, central funding for a pilot service project or projects, perhaps based on a regional group or groups of potential services, would seem advisable in order to ensure that real, rapid and co-ordinated progress is made.

### Details:

As indicated above in section 5, there is a strong case for universities choosing to manage at least local services with some external elements in order to maximise the value inherent in locally-created electronic teaching and research materials and the effort that goes into creating them. Moreover, as indicated in section 6 above, there are a number of other reasons why universities should manage local services with some degree of local focus.

A strong case can also be made for universities managing services with a full external focus, but the position here is less clear because

- The strength of the case is likely to vary from institution to institution, depending on both, local circumstances, such as the strength of existing or planned network-based distance learning programmes, and external factors, such as whether or not alternative delivery mechanisms are proposed or come into being.
- A case can also be made for other external delivery options, such as a national repository, nationally co-ordinated distributed regional or subject based services, or a solution based on the use of private companies, depending on a range of national, institutional, and other requirements, aims, circumstances, policies, and financial and resourcing considerations.

Given the strength of the case for managing a local service with some external elements, and the fact that, especially in the initial stages, there is likely to be a significant overlap between the requirements of a local service with some external elements and that of a service with a full external focus, institutions would probably find it valuable to examine whether a small-scale experimental external service is worth investigating in the context of setting up a local service. This should help clarify some aspects of the question as it relates to the host institution. However, given the significant implications for universities of such a decision as described above, the requirement to resolve the issue of the preferred mechanism for external delivery, and the need for central co-ordination to ensure inter-service integration and resource reusability, central funding for a pilot service project or projects, perhaps based on a regional group or groups of potential services, would seem advisable in order to ensure that real, rapid and co-ordinated progress is made.

On the question of whether or not institutions will choose to manage services, there is some indication that they may do so in the results of the project's 1998 questionnaire-based survey on University Management of Electronic Resources. Amongst other things, institutions were asked about the importance of the issue, whether universities should manage services, and the current position at the host institution. The following summary of replies shows a generally positive reaction to the idea of managing services:

### Is the issue [of universities managing services] important?

Asked to indicate how important the issue was, all respondents indicated that it was an important issue requiring consideration in either the short term (3), the medium term (6), the long term (1) or as time allows (1). Options indicating that the issue was unimportant or that universities should not manage services were not ticked by any respondents. In summary, 69% thought it an important issue in the short or medium term, 15.5% thought it important in the longer term, and the remaining 15.5% gave no response.

### Should universities manage services?

Asked to indicate whether universities in general should manage internally focused teaching resource services 9 (82%) said yes, 1 don't know and 1 gave no answer. On internal research resource services, 8 (73%) said yes, 2 said no and 1 gave no answer. The corresponding results for external services were 8 (73%) yes, 2 no, 1 no answer (Teaching) and 7 (64%) yes, 3 no, 1 no answer (Research). Most (82%, 91%, 64% and 82% respectively) felt their responses were either equally applicable or particularly applicable to their own institution.

### What is the current position as regards the management of services?

Questions on the "current position at your institution" with regard to the management of services produced the following results:

	In place	Planned	Worth considering	Not worth considering
Local teaching service	2	6	3	0
Local research service	1	2	8	0
External teaching service	1	2	7	1
External research service	0	0	9	2

The management of services question will be pursued further at both lead institutions later in the year. <http://wp269.lib.strath.ac.uk/starweb/dio.html> ????

**Conclusion:** From the perspective of both individual universities and the Funding Councils, there is a strong case in favour of universities managing internally focused services with some externally focused elements, and a significant case in favour of a cautious but positive approach to universities managing services with a full external focus, particularly if the institution concerned is already committed to a significant level of support for network-based distance learning. There is, however, a need for further clarification from the centre in respect of the best or preferred method of handling inter-institutional delivery and associated mechanisms. On the question of whether or not institutions will choose to manage services, the answer is that there is some indication that they may. Of the 11 responding institutions in our survey, 9 said universities in general should manage internally focused teaching services, with internal research, external teaching and external research service figures being 8, 8 and 7 respectively. 9, 10, 7 and 9 respectively included their own institution in this. However, given the significant implications for universities of such a decision as described above, the requirement to resolve the issue of the preferred mechanism for external delivery, and the need for central co-ordination to ensure inter-service integration and resource reusability, central funding for a pilot service project or projects, perhaps based on a regional group or groups of potential services, would seem advisable in order to ensure that real, rapid and co-ordinated progress is made.

