University IT review 2011

The following is a rather partial view from one department, but as a general statement it seems to me that the overall state of computing in the university is good, provides good value for money, and is not broken in any significant way. If anything it probably suffers a little from being under-resourced in some areas.

UCS:
The UCS provides a range of services that are professional, well managed and highly useful (and in the some cases essential) to departments. Primary among these are the Cambridge University Data Network, (including the Domain Name Service and connection to JANET), and the hermes e-mail service – both of these run seamlessly 24/7 and are of excellent quality. Other services provided by the UCS that are significant include the managed cluster service (which greatly simplifies the provision of teaching space for undergraduates), raven authentication service, lookup service, eduroam/lapwing wireless network, VPDN and streaming media service. These are provided in a way that makes opt-in straightforward where it required without making unnecessary impositions (if a department wants to run its own e-mail server, then this is possible, but the high quality of the UCS provision really renders this superfluous), and provides a level of service that would otherwise be difficult to replicate at individual department level. The UCS is constantly seeking to improve service delivery and largely succeeds in doing so. In addition they provide help and technical advice for the support of the major operating systems (including anti-virus provision) and help to integrate IT support through the techlink service, which is invaluable as a communication medium for Computer Officers (COS) across the university. Documentation is extensive and generally helpful. Training course provision is generally good.

In recent history the most salient point where large scale IT provision showed a lack of foresight was the introduction of the phone service. The overall project management, scheme concept, communication of the project, setting up of the timeline, implementation and delivery of the phone system was supremely competent and well managed, and the phone system as it now exists is very good. However, the project completely failed to take account of the staff time and hardware costs that would be imposed on the IT systems in departments – it was simply assumed that departments would magically conjure funds to fix any new requirements for their network equipment, and that IT staff would add the recurrent administration of the phone system to their other duties as if staff time was available at zero cost. The UCS is not alone in this type of approach to departmental IT however – EMBS will typically plan building works that affect IT infrastructure without consulting local IT staff, with the result that project work is delayed or goes over budget when it is discovered (for example) that newly installed cabling is incompatible with existing infrastructure.

A major area where the UCS currently is less than perfect regards software licensing. As far as one can tell from outside the service, this area seems to suffer from being under-resourced and appears to lack ambition. The result is that where the university as a whole could benefit from large-scale site licenses the effort for organising these falls on individuals within departments (or on the case of matlab within the school of physical sciences) and financing has to be put together piecemeal. Tracking of the finances for software site-deals run by the UCS but with costs under-written by departments have not historically been well managed. Development of a coherent software strategy, including finding the right balance between commercial and open-source provision, would currently seem to be lacking.
A second area that would bear further development is provision of central backup and storage – while departments will generally provide their own storage systems, each department must currently provide for its own disaster management by finding off-site backup locations – often not an easy thing to do other than by ad-hoc reciprocal arrangement with another department. The UCS offers rack-space for a fee, but not, so far, provision of managed storage systems other than the rather small amount offered by Desktop Services, which is not formally a backup service. Further, the growing prevalence of tools such as Dropbox indicates that there is demand for file storage services that are globally and easily available to mobile users – however it is unclear that such file sharing services are appropriate for all types of document, as they depend upon third parties to provide the storage – in these circumstances the provision of a Cambridge “cloud”, to include backup by default, with ease of access a primary criterion, would seem to be useful service to develop. Note that this is a service with a focus on immediate file access and portability incorporating insurance against data loss, complementary to vital long-term archive repositories such as DSpace.

MISD:
Generally I have less experience of the service provision available from MISD. However, with the notable exception of camtools, the software provided through MISD gives the impression of generally being unwieldy and suffering from adoption of overly complex large commercial packages that have interfaces to the ordinary user that are obscure and difficult to use. This is doubtless unfair and may be partly in the nature of the services that MISD have historically been required to provide, but interacting with their services does not generally seem to be regarded as a pleasurable experience. That said, their services do generally seem to be reliable and largely functional.

While there seems to be a feeling in some quarters that provision by MISD and UCS overlap (or even that the two services should compete) this seems to rest in a misconception – the services provided by MISD are largely to do with personnel management and administration. The UCS would seem to be complementary in the sense that it provides much more in the way of technical services that do not necessarily have a human resource or finance aspect. While some parts of UCS and MISD services may overlap (in particular those areas that require database management and associated tools), it would in my view be a mistake to try to merge the two organisations or to attempt manage them as if they had similar purposes. However, institutionally it would seem likely that the university as whole would benefit from increased co-operation and information sharing between these two institutions rather than competition, particularly in the area of identity management.

Departments:
The general way in which the above central services are currently provided to departments - on the basis of opt-in if required, but provide your own local service where necessary – seems to me to be a good way to organise the system. It allows diversity and flexibility to flourish (and I reckon this to be a major strength of the Cambridge system) so that specialist needs within departments can be catered for, whilst giving access to a central system where advantages may be gained from uniformity of provision or economies of scale. The dis-aggregated nature of the system allows for change management to be handled as suits each department, leading to a more robust and resilient system than one in which attempts are made to aggregate things into larger units.

However, currently the funding for IT at department level is highly variable and in some cases dependent on soft money or budgets that fluctuate wildly from year to year, particularly with regard to capital expenditure for new equipment (although the withdrawal of CIF will doubtless make the fluctuations rather smaller!). This makes consistent up-to-date provision of every-day IT equipment (as opposed to specialist hardware for particular research projects) problematic. There needs to be a recognition that update and refresh of IT equipment is vital to the business of the university and that it requires consistent and adequate funding devolved to the level of the department.

Similarly, the user base considered for computing support in departments should include all users of the system – this means not just academic staff but also academic-related staff, contract research
staff, visitors, graduate students and other (non-IT) support staff, plus the undergraduates. The ratio of users to numbers of IT support staff when all these are taken into account can be larger than desirable – of order 50:1 even without allowing for undergraduates. Not surprisingly this can lead to IT staff feeling overstretched. Some departments seem to cope with this by effectively employing graduate students as casual IT support. While this may be good experience for the students and permit a degree of flexibility for research groups, it does not result in continuity of expertise, nor allow for the build-up of know-how within a department, or provide good career structure within IT with possibility of advancement. Similar comments apply where IT support is provided by short term or soft money lasting only a couple of years. This acquires further force where large specialist codes or packages require long-term expert support that may take years to develop. Again, adequate, stable, long-term funding for such support staff is vital for the business of the university and should not have to be reliant on fluctuating short term financial resources. The provision of well trained COs who have detailed knowledge of the systems and applications that they support should be regarded as an investment rather than a cost burden. In these terms attempting to outsource support, or to merge support between departments with disparate needs is likely to prove a false economy. In fact the latter may even lead to an increased need for staff, as larger systems are typically more complex and difficult to manage effectively without imposing uniformity and inflexibility.

Where outsourcing may be of more value is at the application level – where there are proven systems that provide a needed service that cannot be set up internally without high costs – the obvious example being google calendar – although the time and effort spent on reaching an agreement in this case suggests that the number of such deals is likely to be limited in scope, and involving third parties has implications both for security and confidentiality of data, the effects of which have yet to become fully clear. A further area where outsourcing has been recently taken up is in printer hardware support (since this service was dropped by the UCS). This is worthwhile only where large high-cost printers with long lifetimes but low running costs are in place, so that engineer call-out charges are economical – the low frequency with which such repairs are required (typically only a few times a year) and the very diverse range of printer spares and parts needed makes the provision of such services in-house in a department unattractive.

Shared services, where appropriate are most likely to be effective in terms of sharing information (both technical and purchasing info.) and facilitating the distribution and adoption of tools and techniques that can lead to efficiency gains. A large fraction of this type of sharing already takes place through the medium of the techlink seminars and e-mail lists. The latter are also used to redistribute and share redundant hardware that can be re-used elsewhere in the university. This distributed system of information sharing also ensures that the COs involved in support maintain ownership of the problems they are tasked with solving, a primary requirement for ensuring that motivation levels remain high.
Dear Jim,

I am writing to contribute a few observations, as per the invitation in the Reporter (6228), which I hope will be of some assistance in the ‘Review of IT Infrastructure and Support’. I write in a personal capacity, with a few contributions, which I will list in a somewhat bulleted manner for clarity and brevity.

* I would like to commend the initiatives of mutual support and collaboration exhibited in Cambridge’s College IT Management Group (CITMG) and the Departmental IT Management Group (DITMG), and their continuing efforts to help build up the Cambridge IT community. These self-motivated groups help provide real savings, personal support, practical solutions, and professional development. They also help keep a lively and constructive debate and direct guide for the delivery of relevant services by MISD, UCS, and others.

* There has been some general discussion (e.g. among the ‘TechLinks’ IT support e-mail list) about the IT review and Strategic Plan in the School of Physical Sciences. It is noteworthy that the Strategic Plan <http://www.physsci.cam.ac.uk/strategicplanning/plan.pdf> indicates the understandable expectation of growth:

  ... as IT continues to become more pervasive, and more complex, demand for support resources will continue to grow which will mean that spending on IT will increase or quality of service will suffer unless action is taken.

