

THE AUSTRALIAN NATIONAL UNIVERSITY



TOWARDS A COMPETITIVE
INFORMATION ENVIRONMENT

PLANNING FOR THE FUTURE

Report of the Information Policy Working Party

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SUMMARY

The creation, transmission, integration and use of information lies at the heart of the University's work: academically, information enables us to pursue our key goal of Research and Teaching excellence; intellectually, information is inseparable from knowledge, managerially, it enables us to conduct our affairs with vigour and efficiency. Improved structures, identified by the Working Party, will assist us to carry out our work competitively, with greatly improved communications and increased efficiency and effectiveness.

The urgent challenges facing us are to:

- effect a far-reaching change in our academic and managerial cultures, which will transform the ways we obtain, value and deploy information in the information age;
- provide quality education programs through flexible delivery arrangements;
- maintain global competitiveness through rapid and wide-ranging access to information, such as specialised databases;
- maintain global competitiveness through flexible teaching and learning processes;
- foster information literacy amongst the University community;
- value and respect our information processes as well as those of others whose information we need in order to pursue our research, teaching, learning and management goals, eg. copyright, cultural and intellectual property.

We face strong competitive challenges from both our traditional academic peers, nationally and internationally, and from powerful new interests entering the educational arena, principally in pursuit of commercial gains to be made from the creation and distribution of training and learning materials. Much of the information material emanating from these new interests is aimed at exploiting an increasing community demand for lifelong learning, which can be delivered through the expanding global communications infrastructure. It is essential that we meet such challenges by providing the infrastructure to facilitate learning through staff and student interaction and access to scholarly information and quality education programs.

The IP Working Party has taken a broad view of its remit. We have assumed that the University's urgent external challenges are recognised, that the advent of a new information age is broadly understood and accepted, and that the University is genuinely striving for academic excellence as defined in its Strategic Plan. We consulted some target groups when formulating our proposed actions, and believe that the implementation of these actions will position the University to meet and surmount the daunting challenges it faces.

The IP Working Party identified the need for the University to make core commitments to:

- Enhancing the intellectual life of staff, students and visitors within our University community via information literacy, and fostering innovation and creativity through a strong set of scholarly and corporate information resources.
- Fostering partnerships and broad community affiliations built upon the institution's information resources.
- Promoting information values characterised by accessibility, integrity, authority, relevance, timeliness, and suitability for the purpose for which it is to be used.
- Developing an information infrastructure of a high standard, with aspirations to leadership through attention to functionality and a seamless integration with international infrastructures.
- Ensuring efficiency in governance and management processes by strengthening academic and corporate involvement in all areas of the University's information infrastructure.

The IP Working Party has advanced goals for developing the University's information infrastructure from the distinct but inter-related perspectives of the major roles that staff and students undertake, namely, researching, teaching, learning, and managing. It has also identified services and processes which need to be introduced or strengthened in order to foster access to scholarly and corporate information, as well as the associated infrastructure required to support such services and processes.

While there is appreciable overlap between the requirements of the various goals, this analysis has led to the development of specific strategies and actions under the broad headings of:

- Staff and Student Roles
- Information Services
- Infrastructure
- Governance and Management

The Working Party believes that the University faces a choice: change or risk becoming uncompetitive. Moreover, the Working Party is confident that any difficulties of implementation of this policy will be more than offset by the resultant benefits. The University's adoption of advanced information policies will bring a quantum improvement in the intellectual environment and conditions of the University community, students, staff and visitors.

In addition to specific actions mentioned above, the Report proposes three overarching University-wide initiatives which it considers critical to develop, oversee and implement the strategies. These initiatives fall into the remit of an Information Portfolio, which should be the responsibility of a senior member of the University.

The first is development of an information infrastructure budgeting and funding system. In order to implement information policies and plans, University-wide, there must be a balance of responsibility and funding between the central service planners and providers and the devolved base of users. The University's investment in building information infrastructure must be carried by all parties, in an agreed manner, under broad policy guidelines and well understood and enunciated implementation plans. The resource allocation responsibilities under such a system must be accountable to the University Executive, at the level of the individual Dean and Director.