### 10. What role should the University Library play?

**Summary:** The Library is well placed to play a key role in service management. Of the 11 universities participating in our survey, 6 saw a central role for the Library, 3 an advisory role, 2 gave no answer.

**Details:** The role of the library in managing access to research and teaching materials created in educational organisations is an extension of its existing role in the management of learned information. Expertise of particular relevance can be found in the organisation of information for efficient and effective retrieval and the management of support services. In the project's survey of the 13 Scottish universities, 11 of whom responded, 6 saw a central role for the Library, 3 an advisory role, 2 gave no answer. It is probable that the question of whether or not the role should be central or advisory will depend on other aspects of the institution's organisational infrastructure.

Specific skills and mechanisms which can be provided by the library include:

- **The provision of a rich access route.** Modern library online catalogues use sophisticated software for information organisation and retrieval, including standardised searching by author, title and subject. The latest systems allow direct connection to networked electronic resources using URLs embedded in the related metadata or catalogue record. Librarians have considerable expertise in the creation of metadata appropriate to the efficient and effective retrieval of information, particularly by subject.
- **The provision of an access route from the Internet.** Modern WebPACs (Web-based Public Access Catalogues) provide access to library metadata from the World-Wide Web with easy-to-use interfaces for search and retrieval. These facilities allow distant students to discover and access teaching materials created by their host institution, and complement electronic mail as a communication channel between actual and potential researchers.
- **Integration of access to printed and electronic resources.** Library catalogues provide uniform access to learned resources irrespective of format. Locally-created electronic resources can be retrieved together with related works published externally in print and electronic formats. This allows resources to be created and used in context with works on the same subject or created by the same person or organisation.
- **Integration of access between different organisations.** The development by libraries of networked catalogues using Z39.50 and other standards will allow the creators of research and teaching materials to discover related packages and activity emanating from other institutions, and provide a marketing channel for their own works. This will encourage inter-organisational co-operation on research and teaching, and foster the wider distribution or recycling of teaching resources.
- **Provision of advice on standards and formats.** Libraries have considerable expertise in the development and use of international standards for bibliographic control, and a good working knowledge of the different formats used in commercial electronic publishing. In conjunction with technical support staff, librarians can advise on metadata standards and publishing formats to maximise compatibility with other resources created now and in the future.
- **Provision of advice on some aspects of quality control.** Librarians are engaged in quality control issues pertaining to traditional learned materials. Issues include the identification of old versions or editions, out-of-date material, and material which is known to contain erroneous data. Library expertise can assist the creators of teaching packages in keeping the content up-to-date and relevant. Libraries also have considerable knowledge of the problems encountered by general audiences in the use of materials created for local or specific users, and can provide advice on writing for a wider range of enquirers, including those with differing language, social and cultural requirements.
- **Provision of advice on, and operation of, maintenance procedures.** Experience gained with traditional library materials and the operation of existing routine maintenance procedures such as shelf- and stock-checking can be used to ensure the accuracy of information about the location and availability of locally-created electronic materials.

- **Provision of advice on legal issues.** Librarians have considerable expertise in the relevance of copyright, obscenity, and data protection law to the publication of materials.
- **Provision of current awareness and bespoke identification of relevant external resources and developments.** Librarians can use existing information retrieval skills and current awareness procedures and services to keep the creators of teaching and research materials informed of general developments, and to assist the writers of new materials to identify relevant resources from outside of the organisation.
- **Operation of cost recovery mechanisms.** Existing library infrastructure and procedures for fines, fees and sales can be used to handle payments by external users of locally-created materials.
- **Operation of authentication mechanisms.** Existing library expertise in managing licenses, passwords and other devices for authenticating the right to access and use networked datasets can be transferred to locally networked resources.
- **General academic liaison on information needs.** Existing library infrastructure and procedures to ensure proper and relevant support for the information needs of teachers and researchers can be extended to monitoring the systems for managing locally-created resources, providing advice to academic departments, and the discovery of existing materials.
- **Provision of a neutral, objective focus and support.** Libraries tend to serve their parent institution as a whole, and avoid focusing on the needs of one category of user at the expense of another. This neutral stance can be invaluable in overcoming problems arising from the divergent aims, strategies, resources and levels of activity between different academic departments and units in creating and providing teaching and research resources.