  (from "S. People & Infrastructure, b) Computing and IT" on page 20 - internal page 17)

* It was also instructive to hear Kirsty Allen at a TechLink seminar earlier this (calendar) year <http://www-tus.csx.cam.ac.uk/techlink/workshops/seminar-jan19-2011.pdf> indicate that the University's business continuity exercise identified the loss of IT as the second most important risk in emergency situations, naturally after loss of staff.

* There is undoubtedly much greater scope for sharing of services, and direct support for personal and professional development (e.g. assured time for participation in PPD and other professional development, mutual job shadowing for service resilience, cross-institutional resource planning discussions such as virtualisation and storage).

* Extreme caution should be observed with regard to any outsourcing considerations and calculations. Apart from it being an increasingly out-moded business model, which we would do well to review and take due heed, there are groups such as the European Services Strategy Unit <http://www.european-services-strategy.org.uk> which track some the wider impact of outsourcing attempts, including contract problems and cost overruns (e.g. nearly £30 billion in contracts, with an average cost overrun of 30.5%), see:

It will help if we continue to keep these and other cautionary tales in mind as we move forward.

* It is good to see, as well, that the minutes of the 24 November 2010 meeting of the PRC, which agreed to the establishment of this Review, include (minute 1287) that:

... members ... were concerned that any changes should not be damaging.

Please forgive any unintentional unclarity due to haste and hour, however I would be happy to expand on any points, if helpful. In any case, I look forward to the forthcoming discussions.

Best Regards,
A submission of the views of the College IT Management Group (CITMG) with respect to the University’s IT Infrastructure and Support review

Background

The CITMG was formed in 2003 to provide a collaborative environment for college IT staff to discuss all aspects of college computing. The group meets regularly and provides collective views and considers common issues through topic groups. The CITMG is recognised by, amongst others, the Bursars’ Committee, the University Computing Service (UCS), and the Management Information Service Division (MISD) and has representatives on a number of committees and working parties.

Proposal

The members of the CITMG request that the IT Review committee consider the following during the review’s elicitation process:

1. The colleges are both stakeholders and consumers of many of the services offered by the various University bodies that offer IT solutions. These include amongst others the UCS, MISD, and the University Library. This being the case, CITMG members are in an excellent position to offer constructive feedback on the current services as well as having ideas for the development of future ones.
2. Members of the CITMG value many of the shared services and in some cases rely heavily on them for their IT provision.
3. While the CITMG exists for the benefit of all colleges, it feels, due to the disparity between the colleges’ use of shared services, that it is important to seek the views of colleges directly and not to expect a generic view from the group.

In order to be of help to both the review process and CITMG members, the CITMG would like to propose that:

- The CITMG calls an extraordinary meeting aimed solely at providing a platform for the Review Committee to communicate its aims and objectives to the college IT community. This meeting would also allow a limited opportunity for members to raise any issues regarding the review.
- The CITMG would, if requested, organise a set of group meetings to aid the elicitation process.
This University has long benefited from a loose and highly devolved management structure. This is particularly clear in the area of IT. Although in some parts of the University there is a clear demarcation between IT and non-IT staff, in others the boundaries are very fuzzy, as is particularly fitting in those areas of the University pursuing computational science in its many forms.

This does lead to one problem in considering a University IT Strategy. If one believes that it is necessary to have a strategy which contains much in the way of detail, it ought to be possible to measure the impact of this strategy. One area for impact would be staffing costs, and yet there is no way of measuring at all accurately how many staff actually are involved in IT support. The amount of time that PhD students, post-docs, and even more senior academics, spend on IT support is both unknown and unknowable, as is the amount of time that IT staff spend on academic (or administrative) issues.

However, one should not now conclude that my advice is to give up completely. I believe that there are areas which could be improved considerably.

The UCS and MISD

The IT world is a fertile breeding ground for unaccountable, abusive, monopolies. Some judgements of the European Courts may suggest that Microsoft and Intel could be thus described. It would be a pity if MISD or the UCS could also be so described. In general the UCS has a strong defence against this accusation, for it is often not a monopoly. I choose to use Hermes, not Gmail. I choose to use Lapwing, and not to run my own wireless network. I choose to use its managed web server service, as well as running my own web server. Some of my colleagues choose to use its Help Desk, as well as (or perhaps instead of) speaking to me.

There are a couple areas in which the UCS is inevitably a monopoly. In running the CUDN, which it does quite well. In issuing CRSIDs, which it does quite well. In dealing with CHEST software sales, which it does quite badly, leading to Schools setting up their own agreements where they can (Matlab), and Departments likewise (Mathematica and others).

However, my general feeling is that the UCS does not have a captive market for many of its services, and this causes it to be reasonably responsive to the demands of its ‘clients’, that is to say, to the University.

The same cannot be said of MISD. Most of the systems which MISD runs its users have no ability to opt out of. This may make MISD appear to have a less ‘customer focused’ culture than the UCS.
Management of IT Staff

Management of IT staff outside of MISD and the UCS is undoubtably messy. They are likely to find that their ‘line manager’ knows little about IT, and is liable to issue instructions which range from silly to illegal. Of course, good managers, even technically illiterate ones, are open to debate and in those cases such problems are avoided. But this University is sufficiently large that the existence of bad managers is almost certain.

For those IT staff who are merely staff, obeying all orders save the most blatantly illegal is certainly an option. For those who are Officers, I do not believe it is an option. The University expects its Officers to act in its interests, and not to obey orders blindly. An Officer whom the University has named as an IT specialist is thus put in an awkward position if he receives instructions he regards as ill-conceived from an academic who, although in some senses more senior, has no formal recognition from the University for his abilities in IT, and who has a record of showing misunderstandings in such areas.

The problems in this area do not stop at merely the questioning of instructions. How is someone assessed for promotion if those around him have a poor understanding of the area in which he is working? What use is a probation period in such circumstances? Is it clear that mistakes made as a result of an appointments process will be picked up during the probation period? If someone is about to be given the life-time protection of Statute U, it is particularly important that there are no doubts about their competence and integrity.

I am old enough to recall the time when some ‘Departmental’ IT staff were, in fact, employed by the UCS and placed in Departments. Although that scheme failed, the current position also has deficiencies, so perhaps some middle way could be found?

However, local IT staff do have one advantage denied to the central staff. They work alongside those whose efforts raise the money which pays their salaries and stipends. They thus appear to be more accountable, in that there are obvious informal channels by which their ‘paymasters’ can express discontent, even if the official channels are blocked. Central bodies, funded by seemingly arbitrary top-slicing of grants, a funding stream which does not mirror any accountability system, official or unofficial, work well in good times. If money becomes tighter, and suspicions, well-founded or not, arise that the central bodies are inefficient. If there can be no credible mechanism for those who ultimately provide the money to challenge or to moderate expensive decisions, resentment is almost inevitable. And resentment can lead to otherwise illogical and generally unfortunate actions.

Management of the UCS & MISD

In theory, the UCS used to be regulated by the ITS, now the ISSS. Many years ago, chatting casually to a senior member of the UCS, I heard him describe the ITS as ‘strangely irrelevant.’ Indeed strange that someone involved in the UCS’s management should have described the ITS as ‘irrelevant’, but probably an accurate description. The ITS was large, but still needed a technical ‘sub committee’, which was by no means a subset in the mathematical sense, to advise it on technical matters. An IT committee which requires a separate standing committee for general technical advice probably has the wrong people sitting on it.

The ISSS has so far achieved a greater degree of remoteness than the ITS. The ITS had academic representatives from each School, and, although almost no academic knew who his representative was, at least in theory such a person existed. The ISSS merely has three people nominated by the General Board. This is unlikely to make academics feel that this structure is relevant to them, particularly academics from the School of Physical Sciences which appears to have no academic on the Syndicate, and yet which contains many academics who care about, and are knowledgeable about, IT.
As for IT staff, including those Officers of the University whose posts suggest that they are IT specialists, only those working in the UCS and MISD, who are thus most distant from the academic coal-face of the University, are automatically represented on the ISSS. Currently Council has addressed this somewhat in its nominations to the Syndicate, but neither the extent nor mechanism seems ideal.

The academic part of this University gains strength from the manner in which Heads of Department, of Schools, and even the Vice Chancellor, are elected in their disparate ways for fixed terms of around five to eight years. It is a little negative to state that this means that one set of weaknesses are prevented from remaining for more than a decade, so perhaps one should say that new ideas are brought in at least once a decade. The administrative part of the University does not work in this manner, including the two Directorships relevant here, those of MISD and the UCS. I am given to understand, for instance, that the sudden and welcome change in attitude of the UCS towards wireless networking was not wholly unrelated to its change of Director. If this is so, it would be reassuring to see mechanisms for reducing the ability of a Director being able to hold back an area until his retirement.

