

**Report on ICT survey:**  
**The uptake and use of Information and Communication  
Technologies by Lancaster University researchers:  
Faculty Analysis**

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## ***Table of Contents***

List of Tables	3
1. Executive Summary	4
2. Introduction	5
3. Sample	6
4. Results	8
Resource Discovery and Reference Management	9
Collaboration	10
Publishing	13
5. Conclusion	15

## **List of Tables**

Table 3.1 Response Rate by Faculty .....	7
Table 3.2 Comparison between permanent .....	7
Table 4.1 Distribution of discovery methods for academic resources (%).....	9
Table 4.2 Distribution of methods used to manage references (%) .....	9
Table 4.3 Distribution of number of projects, by faculty (%).....	10
Table 4.4 Primary project's use of ICT (%) .....	10
Table 4.5 Frequency of face to face meetings with colleagues (%) .....	11
Table 4.6 Frequency of travel to meet colleagues (%).....	11
Table 4.7 Frequency of telephoning colleagues (%) .....	12
Table 4.8 Distribution of other technologies to collaborate with colleagues (%)	12
Table 4.9 Awareness and Use of Access Grid Nodes (AGN) by Faculty .....	12
Table 4.10 Distribution of academics by single versus co-authored (%).....	13
Table 4.11 Distribution of methods of managing co-authorship process.....	14
Table 4.12 Distribution of blog writers (%) .....	14
Table 4.13 Distribution of blog subscribers/ readers (%) .....	14

## 1. *Executive Summary*

- This is a report on a survey of the uptake and use of a variety of ICT tools and technologies by research staff, and research students, at Lancaster University.
- The survey was carried out from November to December 2007.
- There were a total of 292 responses, 202 were from staff, the remaining responses were from research students.
- Each faculty was well represented, with response rates of between 21% and 26% of research active staff.
- The age distribution of the sample was younger than comparable data from HEFCE, although each age group was represented.
- Reading was the most important source of academic references, although a variety of ICT were also used across faculties.
- Half of academics use specialist software to manage references, researchers in Arts and Social Sciences were more likely to cut and paste and less likely to use paper based methods.
- Approximately 70% of academics work on 1 or 2 projects, but 9% (Management School) and 11% (Arts and Social Sciences) work on 5 or more.
- Science and Technology projects were most likely to have a wiki (19%) and email list (36%), Management School projects were most likely to have a blog (9%).
- 43% of researchers in Management School have used instant messaging to collaborate with colleagues, telephone conferencing is used by approximately 20% of academics, with video conferencing used by between 5% (Arts and Social Sciences) and 9% (Management School).
- Access Grid Nodes are known about by approximately 20% of researchers, and most used by the Management School (13%).
- Management School are most likely to write blogs related to their research (9%) but least likely to read blogs (11%). Arts and Social Science researchers were most likely to read research related blogs (27%).

### Conclusions

- Researchers use a wide variety of tools in their work
- Many of these tools were not specifically developed for academic use, and take up of those that were (e.g. Access Grid Nodes) is partial.
- Any support for research staff has to recognise this and be flexible and individualised
- There is potential for and interest in increasing the efficiency of collaborative research, suggesting a need for training to encourage the use of new technologies by research and academic staff

## 2. Introduction

Recent developments in computing and communications technology have been associated with widespread changes across society. Within a competitive global knowledge economy government agencies have been keen to harness these changes to enhance economic competitiveness, as in the Lisbon Agreement where in 2000, EU heads of state and government agreed to the goal of making the EU "the most competitive and dynamic knowledge-based economy in the world"<sup>1</sup>. Within academic research this has resulted in significant investment in enhancing science (e.g. in 2000 £120 mn was allocated specifically to e-science projects in the UK Governments Comprehensive Spending Review<sup>2</sup>).