This is not to suggest that only the Library will have a key role. Expertise is also required in technical and marketing areas, which in many organisations will be available from staff engaged in IT and computing support, media and publishing, and enterprise and income services. However, it is likely that the library will already have worked closely with these staff in developing access to commercially-published electronic teaching and research materials.

**Conclusion:** The Library is well placed to play a key role in service management. Of the 11 universities participating in our survey, 6 saw a central role for the Library, 3 an advisory role, 2 gave no answer

## 11. Is there an ideal service design model?

**Summary:** different service design models may be appropriate at different institutions, but the basic requirements are the same regardless of the model favoured. . Illustrations of centralised and distributed models are on the project web-site under 'demonstrators' and are commented on below. A centralised model may be more suited to smaller institutions, a distributed model to larger institutions, although the complexity of the latter model is also a consideration

**Details:** depending on the nature and organisational infrastructure of the institution, the ideal service design model may be a technically, operationally and organisationally centralised one, a distributed one with devolved responsibilities, or somewhere in between. In general, a centralised model may be more appropriate to smaller institutions and a distributed model more appropriate to larger institutions, but there will be other considerations, for example, the fact that the distributed model is more complex to operate, or that the centralised model may (depending upon other circumstances) pre-suppose converged academic service departments. The project demonstrators (<http://wp269.lib.strath.ac.uk:5050/Cat2/demo.html>) illustrate both a centralised model (Napier University) and a distributed one (Strathclyde University). In the Napier model, the Library plays a central role and the service database is held on a central Library server and is maintained and run by the Library. In the Strathclyde model, the Library plays an advisory role through the Digital Information Office (see remit at <http://wp269.lib.strath.ac.uk/starweb/dio.html> (username: guest password: temporary), resources are catalogued on departmental servers by their authors using Dublin Core metadata embedded in the resources themselves, indexed using a metadata harvester, and only placed on a central database to allow inter-service integration via Z39.50. A list of the basic requirements that any service design model must meet, whether it is distributed, centralised, or somewhere in between, is provided at section 8 above. The two models investigated by the project are essentially the same in that each must meet these basic requirements. They differ in that whilst in the Napier model the requirements are met centrally, in the Strathclyde model they are met in the technically, operationally and organisationally distributed and devolved fashion described below:

### **STAR: A Distributed and Devolved Service Illustration**

The STAR (Strathclyde Authored Resources) site is designed as an embryonic - but operational and developing - service where the function is to deliver quality locally created resources to academics and other users within, and beyond, Strathclyde University. N.B. External users permitted only where strategic or commercial agreements exist.

In addition to providing access to these resources, guidance in their use, and links to other local and external information and resource provision services, the STAR pages also aim to provide university members with guidance and advice on a range of associated issues, including: resource design standards, resource formats, metadata standards, quality and currency issues, resource creation incentives, university policy on intellectual property rights, service management responsibilities, and related aspects of the institutional information strategy - see site map pages at URL <http://wp269.lib.strath.ac.uk/starweb/sitemap.html>.

### **Key STAR Pages Overview:**

#### **STAR Registration Page**

STAR service authentication page. It is assumed that universities will only allow access to their resources to external users where commercial or strategic agreements exist.

#### **Digital Information Office**

In the distributed STAR model, the advisory role of the library is envisaged as being carried out through the Digital Information Office. To some extent, the role envisaged is one of catalyst. The DIO is the division of information services based within the university library and is responsible, either directly or in an advisory capacity, for the professional management of both locally created and purchased/subscribed-to electronic teaching and research resources. Other key roles include a metadata

repository and related standards and control, IPR guidelines, and training departmental information managers.