The second is the creation of an Information and Information Infrastructure Committee. This Committee would be the principal advisory body to the University on information matters. It would ensure the development of information services which will satisfy the strategic goals of the University, particularly those associated with support of academic excellence and scholarly information as advised by the University's Research and Teaching and Learning Plans. The Committee would report to the University Executive and the Academic Boards, and could well be formed from a merge of the current IT Strategy Committee and the Library Committee.

The third element is the establishment of a Division of Information. To align the planning, funding and management of University resources to implement the information goals, a Division of Information would be formed. This division would be responsible for the existing operational functions in the Library and IT Services and additional operational and planning functions; new or from other areas.

Recommendations to give effect to this Report are included at the relevant point in the text and summarised at Section 6. Detailed actions as listed in Attachment 5 form the backbone to the successful implementation of the proposals of the Working Party. Implementation of the recommendations and actions will obviously involve some negotiations and sacrifices in the current tight financial times. These will not be possible without wide acceptance of the Report within the University community.

SECTION 1: OVERVIEW

1.1 ESTABLISHMENT AND PROCESS

1.1.1 ESTABLISHMENT

The Working Party was established, by the Deputy Vice-Chancellor in March 1999. The Working Party met regularly and consulted on three occasions with the Reference Group, also established by the Deputy Vice-Chancellor. The Terms of Reference are included as Attachment 1.

1.1.2 PROCESS

The Working Party was convened by the Pro Vice-Chancellor, Academic, Professor Robin Stanton. Other members are: Professor Tim Brailsford, Dr Robin Erskine, Ms Fay Gibbons, Professor John Hearn, Professor Iain McCalman and Mr Colin Steele. To maintain an inclusive focus on central issues, the Working Party decided to use consultative processes rather than to establish separate working parties. Individual members took responsibility for particular aspects of the Report: Research, Teaching, Learning, Scholarly Information, Administration and Management, Internal and Global Integration, and Governance and Management. Members consulted with colleagues in their respective areas of responsibility and drafted material for the Report based on those consultations.

In addition, a Call for Submissions was issued in June. Information about the Call was sent to all members of staff and to students through a) the student associations and b) School and Faculty Boards. Because of the breadth of issues encompassed by the Terms of Reference an issues paper was prepared to guide respondents in their submissions. A copy of the Call for Submissions is at Attachment 2. Twenty-three submissions were received. The Working Party reviewed all of the submissions and members subsequently used them as a reference point in drafting their sections of the report.

1.2 STRUCTURE OF THE REPORT

The Working Party was asked to develop an Information Policy for the University and in doing so to respond against five terms of reference which address particular issues. In the absence of an existing Information Policy document the Working Party decided at the outset to develop a framework for an Information Policy suited to the University's institutional objectives and to respond to the particular issues in terms of that framework. This approach was discussed with the Reference Group early in the process. The structure of this report reflects the general framework.

The design of the structure of an Information Policy framework for the University is a complicated topic containing many subtleties. On the one hand information agendas are concerned with vital infrastructure support for the academic enterprise and on the other they are focussed on information as the intellectual product of the University. The Working Party adopted an academic enterprise focussed view built around four dimensions, namely:

- the roles undertaken by staff and students;
- the major information services on which they depend;
- the layers of the infrastructure on which delivery of and support for those services rest;
- the governance and management arrangements required to balance functionality, values and resources across the infrastructure.

As a consequence, these four dimensions have been used to structure the policies, goals and actions recommended in this report.

In addition to the goals described under those dimensions, the report contains three overarching, University wide, initiatives addressing major organisational issues. These are set out in Section 4.

The Report also aims to contribute to the ongoing development of an information policy and management plan for the University. The foundation policy statements are high level and are seen as linkages from the University's mission to information agendas, and as anchors for the further development of information policies and plans. (Existing University information policies and the legislative framework within which the University works are listed in Attachment 3.)

The Goals have been reached in the context of the current state of the information infrastructure. These, along with associated actions, will change over time and would be reviewed annually by a high level steering group. In short the Report is offered as a blueprint for action and a catalyst for debate for the immediate future, combined with institutional strategies and for planning and managing the information infrastructure over the next five year period.