**Outsourcing**

The University does a huge amount of outsourcing in IT. The times when it built its own computers, and wrote its own operating systems, are past. And what is buying ready-assembled computers, and off-the-shelf software, if not outsourcing? Many support contracts are outsourced, some software writing projects are outsourced, and sometimes outsourcing simply brings in extra staff for a specific project. Laying network cables is a particularly common example.

Outsourcing has many advantages, although the result is not always perfect. CAPSA/UFS was outsourced, the VoIP project was outsourced, and whilst both decisions were probably correct, it is not true that every aspect of the result is above criticism. Elsewhere some expensive support contracts would be better scaled down, or cancelled.

Outsourcing always produces two problems. One is long-term support – what happens when we grow tired of paying the bills? If the answer is that we must always keep paying the bills, any cost savings start to look thin. But the more important problem is that of teaching the external company what we really want and how we really work. There have been many hilarious cases of external consultants completely failing to understand how the University works, even in cases where it should have been obvious. I know of some cases where this has led to thousands of pounds worth of work being paid for, but never reaching a position where it could be used.

I would suggest that outsourcing works where it supplements existing staff. It fails when it is directed at a void the nature of which no-one locally really understands. In those cases, it will be impossible to discern whether the consultants really understand the problem, and how to interface their solution to the needs of the University. And a consultant who leaves no useful product usually leaves much resentment, for often he has enjoyed being paid for his ultimately worthless efforts at a rate which none of the University’s IT staff, including the two Directors, can dream of.

Some of the failures have resulted from the same line of logic which suggests that to translate from French to English someone who knows English but no French should hire someone who knows French but no English. The resulting team may in some sense have all the skills required, but it is not going to work. One needs people each of whom has some level of understanding of both sides of the problem.

Regarding academic IT support in most scientific Departments as being merely generic administrative IT support would be very unwise. It is usually quite specialist, with odd pieces of experimental apparatus and their embedded computers to supervise, or with users requiring the sort of support for compilers and numerical libraries which the UCS used to provide in my youth, but does no longer. Similarly the questions from academic scientific users can be of the sort of technical nature about programming or numerical methods that a small and dwindling number of UCS staff can address. Administrative IT support, and even IT support in arts Departments, is different.

I find it odd that there is no post in the UCS which I covert, and that the UCS does not act as a magnet for the best IT staff in the University. Thus it can be hard to find the best IT staff in
the University, for they are not necessarily in the UCS (although some are – the UCS is far from being a disaster in this regard).

Social Networks

There is a fear that IT staff sit in isolated cells, if not re-inventing wheels, then at least solving problems already solved elsewhere in the University. Whilst it would be foolish to assert in an organisation of this size that no such thing happens, I think it is less prevalent than is often assumed.

IT staff, in general, do talk to each other and do form social networks, just in ways and places that many academics do not notice. Indeed, in general they do not do so in College SCRs as few have rights in such places. The manner in which such contacts are made would be an interesting research topic for a sociologist, but it is certainly not through coercion. Here the implicit freedom of an Officer to act in the interests of the University can be a great asset. If I can spend my next half-hour either doing something which will be of great benefit to St Botolph’s College, or something of negligible benefit to those against whose budget my stipend is actually charged, then, within reason, St Botolph’s will triumph.

Of course the University should encourage the formation of such networks which provide support and expertise amongst IT staff, just as it does amongst academics. It is slightly harder for IT staff, for it is unclear that the academic answer of Colleges and Conferences is appropriate.

Conclusion

I believe that the greatest strength of the University’s current approach to IT is the flexible, decentralised, non-prescriptive manner in which it approaches IT. Departments, and even individual researchers, have great freedom to find solutions which fit their particular circumstances. In most cases this promotes efficiency. In some cases the outcome is less desirable, but it is hard to construct a freedom which does not include the freedom to make mistakes.

I find the greatest weakness to be in its central IT bodies. That they consume much money is inevitable. That they ‘could do better’ is also inevitable. How much better they could do is unclear, although many parts of the UCS seem to be reasonably efficient. What does cause me concern is their apparent lack of meaningful accountability. Solving this could be tricky, for the University has sometimes struggled to solve it for centralised services even within its larger Departments. Fortunately the University has a good number of formally-appointed experts in this area – its senior computer officers in its academic Departments – as well as many academics who understand IT management (many of whom are probably under the age of thirty-five). I believe that it should use them more. It might even ask some of them to sit on any committee reviewing IT Infrastructure and Support in the University.

Compared to those other universities, British and American, about which I have good information, I believe that the current situation in Cambridge is actually excellent. There are pockets of trouble here, but some more centralised universities manage to create large pits of trouble and despair, not small pockets. I believe Cambridge could do better, and I have written this document in the hope that we can do even better. However, copying from institutions which are doing less well than ourselves is a solution remarkably frequently proposed, and which is rarely of benefit.
The following are a few personal thoughts on the issues listed.

1) The need for a more coherent IT strategy

There is clearly a need for a coherent IT strategy and there has, I think, been useful progress in the last few years. That said, it is very much still work in progress and areas which need attention include: defining and prioritising new developments on the basis of the requirements of the whole University; defining standards for inter-system communication, particularly for administrative systems, allowing departmental systems to communicate data with central systems; and a clearer understanding of the relative advantages and disadvantages of open source vs commercial solutions to inform software purchasing.

2) Whether the present management structure can be improved

This is arguably more a governance than a management issue. Were the UCS and Misd to be combined into a single organisation, the management structure would probably not change all that greatly except at the very top. What might be achieved is a more uniform approach to resource allocation and project prioritisation.

3) Balance between centrally and departmentally managed provision

One would expect that the vast majority of IT support at a departmental level would be academic rather than administrative. In practice this is not the case, administrative requirements having grown significantly in recent years. The large central systems have provided some of departments' requirements but by no means all and sometimes at the cost of significant local support effort. A model in which small customised departmental systems provide a front end to many central system functions might be a more efficient approach. An important feature of departmentally managed provision is that these IT staff understand their end users' requirements. More use might be made of this knowledge in informing central decision making.

4) Aspects of the current level of service which could be improved

5) Whether the design and implementation of large IT systems adequately reflect the needs of users

Most, I think, of the problems stem from the service which is being provided not being quite the same as the service which is required. It is obviously very difficult in a large, very diverse organisation like the University and Colleges to satisfy different institutions' different requirements. As suggested above a more layered, distributed approach to this provision may therefore be the way ahead. A particular weakness of almost all the large central systems is the design of the user interfaces. These are generally based on pre-Web styles of presentation and do not make full use of a modern Web browser's capabilities. They also suffer from the diversity of the user community's backgrounds and requirements.

6) Arrangements for the effective and efficient organization of computing
support staff

The great majority of the University's IT staff with whom I come into contact provide far more than they are contractually obliged to do. So, even allowing for the few who underperform, staff are overall working as efficiently as they are able to do. Possible sources of inefficiency include duplication of effort and time spent supporting and working around the deficiencies of sub-optimal hardware and software solutions. Much of the willingness to work long hours stems from a pride in their work and the obvious importance of what they do to the smooth running of the institution for which they work. There is a reasonably active mailing list whereby staff in different institutions can share expertise and avoid re-inventing the wheel; this to a large extent mitigates many of the potential disadvantages of such a distributed model. A possible area of concern is that the pay and grading system has only relatively minor provision for rewarding individual excellence or conversely penalising those who underperform.

7) Scope for cost savings and/or service improvements

The centrally provided services are, for a department, a form of outsourcing but one which can be used to a greater or lesser extent depending on current requirements, i.e. much more flexibly than traditional outsourcing. It is clear that from this that institutions do not and/or cannot outsource all their support. This is generally the case with outsourcing, some level of local support is needed, at the very least to manage the outsourcing. Outsourcing vs in-house provision is somewhat analogous to the case of commercial vs open source software - the balance is between the purchase cost and the increase in local support required. High quality, efficient local support pushes the balance in favour of that direction.

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This is in response to the call for evidence for the review of IT infrastructure and support.

IT in the University is complex and seems likely to remain so. However much a coherent strategy may seem desirable, no single approach will meet every requirement, particularly those of scientific research. However it is certainly conceivable that there is scope for greater coherence than there is at present.

Current IT systems are a mixture of central and more local provision. The terms of reference of the review mention the two main central providers: MISD and the Computing Service. However there are others such as CARET, the Library, the Clinical School and various high performance initiatives running services which are to some degree centralised with varying degrees of autonomy. This may not be the best structure for encouraging a coherent strategy. In particular there is no single body with the oversight of all of them; the ISSS comes closest but it sits in a slightly uncomfortable position with respect to MISD (which appears to be directly responsible to the Registrary).