### **Guidelines for STAR Authors**

The provision of such standards and guidelines is a key part of service management. Their provision and maintenance in the STAR model is the responsibility of the DIO. They include information on incentives to encourage resource creation; guidelines on IPR; quality design; value assessment; cataloguing and metadata; archiving; training; and departmental information strategies.

### **STAR Author's Metadata Guide**

Aims to encourage authors to embed metadata in their electronic resources and to ensure adherence to standards in resource description (Dublin Core and IMS Metadata standards are currently recommended). Also provides access to metadata creation aids (e.g. DCDot from UKOLN). The metadata is gathered through the use of the Harvest search engine, and then made available via the STAR web catalogue.

### **STAR Catalogue Page**

Explains the current and proposed future relationships between metadata Harvester and the STAR catalogue database - with access to both demonstrators and, consequently, illustrations of representative local electronic teaching and research resources. (See also inter-service integration below).

### **Guidelines for University E-resource Service Standards**

By adhering to these standards, university e-resource services such as STAR aim to ensure quality, currency, and high standards of service to users, through the provision and maintenance of appropriate standards and guidelines. A supplementary aim is facilitate inter-service integration through Z39.50. The guidelines cover:

- The reasons for managing e-resource services
- The reasons for having standards
- Resource creation incentives
- IPR Guidelines
- Resource design issues
- Resource maintenance
- Quality assessment and control
- Value assessment
- Service status of resource
- Service design
- Service maintenance
- Service administration
- User help and training
- Staffing-rules-training
- Digital information office
- Inter-institutional co-operation
- Security issues
- Standards and guidelines for authors
- Digitisation policy
- Editorial board
- Current awareness
- Role of the library
- Mission Statement

### **STAR Intellectual Property Guidelines**

This document provides guidelines to protect against the unnecessary transfer of rights to publishers and outlines procedures for determining and monitoring value.

### **Inter-service Co-operation**

It is assumed that there is value in different institutions choosing to manage services co-operatively. At Strathclyde, this is illustrated through co-operation with other ClydeNet institutions within the context of Clyde Virtual University and, in particular, Clyde Virtual University Library. It is assumed that co-operating services will agree on mutually acceptable guidelines such as those described in outline above.

### **Inter-service Integration**

If universities in general are to manage services to deliver resources to clients outwith the university, then inter-service integration is an issue. In the STAR model, it is assumed that integration of catalogues will be based on agreed metadata standards and WWW/Z39.50, hence the inclusion of the STAR catalogue in the Scotland-wide CAIRNS service:

Gateway: <http://cairns.lib.strath.ac.uk>

Web-site: <http://cairns.lib.gla.ac.uk>

Integration of browse functions may be possible in the longer term based on underlying search mechanisms.

**Conclusion:** different service design models may be appropriate at different institutions, but the basic requirements are the same regardless of the model favoured. Illustrations of centralised and distributed models are on the project web-site under 'demonstrators'. A centralised model may be more suited to smaller institutions, a distributed model to larger institutions, although the complexity of the latter model is also a consideration

## **12. Moving to a resource management and service-oriented culture - recommendations to JISC on external funding and other actions, and to universities**

**Summary:** A good case can be made for the view that universities should act on the issue of managing services themselves, regardless of the position taken on external funding by JISC, and there are indications that some institutions at least may already be doing so. However, funding to help 'kick-start' and direct service management activity may be the only way to ensure rapid, co-ordinated development, is essential to ensure inter-service integration and resource re-usability, and is needed to resolve the external delivery question. It may, moreover, bring valuable returns. Rather than focusing solely on funding one-off resource developments that cease to be viable when funding ends, JISC could help shape an environment in which resources are created as part of the normal work of researchers and teachers - thereby both increasing development and accessibility levels and ensuring long-term viability.