1.3 BACKGROUND ISSUES

1.3.1 ANU – THE LAST FIVE YEARS

Over the past five years the University has launched a number of important information infrastructure initiatives. Chief among them were the IT Directions Statement, the Library Review, a review of Central Records, the Enterprise Solution Project and, more recently, the Australian Partnership for Advanced Computing (APAC) national high performance computing initiative. Except perhaps for the APAC initiative, which is only now entering a commitment phase, each of those initiatives led to major implementation programs which continue to shape the University's information infrastructure and its management framework. They deserve much of the credit for the strength of the current infrastructure and support services.

Over the same period there have also been dramatic increases in the use of the internet and the creation of web based distribution of information in a range of areas including, confidential staff information, student results, access to full text information and databases, Council and Board agenda and minutes and course handbooks. The University has also deepened its involvement in national and international advanced networking.

Notwithstanding these progressive achievements, the University has had difficulty in responding to emerging needs in a number of important areas such as overall planning for IT, electronic publishing, desk-top standards, course management, flexible delivery, information commons, information literacy for staff and students, e-commerce relating to scholarly information, continuous media serving and digital asset management.

In pursuit of solutions to these needs, specific initiatives were taken such as the Centre for Networked Information and Publishing, the Teaching Development Laboratory, and the Multi-media Instruction and Learning Laboratory. However these initiatives did not prosper.

Also there have been several investigations, based on study groups and seminar series, into issues such as electronic publishing and virtual universities. Some of these efforts led to proposals but none led to action. Reasons for lack of action included difficulties with integration across areas, with obtaining clear priority settings from University planning processes and with ownership of issues within senior management. These difficulties are also implicated in the dramatic decline of the Library's capacity to deliver effective support for teaching and research. However, the primary concern in that area is the problem of funding unprecedented escalation in the cost of books and serials, and the flow-on pressure for services to electronic provision of scholarly information.

In broad summary then, the last five years have given the University strengths in some areas and weaknesses in others. This report does not set out to review the latter however it is appropriate to comment further on reasons for difficulties in some areas since they have influenced the Working Party in reaching their proposed actions.

Under the general heading of management difficulties within the University's devolved structure there have been misplaced assumptions about where responsibility lay for funding and managing information environments. This is especially true for desk-top services where the problem of bringing all areas up to an acceptable standard is yet to be solved.

Apart from the issue of clear descriptions of responsibilities, covering Senior Officers as well as Heads of areas, there was a lack of effective management processes to deal with the wide range of issues requiring integration across areas. A related issue was the need for a broad-based acknowledgment that the University's academic goals rely on a high quality information infrastructure and on developing a culture of adapting to change. At both area and executive levels, the link between academic and infrastructure goals was not always strongly made.

The advisory structures derived from the Information Technology Directions Statement served the University well for a number of years. However, subsequently the environment changed quite rapidly, and it is now time to revise arrangements. To illustrate the impact of change in the environment, the Electronic Information Committee, the User Services Committee and the Network Services Advisory Committee were discontinued within a year or two of their establishment and the Teaching and Learning Technology Advisory Committee was discontinued due to the need for restructuring in teaching support areas. Further the current Management Information Services Advisory Committee meets infrequently, in part because of the creation of the ESP Steering Committee, and the High Performance Computing Advisory Committee was becoming less of a campus-wide advisory body until recently, when the APAC initiative has led to its rejuvenation.

The Information Technology Strategy Committee and the Library Committee (with advice from four discipline-based advisory committees) remain the major sources of advice to the University in information areas. However apart from problems of coordinating overlapping interests between these two committees, they do not have an overview of all of the information infrastructure issues, nor do they have oversight of associated management plans.

The need for a major IT training and information literacy program was strongly recommended in the Directions Statement. The recommendation was followed up with appointment of an officer to develop integrated training strategies. However the initiative waned through lack of acceptance in areas of the need for such programs, or perhaps appreciation of the need to fund staff training. In addition there was no ownership of the overall process. One successful outcome was the provision of training, organised by IT Services, for local IT support staff (LITSS), jointly funded by the University, the Division of Human Resources and IT Services.