There is some dismay in the University at large at the growth of MISD over the last decade or so. It began as a relatively small organisation doing the "data processing" aspects of the University's computing, in particular functions such as payroll and record keeping which would not have been appropriate to run on general purpose systems (and still would not). The introduction of large and complex systems such as CUF5, CamSIS, CHRS etc was perhaps inevitable in the regulatory framework in which we must now operate, but despite the expenditure of large sums of money, the systems that have been adopted are widely seen as being poorly designed at best and unfit for purpose at worst. My understanding is that within the central administration these systems are seen as highly successful, and the reasons for this mismatch of opinion would perhaps bear closer scrutiny. There appears to be a lack of focus on the needs of the end users whom these systems serve: the model appears to be that the systems do what they do and the users must be "trained" to conform. We live in a world in which members of the general public expect to be able to engage with complex systems. This is just one example of an attitude that seems pervasive and the adoption of a project management structure does not appear to have helped a great deal.

The expansion of MISD into the provision of desktop services is a development that needs to be watched carefully, and thought needs to be given to the extent to which this overlaps with the functions of the Computing Service. Where the requirements are fundamentally for administrative computing support it might make sense, but there is a risk of isolating the administrators from the researchers. In the we have a general policy of not doing work that others can do for us, but we would have strong misgivings about "handing over" administrative desktop support for fear of losing the flexibility of close interaction with the research community that is currently enjoyed. I have at times been concerned at the apparently simple things that some administrative staff tell me they are unable to do because of the restrictions of their desktop environment.
This brings me on to the Computing Service. It has a policy of making use of Computing Service facilities where they meet our needs (and this includes charged services). Dealing with the Computing Service is occasionally frustrating, but on balance I feel that they do a good job and are good value for money.

The division between services which are free at point of use and those which are charged sometimes seems arbitrary and should be kept under constant review. Some departments may be reluctant to pay Computing Service charges and may duplicate facilities even if this is less efficient overall. This may to a large extent be unavoidable if choice and flexibility is to be maintained.

The Computing Service needs to offer services that are robust and sustainable. This is sometimes in conflict with the need to provide usable services when they are needed. Some of the apparently duplicated services in the University may have arisen because a department needed to do something for itself to meet an urgent need before the central service was made available. Rationalising such situations later can be extremely difficult since the central service, although perfectly adequate, is rarely identical to the local one.

However excellent the central services, it seems inevitable that there will continue to be a need in many departments for local provision. Most of these relate to research requirements, often involving the purchase of hardware for a specific purpose. A local service, with local staff supporting it, can respond to user needs in a way that would be hard to match with any conceivable central service (and in passing, I would note that "outsourced" facilities are likely to be even less responsive and flexible). In some cases even departmental-level support is seen as overly centralised, and there is call for support at the level of research groups. The University has largely resisted this, but I am certainly aware of other departments with much finer-grained support structures than ours.

At its best, the system of local provision does much to achieve excellence. Nevertheless, it is not without problems. Support staff tend to remain in a niche for many years, and whilst they may deliver an excellent service, the departments may grow excessively reliant on individuals and career paths may be impeded. There have been suggestions that more should be done to facilitate the movement of staff between departments, perhaps on a temporary basis such as secondment. This would seem to be a good thing in principle but it is hard to avoid the conclusion that it would be more expensive overall.

In this department we have identified excessive reliance on the knowledge of (several) individuals as a major risk in disaster recovery and business continuity planning, but it is hard to see what can be done about this without either having more people or offering a lesser service. Backup and redundancy always costs, and the University must decide what it is prepared to pay for.

A problem which bites at several levels is that research funding often comes with constraints on how it may be spent. For example a research grant may fund a computer and perhaps a person to look after it, but it may not be permitted to spend the money on a shared service. This may inhibit progress towards more rational systems. For example we offer virtual machines to researchers as a greener and more manageable alternative to the purchase of hardware, but we have found it impossible to support the
service by charging for it. It is doubtless beyond the remit of the IT Review to fix this kind of problem, but it demonstrates that IT cannot be looked at in isolation.

Viewed from the outside, and with a business perspective, IT support in Cambridge may appear irrational, chaotic, idiosyncratic and perhaps inefficient. Yet in practice it works well, underpinned by a largely hidden network of unofficial relationships and informal support structures. Any proposed changes will need widespread support if they are to be successful. It would certainly be risky to attempt to force changes purely to save money since the costs would be very likely to pop up elsewhere (e.g. in staff who are de facto supporting IT even if this is not their formal job description).
Dear Dr Bellingham,

The CSCS has pioneered an alternative model to IT provision over the past few years, and I think that the experiences and strategy of our department may be informative to the review committee. My submission should not be taken to represent the School as a whole, but purely a personal contribution.

I thank the panel for taking the time to read this submission and would be happy to answer any questions they may have.

Kind regards,
**Introduction**
With reference to the relevance of the CSCS, we are the largest provider of desktop support within the University. We provide helpdesk, PC/Mac, network and server support (1st, 2nd and 3rd line), to a heterogeneous environment of equipment across many Clinical School departments, as well as affiliated and non-University groups. We have recently agreed to expand our service to include the Department of Zoology, with a view to potentially supporting more departments in the School of Biological Sciences.

**IT Services (and where to draw the line)**
The CSCS has gradually transitioned to a department that provides IT services, focusing our attention on providing IT as a service as opposed to seeking to fulfil specific IT related academic tasks (i.e. biostatistics). Our services are provided for all users, but supplied as a utility (i.e. network should be provided as a fast, reliable service irrespective of how the end user wishes to use it). This approach has permitted CSCS to provide generic services to a wide range of users, using industry standard and mature products. To meet general user needs there is often little requirement to deviate from industry standard solutions, which can actually help to improve the services provided by being robust, resilient and easily supportable.

In the interest of clarity, CSCS works with academics, providing desktop support, data backup, network support etc. In the event of an academic requiring a server to run a statistical package, for example, CSCS will provision a server, install, patch and maintain the hardware and OS; however the operation of the software and analysing data is kept as an academic function. This example is repeated throughout the School of Clinical Medicine, where utility (or administrative) computing is run centrally by CSCS and academic IT remains within the departments.

**Utility Computing**
The CSCS provides services to users at a monthly cost. To a large extent its network, data, server, helpdesk and support provision are cost-recovered, including CSCS staff salaries. This has been extraordinarily successful and important for CSCS for a number of reasons:

- As Clinical Departments (and the user base) expand, the costs for provisioning IT Support are provided via this model. Since 2007 the department has moved from supporting 650 PCs/Macs to circa 2200. With additional service provision costs come additional funds.
- Departments are charged proportionally to their requirements; large users of IT pay more than smaller departments.
- Capital equipment replacement is factored into the monthly charges, meaning that the School does not have to provide grant funds for the replacement of core equipment, and CSCS can design an IT infrastructure with expansion and replacement cycles, given that we can estimate future income.
- The relationship between the customer and provider becomes a positive cycle, whereby customers expect value from a paid service and IT is incentivised to meet user requirements.

**Central versus devolved IT provision**
This debate has been played out within the School of Clinical Medicine over the past few years. Departments have transitioned away from departmental Computer Officers to a central service. The
overwhelming argument for devolved IT provision is to allow flexibility and focus of service on the local user requirements. Having migrated many users and departments onto our service, user requirements tend to be very similar (i.e. fast reliable networking, VoIP, data backup, desktop support etc.), in our experience it is merely the application of these that proves different. Indeed as departments join CSCS, we transition through a process of auditing and investigation prior to migration and the key differences are the manner in which services are provisioned, not the services themselves.

Benefits of centralised IT
Provisioned correctly, centrally provided services should offer improved levels of service (reliability, access etc.) with lower costs to the departments. The School of Clinical Medicine has benefited from the economies of scale of a centralised IT service. To give an example, the network team given the remit of provisioning network support from PoP (Point of Presence) to port inclusive, offers significant benefits to all involved:

- Consistent use of configuration and hardware simplify the School network (reducing complexity often reduces the risk of error, as well as improving failure response times)
- A limited amount of spares can be held to support the entire School network, and a reduction in the complexity of the network means a single engineer may be able to fix an issue anywhere within the School (allowing increased hours of support to be financially viable)
- Career and training provision can provide a structure to bring in staff and progress them through a career path
- Of significant benefit to the School is that CSCS act as a single purchaser of equipment. The CSCS often negotiates directly with suppliers to get prices which can be more cost effective than existing purchasing frameworks.

Dealing with change
IT has, and will continue to be, one of the fastest moving service sectors, in terms of requirements, expectations, tools and utility. The implementation of ‘utility computing’ at the Clinical School has allowed CSCS to become very able and agile to deal with these changes:

- As users require new services i.e. remote access to their University services, CSCS can meet these needs (indeed must meet these needs if it is to maintain its value) through monetising the services. When user requests reach critical mass, then it becomes an economically viable project, and suitable to provide. This equally disincentives minority requests (although if expanded across the University it may be easier to reach a critical mass).
- Critically, and probably of most importance to CSCS, is the funding of posts from user charges. Staff salaries no longer become a ‘default’ cost, apportioned centrally and notionally considered when calculating the actual cost of a service. Total Cost of Ownership (TCO) becomes critical in the implementation of everything that is done within CSCS. When providing a service or expanding capacity, paying for posts or paying for out-sourcing, licensing, capital equipment all come from the same source. Where IT departments have a set amount of funded posts, the only financial fluctuation on a short-term basis tends to be within the allocation of capital funds. As IT tools improve, IT staff should become more efficient year on year; fewer systems administrators required to support more servers and
data year on year etc. If the staff funding structure becomes separated from the IT capital budget, departments that are time rich and cash poor often make decisions that reflect this position.