### **Details:**

#### **Background**

Project results suggest that quality electronic teaching and research resources, of significant value or potential value to academics, universities, and the UK Higher Education community in general, are being created at high levels in all types of university. However, since they are not being created with the aim of wider access and use, they are mostly not networked, difficult to find when they are, and – at least in respect of teaching resources – unlikely to be suitable for reuse by other institutions or even other departments in the host institution. University management of services offering access to these resources within and beyond the host institution would greatly improve the value that both the host institution itself and UK Higher Education as a whole obtains from this material and the effort that goes into creating it - particularly if local efforts were co-ordinated nationally to ensure resource design standardisation and service interoperability. The question of how this might best be achieved is therefore of interest.

#### **The Case for institution-led development, without additional funding**

Looking at the question from the point of view both of the institutions themselves and from that of JISC and the Funding Councils, a case can be made for saying that universities should take responsibility for the development of both institutional and extra-institutional services entirely upon themselves:

- The potential value of locally-created resources to the host university is high, and both the resources themselves, and the effort that the institution and its staff puts into creating them, are under-exploited at present. Managing services should therefore bring worthwhile returns.
- The case for universities managing at least internal services with a limited external remit is strong, regardless of whether or not external funding is available
- There are other good reasons for running internal services with some externally focused elements – for example, the need to support distance learners, or to protect valuable electronic material available on the university web-site
- There is some evidence from project survey results to suggest that, in the long term, universities will be able to manage services within existing staffing levels, because of the efforts already being put into resource creation and institutional and departmental web-site maintenance
- Despite the need for further deliberation on external delivery mechanisms, and the need for additional hardware and other support to deliver external services, there is a strong case in favour of institutions also undertaking full external service provision. In the early stages, there may not be not much difference in outlay between running an internal service with a limited external remit and also running an embryonic external service, so small-scale experiments with minimal implications as regards cost may be attractive, particularly given the possibility that an external service may eventually help pay for an internal service, and the fact that managing a full external service would ensure that the institution would benefit in full from any revenues earned
- As indicated in section 9 above, project surveys show that universities have a generally positive attitude to the idea of managing services and some may have already begun implementing services or may have plans to do so, suggesting perhaps that, on the one hand, action from JISC is not

required to ensure progress in this area, and on the other, that universities who do not take action in this area sooner rather than later risk finding themselves at a strategic disadvantage in relation to some of their competitors

In recognition of these points, it is recommended:

- (1) That regardless of action from JISC and the Funding Councils, individual universities should examine the issues, and take a local decision on whether or not to manage services as soon as possible, bearing in mind that such locally-created electronic materials are potentially of significant commercial and strategic value to the institution, and that failure to act sooner rather than later may leave some institutions at a strategic, and possibly, a commercial disadvantage**
- (2) That JISC and the Funding Councils should encourage them to do so.**

If institutions decide that they will manage services, then it is further recommended:

- (3) That academic staff should benefit if their institution benefits commercially or strategically from the resources they create. This will not only provide an incentive for the ongoing creation of such resources but will also compensate for any perceived or actual loss of control in respect of intellectual property rights brought about by action in this area taken by the institution in order to protect its interests,**
- (4) That local service management efforts should be co-ordinated nationally to ensure both the cross-service interoperability required to ensure reliable UK-wide access, and the resource design standardisation, required to ensure wider usability of resources (particularly teaching resources). This might be done through encouraging discussion on the issue of managing services at the highest level within universities and also within associated inter-institutional bodies such as SCONUL and UCISA**
- (5) That the University Library should take a key role in service and inter-service management. Library organisations such as SCONUL and SCURL should develop agreed policies on Library roles and contribute to inter-service standards. Libraries have a range of skills necessary for good service design and management and a good track record on the introduction and maintenance of the kinds of standards required to ensure service integration and resource re-usability.**

On the question of external services, Universities may wish to wait for JISC to clarify matters as regards the best or preferred external delivery mechanism or mechanisms, but should also note that depending on their specific circumstances, universities introducing local institutional services may find that setting up small experimental extra-institutional services involves little additional effort over and above that required to run internal services and that such experiments may help clarify whether or not a full external service is worth considering..