The development of enhanced science (e-Science) was supported through large scale investment at the regional (e.g. NW Grid<sup>3</sup>), national (NGS<sup>4</sup>) and European level (EGEE<sup>5</sup>) and focussed on particular projects such as the Large Hadron Collider at CERN<sup>6</sup>.

The impact of these developments has started to spread from these core, computationally based fields into other domains across the social sciences and humanities, such that within the UK at least there is starting to be some talk and funding of e-Research<sup>7</sup>.

Along with this internal driver for change there is the relatively recent rise of the term "web 2.0" which amongst other things is characterised as "[having] embraced the power of the web to harness collective intelligence"<sup>8</sup> which along with changing the nature of the web, and the way that many of us communicate and conduct commerce, also has the opportunity to enhance the academic research process.

The impact of web 2.0 on academic research can be seen in the use of blogs and wikis by researchers to facilitate less formal means of academic communication.

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<sup>1</sup> <http://www.euractiv.com/en/future-eu/lisbon-agenda/article-117510>

<sup>2</sup> <http://www.rcuk.ac.uk/escience/news/pilotproj.htm> It should probably be noted that this new wave of spending has not been sustained, with substantial cuts made in future STFC budgets which might impact on the future of the e-Science programme.

<sup>3</sup> <http://www.nw-grid.ac.uk/>

<sup>4</sup> <http://www.grid-support.ac.uk/>

<sup>5</sup> <http://public.eu-egee.org/>

<sup>6</sup> <http://lhc.web.cern.ch/lhc/>

<sup>7</sup> <http://www.jisc.ac.uk/whatwedo/themes/eresearch.aspx>

<sup>8</sup> <http://www.oreillynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html?page=2>

It could be characterised as being more peer-to-peer, or horizontal, in nature than previous web based technologies. As an example, academic publishing responded to the internet by making journal articles available, through subscription, online alongside traditional paper based output. The move towards less formal, 'grey' literature such as blogs, and freely accessible working papers, might be an example of some of the challenges that a 'web 2.0' approach brings to this area.

Therefore, in trying to understand the use of Information and Communication Technologies by academic researchers there are two compelling technologically determinant narratives, that of e-Research and web 2.0. This survey was intending to take a snapshot of academic researchers at Lancaster University to assess the extent to which either of these narratives is useful in understanding their research practice. In addition to this, I collected data about the individual researchers such as their faculty and age so that I could investigate whether this had a significant effect on their take up of ICT

Broadly speaking the methods and tools used in research practice have been classified as traditional, web 1 and web 2. At this stage this classification is very tentative, and whilst loosely based on chronological development there is not intended to be an implied progression from one to another. I have classified tools and methods as 'traditional', when they do not rely on computers at all, 'web 1' as broadly speaking early, vertical applications and approaches, and web 2 as more recent, horizontal approaches.

This survey was conducted from November 9th until December 12<sup>th</sup> 2007. It was carried out online using the survey software SNAP<sup>9</sup> and a project website<sup>10</sup>. The survey was publicised through a weekly internal news email (LU Text), an e-newsletter sent to all contract research staff, and departmental and faculty email lists. An iPod was offered as an incentive to respondents.

### **3. Sample**

The population I was primarily interested in was research active academic staff and students. There is a population of approximately<sup>11</sup> 900 research active academic staff. The figures from each faculty were kindly given to me on request

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<sup>9</sup> <http://www.snapsurveys.com/>

<sup>10</sup> <http://redress.lancs.ac.uk/survey>

<sup>11</sup> An internal report, [http://www.lancs.ac.uk/facilities/pdf/ar\\_44-47.pdf](http://www.lancs.ac.uk/facilities/pdf/ar_44-47.pdf) gives a figure of 1040 FTE teaching and research staff, of whom 92% (957) are research active. The discrepancy between this figure and the totals given for the faculties (861) demonstrate some of the problems in defining 'research active academic staff'.

from the faculty administrators. This includes over 300 Contract Research Staff, usually Postdoctoral Research Associates employed on fixed term contracts.