There are services outside of cost-recovery utility computing that CSCS provides and these are funded centrally, e.g. a Virtual Learning Environment (VLE) for the students. I believe there is a case for centrally provisioned utilities; whereby the funding should be provided centrally (if it is of benefit to the Institution) and there was a desire not to charge the customer e.g. a VLE is of benefit to the School, whereas networking is of benefit to the user/department.

**Management of IT**

As a utility, CSCS is ‘managed’ by its user base as much as it is by its oversight committee. Ultimately we are assessed by the responsiveness of our Support desk, the resilience and applicability of our service. As a utility this can be monitored through metrics, which is something the review panel should give consideration to. It is important that as a service provider we are consistently given ever improving delivery targets.

Any changes to the management and structure of the IT provision within the University will only succeed with the hard work, ability and dedication of those providing the service. I would advise that any perceived cultural or service issues cannot be changed by purely altering the management structure, and so a holistic approach to IT change will need to be considered.

**Conclusion**

The centralisation of IT within the School of Clinical Medicine over the last few years has proven to be a positive experience for both customers and IT staff. With the guidance and support of the senior management within the School, utility computing has been proved to be delivering critical user requirements, in a very flexible model. Of critical importance CSCS have been empowered to generate funds and the freedom to use these funds to deliver services in a cost effective way, whilst ensuring capital provision for future service delivery.
IT Review Committee submission

In response to the review on governance, organization, and strategic development of IT infrastructure and support across the University, we would like the Committee to note that in our view the University's risk management arrangements would be better served if there was a single university IT services provider or – at the very least – more explicit reporting requirements, dialogue, and collaboration agreements between UCS and MISD. Current arrangements mean that there appears to be no single point of contact for IT on the Emergency Management Team and it is difficult to ascertain how the UCS and MISD emergency and business continuity plans intersect at a more local level.
Dear Dr Bellingham

I have for many years felt that our computer support is woefully inadequate having worked across the university and although I don’t know the costings can see from when jobs are advertised is a costly item to run and I am not sure that we get value for money for the system currently in place.

I would like to strip out computer support from all Centres, Departments and Faculties and it be run totally from the Computing Service.

It would then run on the lines of a rapid response unit with teams at various points over the university as a whole even stripping out being assigned to Schools. These teams would be made up people who could perform the standard tasks and be trained by the Computing Service (because I think even the standard of competence varies) so that it is a uniform service. People would be billed accordingly as to the task performed and they would get a timed response of when someone would be expected to call.

I hope this is the sort of response that you are looking for

With best wishes
> I only had two points to make - take them as input if you want/can; I hope others have made them.

> 1. Career paths of Computer Officers

> Our current system of CO’s assigned permanently to departments served us well in last century. It does not now.
> i) the demands in many departments get simpler as more and more systems are self configurable, but they have CO’s with more skill than necessary (and whose skill and knowledge cannot expand due to the limited demand of environment).
> That’s not fair on the department or the CO
> ii) Idle hands: there is temptation to put in customised provision which optimises today’s demands but becomes fragile in the face of industry migration
> iii) knowledge isolation. Going on courses or to meetings is not a substitute for moving people around.
> iv) there is no path for reconfiguring resources, despite the fact that this is the most rapidly changing set of needs in the University.

> We know that short term needs are optimised by department-owned COs.
> But introducing medium term assignments (eg. 5 years) would meet that need. We also know that current arrangements will require grandfathering out, but I suspect some will move scheme voluntarily once the term assignees start getting more interesting jobs (including outside the University).

> 2. Information Strategy

> I think more important than procurement or project ownership is strategy ownership. We tend to have systems owned by divisions. They protect their information. This was really brought home to me in recent discussions about energy data.

> I saw a demo of a pilot system for the Library procured externally.
> The supplier put meters in the Library which feed into their application. I am aware of frustration with the CS in providing the meters on the web which has similar functionality.
> I also saw the CS system which is largely working, gets energy data, but which is useless simply because they cannot get the information that tells them what meter is where. There is no one with bottom line responsibility for ensuring that things join up and that one division has to supply information to another. (And who can translate between the cultures.)

> Happy to go into more detail and apologies if it is all too late.

> Ian
Dr Jim Bellingham  
Secretary, IT Review  
27 February 2012  

Dear Jim  

HPCS provides both high-intensity computing, mainly in the Physical Science and Engineering areas, and also vast amounts of data storage, the latter feature becoming of increasing importance in biology both in relation to genome sequencing and cellular video imaging. The external evidence is that the Cambridge HPCS is of outstanding quality and that there is great potential for future growth scientifically and financially. However, for a variety of reasons the HPCS has not been seen as key infrastructure in Cambridge and as a result it faces major challenges, some of which are unnecessary and counterproductive. I will focus on three:

• Its current physical location in the Arup Building constrains future growth and generates large electricity costs (and carbon emissions) through inefficient cooling. This should be solved by moving to the West Cambridge Data Centre in 2013/14.

• For largely historical reasons, HPCS is currently managed through the Office of the School of Physical Sciences, reporting to the Head of School. This might have made sense in the early days when HPCS usage was dominated by DAMTP and Physics, but the customer base is becoming more diverse and the scale and complexity of operation have expanded. The School Office is not well equipped managerially, operationally, or technically to effectively support the HPCS or to make the business case for HPCS across the whole University and Cambridge area.

• The financial models generally used for computing across the University create perverse incentives that militate against the use of HPCS. Coupled with the natural tendency of academics to prefer to control their own compute clusters, this generates higher space demands, financial costs and carbon emissions than are necessary, and also fragments our high-performance computing presence, reducing our external visibility and our ability to raise funds in this area.

In Chemistry, space was, and remains, a major constraint on expanding research activity. I was concerned to see valuable lab and office space being taken up by ever-proliferating grant-funded computer clusters and their associated air conditioning facilities. The opportunity cost of taking those labs and offices away from experimental work could not be taken into account, and there was also rarely an accurate accounting of the amount of computer officer time required for maintenance of the clusters. I was not convinced that all of these independent facilities were scientifically necessary or productive but I had little
or no influence on the individuals writing their grant proposals, and there is no neutral source of advice as to whether clusters really were better than using the HPCS. I was also aware that our current financial model for HPCS requires that users pay for its electricity whereas clusters in departments are plugged in at no cost to the user. Experimentalists, of course, can also generate a large plug-load in departments with no cost at the point of use, so it would be difficult to charge only users of clusters. I believe that the charging situation in Chemistry is the norm, but that it is different in Engineering.

I have the impression that HPC in Cambridge generally risks losing out on future major funding opportunities if it continues to be fragmented between HPCS and scattered independent clusters. Also, Cambridge risks contravening RCUK rules on applying for funds for new equipment if there is appropriate capacity already here; I do not believe that adding new clusters into CamGrid really deals with this. It seems to me, therefore, that there should be stronger oversight of HPC generally, more effort put into weaning individuals away from clusters towards the HPCS, and a more attractive financial model to help that move.

The new West Cambridge Data Centre will provide an ideal opportunity: energy costs will be reduced by more efficient cooling, and will be reduced even further if the warm water can be used elsewhere and the revenue is credited, in part at least, to Data Centre users. This would be a significant help in reducing perverse incentives, but it may be that a more radical financial model should be considered so that there is an actual incentive to switch away from clusters.

On the governance and management side, HPCS needs to be separate from the physical data centre, but both need to report at a higher and more central level than a School office. It seems to me that something similar should emerge for HPCS, with perhaps the PVC for Research chairing the HPCS Steering Committee. Whatever the final reporting lines for HPCS, I think it will be essential that (a) the Director’s entrepreneurial and collaborative relationships with equipment suppliers should be retained and supported, and (b) present and future major users of the HPCS (and other HPC facilities in Cambridge) should have a serious role in guiding its future development. Put simply, central oversight should not mean that HPCS becomes remote or bureaucratic — it must remain responsive and answerable to its current and potential customers.

I would of course be willing to meet the review committee if that would be helpful.

Yours sincerely
Dear Jim,

Moving stewardship of HPCS to the centre of the University would have several inherent advantages. Chief among these would be the ability to respond better to the needs of a widening HPC user base, the provision for a sounder financial base for underwriting a rapidly expanding operation, and presumably greater opportunity in competing for national and European funding (which appears to be moving increasingly to large central facilities and networks).

Such a change in management of HPCS would not carry potential disadvantages, however. Under the current arrangement the management of the School has ready contact with the prime users and stakeholders in HPC, and this direct line of communication is highly valued by that community. If the management of HPCS were to reside at a higher level many users fear that the administration and management of the facilities could become isolated from the scientific users, and scientific priorities could be subordinated to other considerations. These concerns are especially keen among the external partners in major HPC projects such as DIRAC, and any ill-considered reorganisation could jeopardise Cambridge's standing with these groups.