### **The case for JISC-led development and external funding**

Although, as indicated above, a case can be made for the view that JISC could and should simply encourage universities to take responsibility for the development of services entirely upon themselves there are a number of issues that JISC and the Funding Councils should consider in respect of encouraging or ensuring actual developments in this area:

- The implications of setting up even local services are significant (see section 8). Institutions will almost certainly have to re-organise the roles of some existing staff and re-arrange associated structures. They will also have to agree and develop associated policies and strategies. This will take time and effort and may either not happen at all or happen very slowly and in an unco-ordinated and badly planned way without 'kick-start' funding to supply the short-term staffing resources to allow the management and implementation of change.
- The best method of delivering resources beyond the local institution is open to question, action from the centre is required to clarify the best or preferred approach, and it is likely that some, if not all, institutions will be unwilling to commit significant resources to external services without such clarification

- Institutions who do move in the direction of changes are not likely to be concerned sufficiently with national and regional issues such as resource re-usability and inter-service integration issues (for example Z39.50, metadata standards, browse access integration, common user interface, common support information content and layout and so on)
- If resource re-usability and inter-service integration are assured then the efforts of staff at individual institutions will be of value to the whole U.K. Higher Education community and the result integrated database and associated collection of resource will be a valuable commodity capable of attracting revenue to the U.K. and to U.K. institutions. If re-usability and integration are not assured, the end result will be of much lower value, in both a strategic and a commercial sense.
- Service management can play a potentially vital role in fostering an 'information culture' in this key area of university activity – effectively forcing the pace on the practical implementation of an institutional information strategy and thereby transforming the efficiency with which the university carries out its mission-critical functions of teaching and research

In short, although it is possible that universities may make progress without external help, funding to help 'kick-start' and direct service management activity may be the only way to ensure rapid, co-ordinated development, is essential to ensure inter-service integration and resource re-usability, and is needed to identify the best or preferred method for delivering resources beyond the host institution. Accordingly, it is further recommended:

- (6) That JISC or the individual Funding Councils should consider funding a project or projects that will stimulate the changes required in individual universities, investigate the various options for external delivery beyond the host institution with a view to recommending the best or preferred approach, establish standards in respect of both inter-service integration and interoperability and resource design, and direct local development to ensure rapid, co-ordinated development.

A national agency to develop and provide guidance and advice on standards, to provide various kinds of staff training, to investigate and make recommendations on the various external delivery options, and to disseminate materials aimed at stimulating local service development through informing institutions of the possible strategic or commercial advantages, would be one option. Another would be to offer funding to groups of institutions seeking to set up inter-institutional services (similar to the regional 'clumps' projects), and give them a similar remit. The advantage of the latter proposal is that it offers greater assurance of the active involvement of institutions.

**Conclusion:** A good case can be made for the view that universities should act on the issue of managing services themselves, regardless of the position taken on external funding by JISC, and there are indications that some institutions at least may already be doing so. However, funding to help 'kick-start' and direct service management activity may be the only way to ensure rapid, co-ordinated development, is essential to ensure inter-service integration and resource re-usability, and is needed to resolve the external delivery question. It may, moreover, bring valuable returns. Rather than focusing solely on funding one-off resource developments that cease to be viable when funding ends, JISC could help shape an environment in which resources are created as part of the normal work of researchers and teachers - thereby both increasing development and accessibility levels and ensuring long-term viability.

## **Appendix A: How should individual institutions examine the managing services issue?**

### **Suggested approach to tackling the issues locally**

1. Appoint a group of representative senior staff to examine the issues. Include representatives from all faculties, central services (e.g. Computer Centre, Library), administration, and other relevant agencies within the institution. An existing Information Strategy Advisory Group or I.T. Committee may be an appropriate forum.
2. If necessary, suggest that each member of the group familiarise themselves with the issues individually, either by reading this report or by working through each section of the Issues section of the CATRIONA II web-site (<http://wp269.lib.strath.ac.uk:5050/Cat2/issues.html>). Thus becoming familiar with the key questions, survey questionnaires, survey results, service demonstrators, and associated institutional policy, strategy, organisational infrastructure and service design issues.
3. Meet to examine and discuss the CATRIONA II:
  - Resource creation survey results
  - Service management intentions survey results
  - Demonstration services

Decide on the basis of the examination and discussion whether to set up a small subgroup to examine the issues in more detail with a view to deciding whether or not to manage a service to deliver locally-created resources to desktops both within and beyond the university.