The staff responses from each faculty are given in table 2.1 below. The first thing to note is the variation in faculty size, with over half (55%) of all academic staff based in the Faculty of Science and Technology, 29% in Arts and Social Sciences and 16% in the Management School.

**Table 3.1 Response Rate by Faculty**

Faculty	Research Staff	Responses	Response Rate
Science & Technology (FST)	470	105	22.3
Arts & Social Sciences (FASS)	250	52	20.8
Management School (MS)	141	37	26.2
Total	861	202	23.5

It was not possible for me to obtain figures for the age profile of academic staff at the university, but a recent HEFCE report<sup>12</sup> provides some information about the age profile of permanent academic staff across the sector, and table 1.2 compares this data with my own.

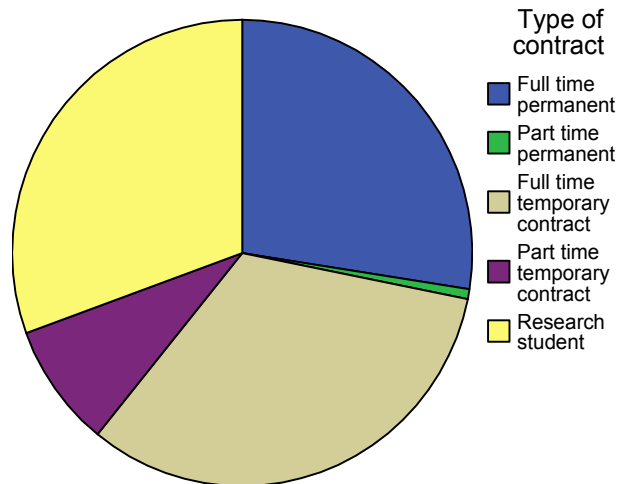
**Table 3.2 Comparison between permanent staff subsample and HEFCE population**

Age group	HEFCE 2005-6 (%)	Subsample (%) (n=79)
Below 30	2	19
30-39	21	29
40-49	35	28
50-59	34	18
60 +	7	6

We can see from this that the subsample is skewed towards younger permanent members of staff and this could be a result of the method used to recruit respondents and the choice of an Apple iPod as incentive, both of which might be expected to favour younger academics.

<sup>12</sup> "Staff employed at HEFCE-funded HEIs: update" 2007 HEFCE

Permanent staff accounted for approximately half of all responses from staff, with a similar number of research students responding as in figure 1 to the right, with a negligible number of permanent part time members of staff responding. The fairly even split between permanent and temporary staff is broadly representative of academic staff at the university as a whole.



I also publicised the survey to an emailing list for postgraduate students, specifying (and eliminating where necessary) research students such as PhDs. I received a further 92 responses from this group, which are excluded from most of the analyses at this stage, unless specifically mentioned. This data will be used when analysing the impact of age and career stage on the uptake of ICTs.

In summary I was pleased with the overall response rate to the survey, which was broadly representative across faculties and contract type, but overrepresented younger members of staff.

#### **4. Results**

The questions in the survey were separated into sub sections that approximated what I felt would be key aspects of the research process. I tried to use the piloting process of the survey design stage to moderate any social science bias there might have been in my assumptions about the research process due to my backgrounds in Economics and Sociology.

There were however a couple of comments from respondents which suggest that I was not entirely successful with this, and failed to take into account some of the specificities of the scientific research process. There will inevitably be problems and compromises in trying to carry out a survey from such a wide range of research disciplines and practices.

For each section I have presented some of the key results, cross tabulated with Faculty. Future analysis will look at other individual factors such as age, and years in academic and their effect on the uptake of ICT in the research process.

## a. Resource Discovery and Reference Management

This section of the survey was concerned with how researchers discovered relevant resources and managed references relating to the resources found. For all of these questions I gave a list of methods ranging from might be thought of as traditional methods through to more recent methods that may or may not be thought of a web 2.0.