My intent in raising these concerns is not to argue that moving HPCS out of SPS is necessarily the wrong thing to do. What I would argue instead is that the oversight and advisory structure of HPCS---wherever it resides---will be at least as critical as its place in the administrative structure. Ensuring that the scientific communities who provide most of the justification and the "entrepreneurial spirit" are represented in any such structure is critical I believe. Likewise I would strongly encourage the views of these scientific stakeholders to be sought out as part of your review, if they have not already.

Thank you for this opportunity to comment, and best wishes in completing this important undertaking.
Jim,

Please distribute the attachment.

Thanks,

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---------- Forwarded message ----------

Please find attached the latest revision of the IT Strategy Summary document. This has been amended slightly after discussion at today's ISWG meeting. It remains a draft, but should hopefully be useful input for the IT Review Panel.
The University of Cambridge is a complex and diverse organization; as such, its IT requirements vary drastically according to the constituency being served. In order to capture the general requirements and strategic aims, a number of working groups were set up, each aiming to capture the needs from the perspective of four different themes. In this document, we collate an initial set of principles and strategic aims across the different areas:

- **Campus Experience**: this focuses on the general needs of students (and staff, and to a lesser extent, alumni) while studying and working in the University. Key strategic aims are moving to ubiquitous on-line information provision along with universal wireless network access.

- **Teaching and Learning**: this focuses on support for teaching with, once more, an emphasis on making all materials available on-line, and readily accessible via the provision of wireless access. Some longer term goals here involve universal adoption of ‘virtual learning environments’ (VLEs), but this is likely too far out for the purposes of this strategy review.

- **Management Systems**: this focuses on the ‘back office’ aspects of the University, chiefly functions such as finance and human resources. The key strategic aim here is to ensure that systems can interoperate, and can be widely used (subject to appropriate access control). Focusing on interoperation at the level of data exchange, with comprehensive data validation on input and output, seems a promising avenue.

- **Support for Research**: this considers the various and varied forms of IT support required for the carrying out of research within the University. Apart from basic IT (workstations, printers, network access, etc), this area also identifies possible future directions in terms of the provision of University-wide high-performance computing; management and protection of research data; collaborative working support; and on-line bibliographic summaries for academic profiles, both for the REF and more generally. Overall, the required support for research changes rapidly, and hence there is need for flexible and adaptive systems.

Clearly the above areas overlap, and there is a similar overlap in terms of the principles and aims. The top-level common objectives seem to be:

(a) ubiquitous and seamless access to the network;
(b) migration of all materials on-line; and
(c) data-driven interoperation between all systems, whether provided by MISD or by UCS.

There is a less explicit, but nonetheless present, strategic aim of increased “self-service” by both students (in terms of on-line learning) and researchers (in terms of grant & personnel management).

The following sections provide the principles and strategic aims of each of the four above areas in somewhat more detail.
Campus Experience

Principles
The following strategic IT principles in this area were recognised by the Group.

- Individuals should be able to get easy access to information and facilities whenever they need to and wherever they are.
- When a University identity is created for an individual then the identity should be the same in all contexts within the University and should persist for the lifetime of the individual even after they have left.
- The University should follow the individual, providing information and facilities that are accessible and pertinent to their current natural context and not simply the context that they had when here.
- Information and facilities provided should be coordinated across the University, hence consistent structures or formats should be applied where appropriate.
- Information and facilities often have to be restricted to particular audiences, and appropriate authorisation mechanisms must be provided to cater for the many and complex user groupings encountered within the University context.
- Information should be personalised and be relevant to the individual concerned where possible.
- IT facilities provided should enhance the unique University/College experience, not undermine it.
- Multi-lingual versions of selected online outreach information should be supported.
- The underlying IT infrastructure must be capable of responding to emerging initiatives, be robust be fit for purpose, and anticipate future trends in IT usage.

Strategic Aims
The Campus Experience and Outreach Working Group has identified the following strategic aims for the next five years:

- to move towards a paperless, online information environment for staff and students alike;
- to provide unified network access (e.g. wireless) throughout the Collegiate University easy access to information and facilities whenever and wherever needed;
- to provide more coordinated information by utilising shared IT systems where possible, and ensuring that all IT systems (local and University-wide) provide standardised interfaces allowing the exchange of information;
- to improve the communication and collaboration tools available within the Collegiate University;
- to improve support for alumni (use IT to help break down the 3 year/60 year divide) including retaining information about their identities and ensuring that mass communications can be managed in a segmented and yet coordinated fashion in order to ensure that alumni are not overwhelmed by disconnected approaches from collegiate Cambridge.
Teaching & Learning Services Steering Group

Principles
Two main principles of practice were agreed:

1. the strategy should be sufficiently flexible to reflect the range of styles and practices that contribute to the University’s success in teaching and learning;
2. value for money and efficiency savings should be primary considerations for new initiatives.

The Group agreed that the strategy should focus on the following priority areas:

i. requirements and future use of Virtual Learning Environments (VLEs)\(^1\);
ii. access to computing and IT provision; and
iii. the provision of teaching material online.

Access to computing and IT provision for teaching and learning
The Group agreed that pervasive access to computing and IT provision (e.g. wifi, access to a personal computer, site licences and provision of computer rooms) should be a priority area for the strategy.

The following points were among those noted in the course of discussion:

• the strategy should assume as a starting point that undergraduate students have access to their own computer and that wifi access should be available across Cambridge;
• consideration should be given to what arrangements should be made for those students who do not have their own computer (e.g. a laptop pool or bursary etc);
• mobile and Web 2.0 technologies were not yet widely used in teaching and learning but future developments should be device agnostic so as not to preclude future use;
• there was still a demand for some large computing rooms equipped with specialist software as this enabled teaching efficiencies in certain subjects;
• a strategy should be developed for considering site licences for teaching and learning software with reference to value for money/efficiency savings and the relative merits of commercial and open source software;
• the Group regarded ‘nice to have’ mobile device developments (e.g. provision of a course calendar iPhone app) as low priority.

Provision of teaching material online
The online provision of teaching material (e.g. course web pages, lecture notes and exam questions etc) was identified as the third priority area for the strategy and is closely related to VLE use.

Members agreed that it would not be appropriate to prescribe what information should be published, but that where teaching materials are published in hard copy it would be reasonable to expect them to be made available online to students, staff within the Faculty or Department and to Directors of Studies and Supervisors.

\(^1\) At the ISSS meeting of 17 March 2011, it was noted that ‘VLE’s were of growing importance but not yet for the strategy’, therefore section (i) of the report is not included in this paper
It was noted that student expectations of what should be made available online were likely to exceed what is considered desirable or feasible.

**Management Systems Working Group**

**Principles**
A large number of principles were derived for the management systems. Some key ones identify the need for integration and usability, i.e.:

- All systems should be integrated where possible, (e.g. Finance, HR, Student, Research Grants) with the ability to exchange information as relevant to the system, plus provide the ability to export data to other systems in a controlled and secure way.
- Systems must be user friendly for the occasional user as well the frequent user, with modern user interfaces that encourage the use and adoption of the systems.
- Simplified access to systems is essential; a single log in screen to access all applications is the ideal we should aspire to.
- System developments (large and small) must ensure wide engagement with users and institution heads

A further set of principles reflect that we should follow best practice in the industry:

- The University should promote a vision of its long-term aims and make sure every new piece of software/application/development is a step in that direction; a strong communication strategy and widespread buy-in will be required for this to succeed.
- Change management for business processes and the adoption of new working methods to maximise the benefits of new systems should be widely considered and part of the system proposals at the planning stages.
- Current systems should be subject to post-implementation review and analysis when planning new systems, and lessons learnt applied.
- All new system developments should include a clear retention and archiving policy since there will not be infinite storage capacity and systems become slow and unreliable once they are saturated.
- Data entry should be closest to source and once only. Systems must eliminate duplication of effort as part of their implementation.
- Reporting (both formatted reports and free data extracts) is a key component of any system/s and should be given much greater priority. Reporting should be on-demand, reliable, accurate and available from multiple key systems.
- Greater emphasis should be placed on business analysis, planning, requirements gathering, and expectation management in systems development.

**Strategic Aims**
1. Core business processes should be identified and supported by robust business systems;
2. Leadership will be necessary to implement comprehensive business systems with associated process and cultural changes;
3. The pace of change must be accelerated given the compounding internal and external drivers;
4. The University should continue to develop our capabilities in business analysis, defining organisational needs, developing systems for usability and change management for organisational change,
5. Systems development must be guided by the principles outlined above.

Support for Research

Principles
Specifically, the university community needs and expects:

- basic IT resources that are adequately supported and refreshed in order to carry out their research, teaching and learning and administrative work;
- seamless, integrated, immediate and continuous self-service access to information and services;
- robust technology tools to support collaboration; and
- access to tools, data/information and advice that enable community members to develop the integrate software systems that they need for their own work.