4. Use the CATRIONA II Resource Creation Questionnaire - or an adapted version of the document – to conduct a local survey. Take particular note of the resources followed in the CATRIONA II surveys, as described in the Full Report and Conclusions: Electronic Research and Teaching Resource Creation at Six Scottish Universities.
5. If resources are being created locally at significant levels, proceed with the process outlined \*below. If resources are not being created locally at significant levels, consider whether this is a potential matter for concern given the results of the CATRIONA II Resource Creation Surveys at other institutions. If the lack of resource creation is a cause for concern, examine possible solutions in the context of the results of Question 9 of the Resource Creation Survey, which considers a range of possible incentives to stimulate resource creation among academic staff. Any action taken to encourage an increased level of resource creation should then be evaluated over a suitable time-scale. If the lack of resource creation is not a cause for concern, end the investigation here. If possible, please let us know of your decision and the reasons for it. Any feedback will be treated in the strictest confidence. Should you reconsider the issue in a few years time?
6. Re-examine the results of the CATRIONA II Surveys on University Intentions Regarding the Management of Services, then utilise the associated questionnaire - or an adapted version of the document - to establish an initial University position with regard to
  - The management of local and external services issue
  - Implications for institutional policy, strategy, organisational infrastructure and approaches to resource delivery and maintenance
  - The role of the University Library with regard to service provision, resource creation and associated areas.
7. If the initial decision is against managing a service, report back to the main committee. If the initial position is for managing a service, make a recommendation for action to the main committee taking into account the probable costs, benefits and strategic importance of the issue or issues.
8. If the decision to proceed is taken - and the necessary resources are allocated - utilise the CATRIONA II demonstrator pages as a guide to policy, strategy, organisational infrastructure and

service design issues. Also examine the pages on Questions to Consider and on Guidelines for Best Practice.

## **Questions to Consider**

### **Resource Creation (by academic staff)**

- Are academic staff engaged in the creation of quality electronic teaching and research resources?
- Are such resources of potential value within and/or outwith the institution?
- Are existing resources stored in a useable format?
- To what extent are resources created by staff accessible to others within/outwith the institution?
- Is the computing/networking infrastructure of the institution capable of supporting/facilitating increased access to existing resources?
- Is the institution willing to provide incentives to academic staff to stimulate creation of electronic teaching and research resources?
- What kinds of incentives are most likely to increase the creation of electronic resources among academic staff?
- How important to academic staff, themselves, the possibility of increased accessibility to electronic resources?
- If increased accessibility is important, what kind of electronic resources would they most like to have access to?
- Is the institution aware of the legal issues (e.g. intellectual property rights, accountability, defamation, data protection, etc.) of publishing over a network?
- Are academic staff aware of the copyright implications of providing increased access to electronic resources?

### **Service Management (of resources by the institution)**

- Does the institution regard the management of services to deliver electronic resources to be an important issue, worthy of further consideration?
- What are the potential operational, strategic and commercial benefits of service management?
- What are the possible disadvantages associated with providing a service management to widen access to electronic resources?
- What are the likely implications for university policy and organisational infrastructure?
- If the issue of service management is important, what is the proposed time-scale for such consideration?
- What institutional bodies would be responsible for developing a plan to create a service management facility?
- Would the institution manage services based on a centralised or distributed model, or a combination of both?
- Are there possible advantages/synergies in developing a service in conjunction with external institutions/agencies?
- What resources (financial and personnel) would be made available for managing services?
- Who would be responsible for:
  - formulating resource creation guidelines?
  - assessing the quality and value of resources?
  - co-ordinating effort to minimise duplication?
  - monitoring the currency and relevance of content?
  - dealing with disputes over copyright/legal issues?
  - ensuring effective resource indexing and retrieval?
  - implementing secure access control mechanisms?

setting up a reliable archiving policy?  
providing technical help and support?  
promoting the service to a wider audience?