**Table 4.1 Distribution of discovery methods for relevant academic resources (%)**

Faculty	Traditional		Web 1				Web 2		
	Reading	Colleagues	Database	Web search	Journal notifications	e-mail list	Google scholar	Wikipedia	RSS
FST	88	77	77	63	42	26	53	26	5
FASS	95	88	94	72	53	42	66	31	11
MS	91	78	81	59	57	28	57	12	3

The first thing to note from the table above is that there was widespread use of a variety of tools for this key academic task, the survey accepted multiple answers from respondents. This makes a comparison between faculties difficult as, for example, researchers in FASS were more likely to use every method for resource discovery than FST.

We can see that there is some variation across the faculties. Whereas the most popular method across the faculties was to discover relevant resources through reading there was some significant variation in the use of other methods.

Researchers in the FST were equally as likely to learn of new resources through colleagues or a database search (77%) but used these methods less than the other two faculties.

**Table 4.2 Distribution of methods used to manage references (%)**

Faculty	Software	Cut and paste	Custom db	Paper methods
FST	50	34	20	40
FASS	53	51	12	24
MS	50	33	14	38

Once again we can see in the table above that a variety of methods are used to manage academic references although the level of use of specialist software packages is broadly similar across faculties (this includes Bibtex which was mentioned as 'other' by a number of researchers in FST and MS). Researchers in FASS were more likely to use cut and paste from previous documents than the

other two faculties. Researchers in FST were more likely than those in the other two to build a custom database, and this faculty and the MS were more likely to use paper based methods than FASS.

## b. Collaboration

Table 3.3 below shows the distribution in the number of projects that academics were involved in across faculties. Both FASS and MS researchers were most likely to be involved in one project (39.8% and 37.9%) with FST researchers most likely to be involved in two projects (37%). Researchers in FASS were nearly twice as likely to be involved in five or more projects than FST staff.

**Table 4.3 Distribution of number of projects, by faculty (%)**

Faculty	1	2	3	4	5+
FST	29.7	37.0	22.5	5.1	5.8
FASS	39.8	30.1	16.9	2.4	10.8
MS	37.9	25.9	20.7	6.9	8.6

Respondents were then asked whether the project “to which they devote the most time” uses a variety of ICTs as in table 4.4. The purpose of this question was to see which of a list of ICT technologies were adopted by the respondent’s main projects to help with co-ordination and communication.

There is a striking contrast between faculties in table 4.4, in that science and technology projects are considerably more likely to use a wiki than the other faculties. Whilst web pages and email lists were relatively common, the use of project blogs was low, with the highest usage in the Management School (see tables 4.11 and 4.12).

**Table 4.4 Primary project’s use of ICT (%)**

Faculty	Web page	Wiki	e-mail list	Blog
FST	41	19	36	2
FASS	36	4	32	6
MS	36	9	28	9

The following tables chart the nature of interactions with three or more colleagues. This will include work on the main project as above, but is not limited to them. We can see that in each faculty there is a significant proportion who have no such meetings, with the most likely frequency as less than weekly.

If we combine the first two columns ( 'never' and 'less than weekly') we can see that researchers in FASS are most likely to have meetings less than weekly (65.9%), followed by MS and FST (57.9% and 52.2%). This suggests that nearly half of the researchers in FST meet their colleagues 1-2 a week or more, compared to just under a third in FASS.

**Table 4.5 Frequency of face to face meetings with colleagues (excluding non-research admin) (%)**

Faculty	Never	<weekly	1-2 week	Several times a week	Daily	Several times daily
FST	13.2	39.0	30.1	13.2	2.9	1.5
FASS	12.2	53.7	23.2	9.8	0	1.2
MS	17.5	40.4	19.3	19.3	0	3.5

Some of the meetings above will have involved travel for some of the participants. As we would expect the frequency of travel is significantly less than frequency of meetings above, but the distribution across faculty is broadly similar.