Strategic Aims

Research 1: Basic IT resources and Technical Support.
Researchers and research support staff across disciplines require a minimum level of technically competent support to facilitate research, including the sharing of data. They also require access to documents and expertise to avoid significant reinvestment and training for each new research initiative.

University research units have considerable hardware and software resources that often are administered part time and may be poorly and/or insecurely configured. State of practice, resilient networking within the University and externally is essential.

Research 2: Research Data stewardship and digital asset management.
The management of disparate, massive data sets must ensure availability, accessibility and, where appropriate, security of data. This requires next-generation metadata techniques and archiving practices and tools. These requirements extend to data management requirements for the outcomes of research.

Research 3: Advanced collaborative and multi-site research tools and services.
Research endeavours between university departments, among universities and with the private sector, increasingly rely on shared resources located at multiple academic and for-profit institutions. Such collaborations need to have appropriate systems (such as ‘grid’ or ‘cloud’ computing) in place if they are to be effective.
Research 4: High-performance computing for analysis, simulation, visualisation and modelling environments including housing.
Even though computing power continues to double on average every 18 months, requirements for analysis, simulation, visualisation and modelling tools are growing even more quickly in some areas of research. Researchers increasingly need access to a ‘high-end’ computer and/or high performance computing clusters to conduct their work. Such machines make significant electrical and air-conditioning demands, and a strategy for housing and managing them is needed which both meets researchers’ requirements and balances availability and cost.

Research 5: Research Project Management.
Researchers and research support staff are required to apply for research funding and therefore need the tools to assist with the costing and management of the funding throughout the lifetime of the grant including:
- Costing proposal
- Contract management
- Workflow
- Award financial management for both the researcher and the department and Head of Departments housing the research to assist with strategic planning etc.
- Recording staff time management (i.e. timesheets) where required
- Any system(s) provided must be easy to use and provide timely information.

Research 6: Admin Output Purposes.
When research is underway and after completion, researchers and research support staff need systems to assist with the tracking of publications, impact, and other outputs such as engagement with the public. There is also the need to comply easily with any requests made for data under the Freedom of Information requests (FOI).

Research 7: Management of Relationships with Sponsor and Funders.
The University has a need to manage the corporate relationships with our sponsors and funders and therefore a system is required that will easily allow the sharing of suitable information with the relevant interested parties under suitable guidelines from the relevant University committees.

Research 8: Academic Profile and Web Promotion of Research.
There is a need to provide structured support for academic profiles across the University, including the ability to capture up to date information needed for CV’s such as publication lists and research history. We need to ensure that any existing profile data is used to alleviate the need to rekey etc. Different levels of support may need to be considered
- Standard Academic Profiled, linked to the existing University Look Up system
- Ability to pull the above through to department web pages using basic profile data held in a central source
- Use the data within “Theme” websites pulling the data through from the above.
Jim –

I asked members of the ISSS Business Committee if they thought it would be helpful to inform you of any specific topics that they wished to have raised.

They asked me to forward to you the Syndicate’s annual report for 2011, revised at the last Syndicate meeting, and the following five headings as specific topics which it might be useful to discuss:

1) Gaps in Terms of Reference
2) Relationship to Other Committees
3) Incompletely Defined Boundaries
4) Balance Between Academic and Administrative Computing
5) Project Governance

Could you let me know where the meeting is to be held and roughly how long the review group has set aside to meet with the representatives of the ISSS?
Introduction
This is the third annual report of the Information Strategy and Services Syndicate (ISSS) which meets six times each year.

Members are listed in Appendix A. Professor Littlewood was succeeded by Professor Oliver as the Vice-Chancellor’s deputy as Chairman, in April 2011. Dr Hand will succeed Professor Oliver as Chair of the ISWG in October 2011.

Operation
The Syndicate's annual cycle of business is shown in appendix B.

The ISSS has three subcommittees: the Business Committee (BC) prepares the agenda for the ISSS and ensures proper preparation and presentation of issues; the Information Strategy Working Group (ISWG) which is tasked to anticipate and gather future information needs, provide a sounding board for new proposals, advise on allocations from the Technology Development Fund (TDF), and to work with the BC in drawing up papers for formal discussion at the ISSS; and the Joint Network Management Committee which oversees the management of the University Telephone Network (UTN), the Cambridge University Data Network (CUDN), and the Granta Backbone Network (GBN).

Various other committees, Project Boards and System Management Committees report to the ISSS (some also reporting to committees in the business area they serve): the Joint Network Management Committee (JNMC), University Card Management Committee, CamSIS Project Board, Financial Systems Management Committee, HR Systems Management Committee, X5 Project Board.

The information systems activities of the Library and CARET are included within the ISSS’s remit.

The ISSS’s last annual report stated its support of the internal auditor’s conclusion that the ISSS be encouraged to shift from project governance to setting a strategic focus. As part of this, the ISSS has instituted a major review of the Information Strategy, setting up working groups to cover different uses (see below under (a)).

Although the ISSS in 2008 approved the establishment of a Project Office to assist it with the setting up and subsequent governance of major projects, budgetary constraints have prevented the creation of the associated officer post. Fortunately the need for the Project Office has not been acute as there have been relatively few new major projects, but they have not been assisted by the lack of the Project Office. That said, the ISSS has established (see (f) below) guidelines for the governance of IT/IS projects and will update these from time to time. Since IT/IS projects make significant budgetary demands and effective and user-friendly IT systems are essential to all the University’s activities, good governance of such projects is of crucial importance and the University should consider how best to monitor the
implementation of the guidelines produced by ISSS. Discussion between the ISSS and the Audit Committee may be beneficial in developing this further.

**Reporting under Terms of Reference**

*(a) to establish and keep under review, subject to the approval of the Council and the General Board and in consultation with the Senior Tutors' Committee and the Bursars' Committee where appropriate, an information strategy in support of the aims and objectives of the University and the Colleges;*

The working parties the ISSS had established to advise it on the further development of the Information Strategy (for details see annex C to the 2010 Report) reported during the year on:

- campus experience and outreach
- management systems
- support for research

The General Board's Teaching and Learning Support Services Steering Committee (on which the ISSS is represented) advised on the fourth area:

- teaching and learning

The Chair convened a meeting of the four chairs to discuss coverage of the reviews. The ISSS subsequently discussed the reports in depth and, having suggested some changes, asked the ISWG to develop a summary for further discussion, circulation and eventual adoption as the revised Information Strategy (IS). Two key themes already being addressed were reinforced by these studies: usability; and the need for Identity Management. The balance between business process change and the cost of customisation is another important theme.

*(b) to promote the adoption of the information strategy where appropriate throughout the University and the Colleges, and advise on developments in information technology and its implementation;*

A strategic implementation plan has been developed (Appendix D), but will require review when the new IS has been agreed.

The ISSS provided funding enabling UCS to complete the identity management project, which will enable an individual to be identified across systems. The next phase is to review other types of identity that span systems.
(c) to keep under review the information requirements of the University and the Colleges, and advise the Council and the General Board on priorities for and other matters relating to the development and application of appropriate information policies, facilities, and services in support of those requirements;

The ISSS maintains a rolling five-year list of developments requiring funding in excess of the regular Service Allocations. It recommends annually to the PRC which developments should be funded in the next year and the provision that should be earmarked for future years. The ISSS requests an annual allocation to the Technology Development Fund from which it can provide limited development funds. These allow small projects to be completed, and larger projects to be evaluated and brought to a stage at which support may reasonably be requested from PRC.

Approved Allocations for 2011-12 are for Research Grants Financial Management; Records Management; Documents Management; CamTools production services (at a reduced level); Institutional Repository Development and for investigation of the appropriate strategy for development of the Finance and HR Systems. This last is expected to be a major project and was registered under the Capital Projects Process. A joint HR and Finance Systems Review Steering Group was established.

The ISSS received a request from three of the Schools to support the purchase of a site-wide licence for Matlab. The Syndicate viewed this as an appropriate University-wide purchase and has asked the UCS to add it to its annual request to PRC. The Syndicate is now considering the more general issue of site-wide licensing for software which is widely used in teaching and research.

The ISSS has asked for a review of the advantages of co-ordinating the purchase of niche and specialist software to give wider benefit where needed and to avoid multiple purchases.

The planning guidance now asks institutions for early notice of local IT/IS projects to assist the Services in developing their plans. The ISSS received a summary compiled from the 2010 returns, which it referred to the ISWG to see if assistance could be provided. The ISSS has asked that it should be kept informed of all plans with a bearing on IT/IS strategy and of examples of best practice in IT/IS that it may promulgate across the university. By means of these report, and otherwise, the University should be made more generally aware of the role of ISSS and contribute to both IT/IS planning and the spread of best practice.
(d) to ensure that any such information policies, facilities, and services provided are operating effectively and are fit for purpose;

Project reports are made to every meeting. Streamlined “exception” reporting has been introduced for Service Directors enabling them to bring specific matters to the attention of the Syndicate, but whether or not there is a need for report on a specific matter the Syndicate receives activity reports at every meeting. These show the high levels of availability and use, the prompt dealing with requests and generally the very large volume of regular work delivered efficiently by each Service. The Syndicate puts on record its appreciation of the work of Service staff in delivering their vital services so efficiently and effectively.