??? Add Guidelines for best practice: IPR and Formats

## **Appendix B: Glossary**

### **CAIRNS**

*Co-operative Academic Information Resource Networks Scotland*

A JISC/HEFC-funded research project based at Glasgow and Strathclyde universities aimed at integrating Z39.50-compliant catalogues across Scotland into a functional and user-adaptive test-bed service.

### **CAL courseware**

*Computer-Assisted Learning Courseware*

Learning materials created and/or delivered by a computer.

### **Chi Square**

Chi-square is a statistical test commonly used to compare observed data with data that would be expected to be obtained according to a specific hypothesis.

### **CVU**

*Clyde Virtual University*

An evolving service funded by the Scottish Higher Education Funding Council through its Use of the MANs Initiative. CVU is dedicated to the delivery of Internet-based multimedia learning materials to students at institutions connected to the ClydeNet MAN. The project is led by Strathclyde University in collaboration with four other institutions.

### **DC**

*Dublin Core*

A metadata element set intended to facilitate discovery of electronic resources. Originally developed for author-generated description of Web resources, it is now popular with formal resource description communities such as museums, libraries, government agencies, and commercial organisations.

### **HTML**

*Hypertext Mark-up Language*

The main document format used for publishing data on the World Wide Web using the Hypertext Transfer Protocol.

### **Information Culture**

See page 27 of the report for a detailed definition.

### **IPR**

*Intellectual Property Rights*

The general term for a collection of legal and moral rights aimed at protecting various aspects including patents, designs, trademarks and copyright

### **JISC**

*Joint Information Systems Committee*

An initiative funded by the UK Higher Education funding councils to enable the cost effective exploitation of information systems and to provide a high quality national network infrastructure for the UK Higher Education and research councils communities.

### **LDAP**

*Lightweight Directory Access Protocol*

A client-server protocol for accessing a directory service. It was initially used as a front-end to X.500, but can also be used with stand-alone and other kinds of directory servers.

### **Metadata**

Metadata is data about. In terms of Web documents, metadata tags can be included in the document's head to describe, for example, the author, keywords, language, etc. These embedded tags can then be used by indexing and search agents as a means of providing users with enhanced document retrieval mechanisms.

### **Metadata Harvester**

An indexing tool capable of retrieving metadata from a number of protocols for storage in a searchable index. Harvest runs on all popular Unix platforms.

#### **RAE**

##### *Research Assessment Exercise*

An evaluation programme implemented by the Higher Education funding councils to assess the quality of an institution's research outputs for the purposes of deciding research funding allocations.

#### **RDN**

##### *Resource Discovery Network*

A proposed service arising from JISC's Electronic Libraries programme to develop and extend subject-based information gateways. The resulting network will provide users with access to high-quality resources covering the entire subject range applicable to UK Higher Education.

#### **SCONUL**

##### *Standing Conference of National and University Libraries*

A group made up of the universities and national libraries of the UK and Ireland to promote and advance the science and practice of librarianship, and to improve the standards of its member libraries

#### **SCURL**

##### *Scottish Confederation of University Research Libraries*

#### **Statistically Significant**

See page 13 of the report for a detailed definition.

#### **TLTP**

##### *Teaching and Learning Technology Programme*

A £7.5M Universities Funding Council-funded project with the aim of making teaching and learning more productive and efficient by harnessing modern technology.

#### **TQA**

##### *Teaching Quality Assessment*

An evaluation programme implemented by the Higher Education funding councils to allow assessment of the quality of learning and teaching at the institutions they fund.

#### **UCISA**

##### *Universities and Colleges Information Systems Association*

A group formed to represent UK Higher Education in the provision and development of academic, management and administrative information systems, and providing a network of contacts, together with a powerful lobbying voice.

#### **UKOLN**

##### *United Kingdom Office for Library and Information Networking*

A national centre for support in network information management in the library and information communities: providing awareness, research and information services and based at Bath University.

#### **WebPAC**

##### *Web Public Access Catalogue*

Server software designed to enable library systems users to access Web browsers form a standard library public access catalogue interface.

#### **WHOIS++**

A simple text-based query protocol which can be used to construct a distributed directory for white pages information.

#### **Z39.50**

An networked information retrieval protocol specification to define the procedures used by computers to interact with one another.