If we combine the first two columns again we can see that researchers in FASS and FST are most likely to travel less than weekly for meetings (91.5% and 93.4%) with 80.4% of MS respondents travelling for meetings less than weekly.

**Table 4.6 Frequency of travel to meet colleagues (%)**

Faculty	Never	<weekly	1-2 week	Several times a week	Daily	Several times daily
FST	20.6	72.8	6.6	0	0	0
FASS	19.5	72.0	7.3	1.2	0	0
MS	17.9	62.5	12.5	3.6	1.8	1.8

Respondents were next asked how often they used the telephone to discuss work (the question specifically included VoIP such as Skype). The distribution across faculties is comparable with table 4.5 with the FST and FASS most likely to telephone their colleagues less than weekly (77% and 71.6%) compared with the MS where 54.4% phone less than weekly.

**Table 4.7 Frequency of telephoning colleagues (%)**

Faculty	Never	<weekly	1-2 week	Several times a week	Daily	Several times daily
FST	31.4	46.0	12.4	7.3	2.2	0.7
FASS	29.6	42.0	11.1	14.8	1.2	1.2
MS	19.3	35.1	21.1	12.3	8.8	3.5

Collaboration between colleagues is no longer limited to face to face meetings (whether involving travel or not) or telephone conversations. Respondents were next asked about their use of a variety of relatively recent collaboration tools to collaborate with colleagues.

The most popular tool across all faculties was instant messaging, with 43.1% of management school researchers using this tool. Conference telephone calls were used by approximately a fifth of researchers across faculties, with desktop videoconferencing used between 4.7-8.6% and Google documents used by 3.4-3.6%.

**Table 4.8 Distribution of the use of other technologies to collaborate with colleagues (%)**

Faculty	Instant messaging	Conference telephone calls	Desktop videoconferencing	Google docs
FST	29.0	21.7	6.5	3.6
FASS	22.4	18.8	4.7	3.5
MS	43.1	19.0	8.6	3.4

Respondents were next asked a series of questions about Access Grid Nodes. The Access Grid is a network of nodes which allow for high bandwidth audio-visual collaboration<sup>13</sup>. JISC supports the use of AGN in UK academia through funding the Access Grid Support Centre, and various Access Grid related projects. Lancaster University currently has 7 access grid nodes.

**Table 4.9 Awareness and Use of Access Grid Nodes (AGN) by Faculty**

Faculty	Awareness (%)	Use (%)
FST	23	7
FASS	12	6
MS	21	13

<sup>13</sup> see <http://www.accessgrid.org/>

Respondents were asked whether or not they had heard of Access Grid Nodes, and whether or not they had every used them. We can see from table 4.9 that both awareness and use are fairly low, especially given the number of nodes available on campus.

Awareness is greatest amongst the FST, whilst use is greatest in the MS, across the board the level of awareness and use are fairly low, but those researchers who do use it could be heavy users. A more detailed analysis comparing the levels of face to face, and telephone collaboration undertaken by AGN users and non-users will follow.

### c. Publishing

Respondents were then asked whether most of their work was single or co-authored. There was substantial variation across the faculties and this was broadly as discussed elsewhere, where 'hard science' subjects have higher numbers of authors per paper, partly due to larger projects and partly due to the different norms surrounding inclusion of authors<sup>14</sup>.

**Table 4.10 Distribution of academics by single versus co-authored (%)**

Faculty	All or nearly all single	Mostly single authored	50/50	Mostly co-authored	All or nearly all co-author
FST	5.3	6.8	6.8	25.6	55.6
FASS	48.2	12.0	10.8	20.5	8.4
MS	15.8	19.3	21.1	33.3	10.5

Nearly half (48%) of respondents in the FASS stated that all or nearly all of their work was single authored, compared with 16% in MS and only 5% in FST. This distribution is mirrored in the portion who stated that their work was all or nearly all co-authored.