As a final comment on the lessons which the Working Party takes from difficulties which emerged over the past five years, it is fair to say that the University has lost considerable ground in areas of strategic importance, especially WWW-related areas, and that in the process the institution has lost valuable staff and expertise. The Working Party believes that the University can and should recover that ground and aspire to leadership in the functionality and quality of our information infrastructure.

1.3.2 CHALLENGES AHEAD

Over the next five years, many of the challenges facing higher education institutions are intimately related to the impact of information technologies on academic practices and more generally, on the evolution of practices in line with the rise of the information society.

To guide its thinking, the Working Party identified four aspects of the future as high priority challenges to which the report and its recommendation must respond.

Learning centred culture:

In broad terms the traditional discipline centred model for higher education will move towards a learner centred model. The emphasis will be on facilitation of learning and the management of processes and information sources through which educational objectives

can be realised. Accreditation of learning outcomes will be closely related to the quality of the associated processes and information sources. Life-long learning paradigms involving educational opportunities, integrated seamlessly with employment and other practices, will be normal social expectations. Developments in these directions are already changing the funding models for higher education and the structure of academic work. On this last point, an informed estimate is that in five years time some 30% of academic time will be spent on facilitation of learning at the expense of traditional teaching activities.

From the higher education perspective, the onset of the information society and the evolution of a learning culture are tightly coupled concepts. The fabric to support educational services having the focus and quality of "higher education", as we know it today must be embedded in the global information infrastructure, in part to ensure that such services are affordable. Synchronous learning and flexible delivery mechanisms will of course be dependent on those infrastructures. Campus based infrastructures will, as now, develop well in advance of national and international network services. At present, campus infrastructures which support interactive, continuous media applications, built upon broadband services and next generation internet protocols are being implemented. In addition, higher education institutions are driving the development of next generation internet services through high performance test beds. The front line role played by higher education in these areas reflects the importance of emergent information infrastructures to the competitive positioning of institutions. The importance of being involved in these developments is also reflected in the intensity of research into effective methods for high quality outcomes from learning processes mediated by information infrastructures.

Frameworks for research collaborations and publications:

In research, as in most other academic areas, the impact of collaboration technologies will lead to dramatic changes in the way research is organised. On-line laboratories will provide "tele-access" to rare (or expensive), research facilities, distributed design teams will work effectively in interactive modes, computational modelling will take place within the infrastructure itself, and large scale research databases will provide opportunities for integrating empirical information on a hitherto unheard of scale.

High performance computing in its own right is paralleling the communication revolution, for similar technical reasons, and will continue to consolidate its role as a fundamental mode of enquiry into the sciences, arts and humanities.

Perhaps the most significant change for research methods arising from information technologies is the rapidity with which new information, and new knowledge, can be transmitted and assimilated. The time to refereed publication will continue to be shortened, quite dramatically in some disciplines, and a culture of "partial-publication" will continue to grow through researcher's enthusiasm to exchange information about discoveries without traditional publication delays. More generally, research publications will be aligned with the concept of providing "learning experiences" about research outcomes for a broad college of interested "readers". Such publication will include access to setups whereby "learner-readers" can experiment for themselves.

Management of scholarly information: transformation of library services:

The principle role for libraries in the 21st century will be the organisation and certification of information through generic and specific portals and the facilitation of access to and distribution of scholarly information. Issues to be addressed in this context will include: copyright and the ownership of intellectual property both in an incoming and outgoing university setting and the use of that information; authentication and the ability to be at the cutting edge of global information; and the effective combination of site-wide licenses and document delivery platforms. In addition libraries

will be involved as co-partners in development of electronic publishing models within Universities.

As the future unfolds in this direction, library services will have a distinct hybrid character, mixing traditional services with programs to assist in changing to facilitation and brokering roles. The hybrid library provides difficult challenges both in funding models and in the diverse needs of the user populations. Overseas models have seen a requirement for institutions to focus on changed user patterns and also to gain access to material until new scholarly changes take effect, and especially to take into account marked discipline differences in the rate at which these changes are occurring. It is quite clear however that we are moving into a century where information will be the economic and social driver and it is imperative that library services stay abreast of those changes.