(e) to oversee the direction and planning of the University Computing Service and Management Information Services Division and to approve general principles for the allocation of resources and priorities in the use of their facilities;

The Directors of the UCS and MISD provide service reports to each meeting. As input to the annual planning round, the ISSS reviews the Services’ strategies in July and drafts of their submissions in October.

The UCS’ revised approach to network charging gives greater certainty to capital requirements and will reduce reliance on CIF.

Arising from their review of efficiencies, the PRC in co-operation with the ISSS established a review of IT infrastructure and support to meet later in 2011. The Chair of the ISSS is a member of the Review Panel and the ISSS will contribute to the review process.

(f) to be responsible for ensuring that appropriate project and budgetary management and control mechanisms are in place for such major information systems and technology projects as the Council or the General Board may from time to time determine; and to be accountable for the funds allocated for such projects;

The ISSS has developed project governance guidelines for major projects.

The current systems are overseen by the HR Systems Committee, the Financial Systems Committee and the new Student Systems Committee, all of which report to the ISSS, as well as to – respectively - the HR Committee, the Finance Committee and the Education Committee.

A Cambridge project board was established to oversee the Cambridge interest in the “X5” project, being promoted jointly with Oxford and a Project Manager has been appointed. The satisfactory arrangements for governance of the project had been confirmed by an independent review.
The ISSS manages the Technology Development Fund (TDF). Projects that have been deemed suitable for TDF funding by the ISWG during 11/12 (although funding has not yet been committed in every case pending full business plans) include the development costs of:

- REF support system;
- “Search”; Identity Management;
- Records Management;
- timetabling/room booking;
- exam paper distribution;
- alumni system replacement;
- the University map;
- developments and implementation protocols associated with web content management systems;
- institutional repository;
- internal communications.

(g) to make, or amend, and publish rules, subject to approval by the competent authority, for the regulation and security of the use of information technology facilities within the University, and of such computing facilities in College institutions as may be designated for this purpose from time to time by the appropriate College authorities concerned, and to impose on a person infringing one or more of those rules either or both of the following penalties:

(i) the suspension of authorization to use computing resources for such a period as the Information Strategy and Services Syndicate shall determine;

(ii) a fine not exceeding maximum the prescribed by Ordinance.

Review of the rules and guidelines is an annual item of business and the ISSS is assisted in this by staff in the UCS; some changes will be needed this year following new legislation. The ISSS gave particular attention during the year to managing the risks associated with the growing use of cloud computing, in particular the security of data. Syndics’ attention was drawn by the Proctors to a complaint concerning the possible misuse of staff e-mailing lists but agreed it did not constitute misuse as defined by the Rules.

(h) to make an annual report to the Council and the General Board and to the Senior Tutors’ and Bursars’ Committees.

This report is sent to all these bodies.

Appendices

A – List of Members
B - Annual Cycle of Business
C – Implementation Plan and Glossary
### A – List of Members

The ISSS was constituted by Grace in November 2007

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<th>1.</th>
<th>The Information Strategy and Services Syndicate shall consist of:</th>
<th>Appointment to</th>
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<tr>
<td>(a)</td>
<td>The Vice-Chancellor (or a duly appointed deputy) as Chairman</td>
<td>Professor S Oliver (Professor P Littlewood until 31 March 2011)</td>
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<td>(b)</td>
<td>Three persons appointed by the Council</td>
<td>Mr. James Matheson, Engineering 31 December 2011</td>
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<td></td>
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<td>Mr. John Norman, CARET 31 December 2011</td>
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<td>Professor Christine Howe 31 December 2012</td>
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<td>(c)</td>
<td>Three persons appointed by the General Board of the Faculties</td>
<td>SAH/SHSS: Dr Gavin Alexander, Faculty of English 31 December 2013</td>
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<td></td>
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<td>SPS/ST: Dr Alan Blackwell, Computer Laboratory 31 December 2011</td>
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<td>SBS/SCM: Dr. A T Carpenter, Clinical Neurosciences 31 December 2011</td>
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<td>(d)</td>
<td>Three persons appointed by the Colleges’ Committee</td>
<td>Sir David Wallace, Master of Churchill College 31 December 2011</td>
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<td>Dr. Stephanie Ellington; Senior Tutor, Lucy Cavendish (Dr Rob Wallach until 31 July 2010) 31 December 2014</td>
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<td>Mr. Ian du Quesnay, Bursar, Newnham College 31 December 2011</td>
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<td>(e)</td>
<td>one person elected from among their own number by the officers of the University Computing Service;</td>
<td>Mr Jon Warbrick 31 December 2011</td>
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<td>(f)</td>
<td>one person elected from their own number by the officers of the Management Information Services Division of the University Offices</td>
<td>Mr Andy Richardson 31 December 2011</td>
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<td>(g)</td>
<td>two members of the University in <em>statu pupillari</em>, co-opted by the Syndicate, at least one of whom shall be a graduate student *</td>
<td>Alex Wood 31 December 2011</td>
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<td></td>
<td>Vacancy 31 December 2010</td>
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<td>(h)</td>
<td>not more than two persons co-opted by the Syndicate, provided that it shall not be obligatory for the Syndicate to co-opt any person or persons</td>
<td>Dr Robin Walker 31 December 2011</td>
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<td>Vacancy (Professor Steve Oliver to 31 March 2011) 31 December 2011</td>
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2. The Registry, the Librarian, and the Directors of the University Computing Service, and of the Management Information Services Division and the Finance Division of the University Offices, shall have the right to attend meetings of the Syndicate.

Respectively:

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<td>Dr Jonathan Nichols</td>
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<td>Mrs Anne Jarvis</td>
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<td>Dr Ian Lewis</td>
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<td>Mr Paul Dampier</td>
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<td>Mr Andrew Reid</td>
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To attend by right of Standing Invitation:

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<td>Professor Steve Young, Pro-Vice Chancellor, Planning and Resources</td>
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Secretary:

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<td>Mr. Nick Wilson, Senior Assistant Registry, Academic Division</td>
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## B - Annual Cycle of Business

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<th>Meeting</th>
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<th>Business</th>
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| 1       | Early October          | 1. Preliminary planning round discussions about MISD, UCS, UL and Projects (taking account of financial outturn for previous year)  
|         |                        | 2. Discussion of Information Strategy and annual programme of work.  
|         |                        | 3. Annual Report  
|         |                        | 4. Appointment or election of Syndics                                                                                                           |
| 2       | Late November          | 1. Final planning round submissions for MISD, UCS and Projects (having received relevant financial outturn information)  
|         |                        | 2. ISSS covering paper on planning round submissions under 1 including recommendations/priorities for resources.                                   |
| 3       | Late January/Early     | 1. Initial annual review of guidelines (in first year those inherited from ITS)  
|         | February               | 2. Annual Reports on Information Compliance and from MISD, UCS, Library (including CARET)                                                                 |
| 4       | Late March/Early April | 1. Initial planning discussions                                                                                                                                 |
| 5       | Mid to Late May        | 1. Invite comments from Syndics on (a) operation of Syndicate (b) matters to be covered in annual report for consideration by BC in first instance  
|         |                        | 2. Approve published rules, guidelines and disciplinary procedures etc                                                                                   |
| 6       | July                   | 1. Outline ISSS Annual Report including review of effectiveness  
|         |                        | 2. In accordance with the Disciplinary Procedure (para v.) to appoint a Syndic to be the Panel Convenor of any Panel that needs to be convened in the next twelve months.  
|         |                        | 3. Strategic Plans – first look                                                                                                                        |
C – Implementation Plan

The Syndicate’s Implementation Plan is published at:

http://www.admin.cam.ac.uk/cam-only/committee/isss/strategy_plan.pdf

Glossary

BC See ISSS - BC

CamTools an innovation unit focused on learning and research technologies helping the University's staff and students collaborate, communicate and interact online

CARET Centre for Applied Research in Educational Technologies

CamSIS Cambridge Student Information System

CHRIS Cambridge Human Resources Information System

CUDN Cambridge University Data Network

CUFS Cambridge University Finance System

GBN Granta Backbone Network

ISSS Information Systems and Strategy Syndicate

ISSS- BC The Business Committee of the ISSS

IS, IT Information Systems; Information Technology

ISWG Information Strategy Working Group (a sub-committee of the ISSS)

JNMC Joint Network Management Committee (a sub-committee of the ISSS)

MISD Management Information Systems Division

pFACT Project Financial, Accounting and Costing Tool; used to calculate the Full Economic Cost (fEC) of a research project

PRC Planning and Resources Committee

TDF Technology Development Fund

UCMC University Card Management Committee

UCS University Computing Service

UTN University Telephone Network

X5 The project for the replacement of pFACT (qv) grant costing system