The next question concerned the use of ICT in the management and co-ordination of the co-authorship process, alongside a selection of traditional methods. The question included an open entry for other methods, with one respondent using a wiki for this purpose, three mention working over Skype or a telephone conference and a further respondent mentions working over MSN messenger, these findings tally with table 4.8 although it is perhaps surprising that these technologies, whilst apparently quite widely used, are not used more frequently for collaborative writing.

<sup>14</sup> See Tony Becher and Paul R. Trowler (2001) "Academic Tribes and Territories" 122-6

**Table 4.11 Distribution of methods of managing co-authorship process.**

Faculty	Traditional			Web 1	
	Face to face	Print and send	Nominally co-authored	e-mail	Collaboration within Word
FST	52	13	35	68	16
FASS	47	21	15	59	25
MS	62	16	24	69	31

The following questions asked about the use of blogs as part of academic communication. First respondents were asked whether they wrote a blog that was related to their research. The lowest response was in the FST, with moderately higher rates in the FASS and MS.

**Table 4.12 Distribution of blog writers (%)**

Faculty	Yes	No
FST	2.2	95.6
FASS	7.3	90.2
MS	8.8	89.5

The next question asked whether or not respondents subscribed to any research related blogs. As you would expect the rates are higher than for writing blogs, but the distribution by faculty has changed. The MS, with the highest rate of blog authorship, has the lowest level of blog subscription, and the FASS has a much higher rate at 27.4%.

**Table 4.13 Distribution of blog subscribers/ readers (%)**

Faculty	Yes	No
FST	16.3	83.0
FASS	27.4	72.6
MS	10.5	86.0

## **5. Conclusion**

This report provides a summary and a brief analysis of the data. Further detailed analyses are being carried out and will be submitted for publication in peer reviewed journals and presented at conferences. However in the space remaining I will suggest some early conclusions that I have drawn from the data presented thus far.

There is clearly some considerable variation across the faculties in the uptake and use of ICTs in the research process. A wide variety of tools are being used, by individuals and across faculties. Even where tools have a very high uptake (e.g. 94% use of databases for finding resources in FASS) this is not at the exclusion of other tools that perform a similar task.

Across each stage of the research process there are clearly significant differences across faculties and this might arise from disciplinary norms, and collaboration and networking with colleagues within faculties. The picture of uptake and use of ICTs across faculties is clearly complex with some faculties quick to adopt web 2 technologies in some areas but not others. For example projects in FST were more likely to adopt wikis, but researchers in this faculty were least likely to write blogs.

Similarly many of the tools that have been adopted by researchers were not initially developed with academic research in mind. Telephone conferencing, VoIP and Instant Messenger were all developed commercially for general use and yet are widely adopted by researchers, whereas some tools developed specifically for academic researchers, such as the Access Grids nodes, are far less well known and used.

Current efforts to offer centralised support (such as AGNs, but also recent efforts at establishing integrated Virtual Research Environments<sup>15</sup>) have had limited success thus far, and this could be because this approach does not reflect the rapidly changing ICT environment in which academics often operate. Flexible individualised support, for multiple (even competing) tools and technologies would have a much wider impact on academic practice.

This survey suggests that academic researchers across the faculties at Lancaster University are using a variety of tools to carry out their work, and no doubt will continue to do so. Further analysis of this data, in particular in relation to age and further research looking at multiple institutions will uncover a richer picture

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<sup>15</sup> E.g. JISC has allocated £2mn to phase one of a VRE programme  
[http://www.jisc.ac.uk/whatwedo/programmes/programme\\_vre.aspx](http://www.jisc.ac.uk/whatwedo/programmes/programme_vre.aspx)

of the wider use of ICTs in academia, and I hope that this will inform future training provision as part of an overall ICT strategy to support researchers at Lancaster University and elsewhere enhance their own research practice.