Globalisation and Partnerships:

Globalisation of the higher education "market place", combined with deregulation in the national system, has become a major driver for change in the Australian system. The emergence of globalisation is closely tied to the onset of the information society, and so it is not surprising that institutional responses are also based in the enabling technology developments mentioned above.

There are many models which the University could support within its globalisation strategy, however most involve partnerships of one sort or another. Partnerships will focus on building the institutional strength required for successful competition, or for providing the distributed infrastructure needed for collaborative ventures such as shared laboratories or jointly taught courses. Depending on the depth of integration of resource and responsibility arrangements between partner institutions, shared information infrastructure will be critical to their success. This issue extends well beyond bandwidth and connectivity between institutions, reaching into the design of teaching materials and corporate systems. The latter is often overlooked. However the design of corporate systems is a critical issue if they are to provide access to management information and the authority to run transactions at enterprise levels.

SECTION 2: FOUNDATION POLICIES

2.1. PURPOSE

First, to learn the nature of things.

The University is first about learning, but more broadly about the creation, transmission, integration and recording of knowledge. The University pursues its purpose in this sense through its traditional constitution as a community of scholars engaged in research, teaching and outreach activities.

Resting on the relationship between information and knowledge, the creation, transmission, integration and recording of the knowledge underpins the centrality of information to the University's mission. Information viewed from this perspective is generally referred to as "scholarly information".

Although scholarly information is the sine qua non of Universities, the vitality of institutions and the effectiveness of their academic enterprises depends equally on many other kinds of information. These other kinds include course description, faculty structure, policy, planning, management, enrolment, student, finance, staff, campus news, and so on. Collectively these other kinds of information are covered by the term "corporate information".

Information policy in the ANU setting is about valuing and managing scholarly and corporate information. Such policy recognises the essential partnership between information, academic endeavour and institutional goals. Values attached to information resources, combined with those related to human resources, drive the development of infrastructure programs and associated deployment of information technologies.

Information technologies are affecting academic practices in quite profound ways. Information policies provide a framework through which those effects can be harnessed to the University's aspirations. Chief among those effects is the dramatic weakening of space and time constraints on access to information, and the rapidity with which information can be diffused throughout a community. Convergence across media forms and remarkable advances in communications technologies underpin the ongoing, equally remarkable, pace at which academic practices are being aligned with the tenets of the information society.

Rapid diffusion and the intimate linkage between scholarly and corporate information in research, teaching, learning and learning activities argue for information policies which are themselves capable of being diffused throughout the institution's organisation and processes. The policy statements in the following section reflect this aim. They address the University's priorities in four major areas, namely:

- commitment to staff, students and the broader community,
- commitment to information values,
- commitment to information infrastructure
- commitment to governance and management.

2.2. POLICIES

The following policies link information agendas to the University's mission. They are expressed in terms of commitments to the four major divisions: staff, students, community; information values; infrastructure; governance. They are proposed as foundations for the ongoing development of information policy for the University.

P1: COMMITMENT TO STAFF AND STUDENTS AND THE BROADER COMMUNITY

The University will provide staff and students with an information rich environment and associated services in which to pursue their institutional commitments and to fulfil their related personal ambitions. Innovation and creativity within these environments will be fostered. In addition the University will nurture information literacy through standards based systems and educational programs.

The University will work with our partners, within Australia and overseas, and the Australian community to make information readily available for education, research and innovation.

P2: COMMITMENT TO INFORMATION VALUES

The University will ensure that corporate and scholarly information is held for the benefit of all members of the University community and in a form which reflects the following values:-

Accessibility: through open access policies in which information is readily available to all staff subject only to privacy and confidentiality constraints;

Integrity: through quality assurance policies which ensure that information is free from misleading filtering or corruption;

Authority: through quality assurance policies which ensure that sources of information are accurately attributed;

Relevance: through record and archiving policies which ensure that information is supportive of the University's mission;

Timeliness: through management policies which ensure that information is available without undue delay;

Fit-for-purpose: through quality assurance policies which ensure consistency between data and meta-data.

P3: COMMITMENT TO INFORMATION INFRASTRUCTURE

The University will vigorously evolve and maintain a world class information infrastructure and its seamless integration with national and global information infrastructures. In this context, the University aspires to leadership in functionality, in effectiveness, and in efficiency of its information infrastructure.

P4: COMMITMENT TO GOVERNANCE AND MANAGEMENT

The University will preferentially adopt governance and management processes which strengthen the information infrastructure and its potential to provide freedoms and creative opportunities for staff and students. In particular the University will adopt communication, messaging and information access standards which empower staff and students within a devolved management structure.

Recommendation 1:

That the four foundation policies :

- commitment to staff, students and the broader community,
- commitment to information values,
- commitment to information infrastructure
- commitment to governance and management

be adopted by the University.

SECTION 3: OBJECTIVES

This section is essentially a 'needs analysis' driven by: roles that staff and students play, scholarly and corporate information services, supported information infrastructure and requirements for management and governance.

Each of these four areas has a separate sub-section below describing high priority goals. Overlapping and complementary needs among the areas has led to a certain amount of repetition which the IPWP has let stand in the interests of capturing requirements for each area in a 'stand alone' form.

3.1. STAFF AND STUDENTS: PRINCIPAL ROLES

The major roles played by our staff and students are researching, teaching, learning and managing (or administering). These are discussed in turn below.

3.1.1 RESEARCHING

Goals:

A1: Optimise the ability to catalyse research and to enhance competitiveness

A2: Maintain high quality communication infrastructure

A3: Establish computation-based facilities which are of world standard

A4: Coordinate support for access to scholarly information

A5: Provide support for publication of research outcomes (especially in electronic formats)

The future research environment

Far-reaching changes to research and research training represented by the Federal Government's recently published position paper,¹ will create a new and unprecedented research environment. As a result the University is being pressured, through funding incentives, to improve its performance in research training, while simultaneously having to redirect research activities from basic research towards applied research, or towards research which demonstrably addresses national needs. This new government direction poses a dramatic challenge to a university such as the ANU which has traditionally excelled at basic research, and which is strong in disciplinary research fields such as the humanities or pure sciences, where applied or socially utilitarian outcomes are unfamiliar and elusive. In order to meet this critical challenge to our research pre-eminence, the University will need to develop an information environment which, wherever possible, fosters collaborative team research and which enhances the development of collaborative research projects and consortia with industry partners (including governmental and cultural institutions).

Research programs will need to be designed to facilitate staff and student exchanges between educational institutions both within Australia and abroad, and between university consortia and industry. Above all, such research programs will have to strengthen our sometimes attenuated links to postgraduate training. Since government and industry increasingly envisage the core functions of our economy being conducted using information and communication technologies, we will need to demonstrate a distinctive capacity to provide postgraduates with high-quality training in portable generic skills of communications and problem solving.

¹ *New Knowledge, New Opportunities: a Discussion Paper on Higher Education Research and Research Training* (Canberra: AGPS, 1999).

A1: Optimise the ability to catalyse research and to enhance competitiveness

Although library-based services will continue crucially to underpin our research efforts in all fields, they will inevitably need to do so in new, as well as traditional, ways. In the future the library will have to become a pre-eminent repository and gateway for stored digital assets and collections, as well as a manager of existing collections. Controlled access to such a library will greatly facilitate the deployment of information resources needed for the efficient conduct of research and the management of intellectual property. In the information age the library will also continue to function as a catalyst for research through participation in the production and the delivery of research outcomes.

With the increasing introduction of e-commerce, the library may also become an important source of university income. Since the possession of high quality digital resources is also likely to be an important asset in negotiating access agreements to similar collections held nationally and internationally, the library of the future could play a major role in enhancing the research environment through international trading in digital research information and knowledge.

A2: Maintain a high quality communication infrastructure

Successful research and research training outcomes will increasingly rely on access to high quality communication infrastructure. In practical terms, this means researcher access to up-to-date information through communications technologies and associated networked facilities. Network bandwidth, quality of service, reliability and interoperability of standards will be critical factors for future research success in all fields. The University must develop a policy that supports the phased acquisition of new technologies and services as these become available. Technologies which support collaborative academic ventures such as virtual laboratories, tele-instrumentation, virtual design spaces etc. are major drivers for network developments. It is vital that the University is vigorously involved in taking advantage of such technologies and in the associated network development.

At the research unit level, we must accelerate the rate of updating information infrastructure such as network switches and high capacity data cabling if we are not to fall behind our research competitors. Priority must be given to assessing the data and infrastructure needs of research projects in all parts of the University, and to devising mechanisms which encourage such needs to be incorporated into departmental and faculty budget planning, and into external funding applications where appropriate.

A3 Establish computation-based facilities which are of world standard

Broad access to technologically sophisticated computational facilities is essential in order to meet the University's research aspirations, whether in the sciences, social sciences or humanities. The provision of such services must be accompanied by training in their use as research tools, and by associated technological expertise and advice.

At the same time, provision of computational services should also recognise the distinctive needs of different research communities within the University. There is a mounting need for more specialised and differentiated access to high performance computing. The scientific modelling will be handled by an ANU computational centre in association with the Australian Partnership for Advanced Computing (APAC). This is especially important for research projects that require the processing and analysis of large data sets.

There is also an emerging requirement for specialised high performance computing in new research areas resulting from cross-disciplinary fusions. Such areas include: statistical analysis; geographical and environmental information systems; 3D visualisation and animation; and digital video and hypermedia production. The most effective way of using such complex and expensive computational facilities to enhance research outcomes is to concentrate them in clusters, supported by expert advice and assistance. Budgets will need to be allocated to these research clusters or groupings to ensure that work-stations are replaced in a two to three year cycle, and that software is upgraded as vendors release new versions.

If the University is to succeed in fostering the necessary future symbiosis between research and postgraduate education envisaged by government, it will also need to provide the high-quality computational research skills required by modern cultural and media industries. Consideration must therefore be given to providing postgraduate access and training to computational resources such as high performance graphics work-stations, digital video editing suites and studios. Equally, if faculties, schools, centres or cross-university consortia seek to engage in collaborative research projects with business, cultural and media industries, consideration must be given to supporting their communications infrastructure needs.

A4: Coordinate support for access to scholarly information

Access to scholarly information is the life-blood of research. It is indisputable that researchers must have quick and economic access to relevant information resources (i.e. databases). However, while a great deal of information is appearing in digital form it must not be forgotten that research in certain disciplines, notably in the humanities, is highly reliant, and will be for the foreseeable future, on information in conventional print-based formats (books, learned journals). Careful consideration therefore has to be given to balancing the disparate needs of researchers.

To cope with the convergent factors of shrinking budgets and the explosion of available information resources, the University must identify and plan for the print-based needs in areas of current and projected research strength. Strategies should include development of strategic alliances with other universities and commercial publishers in order to develop alternative means of production and distribution of scholarly information (i.e. 'print on demand' services).

The University should also implement enterprise-wide policies and programs that support the cataloguing of its information resources. The widespread application of metadata standards, such as Dublin Core, will greatly facilitate the location and retrieval of information resources. Similarly, the adoption of server technologies, based on the Z.39.50 standard, will enhance the capacity of international and local researchers to locate and access the University information resources.

A5: Provide support for publication of research outcomes (especially in electronic formats)

Clearly, there is a general need for facilities to meet current and projected research aspirations in areas such as electronic publishing and information retrieval. It is widely accepted that publication is the primary outcome of research, notwithstanding changes in the forms of publication. Improved processes and facilities for publication and delivery are needed to enhance research competitiveness across all fields.

One way to do this is for the University to develop a model software environment that provides networked content management, production facilities and delivery mechanisms for research outcomes. Such research outcomes need to be developed in flexible digital forms so that they can be delivered both through the web and in conventional print-based formats. Ideally, the University's publication environment should be interoperable with the digital initiatives currently being undertaken by leading national and international research libraries.

One of the University's long-term research goals should be to create an information environment whereby research communities are able easily to encode the structure of documents at the time of composition, and to check structures automatically against specified encoding conventions maintained at a central networked location. This would ensure the integrity, archival stability and hyperlink performance of documents. The environment should also be designed to facilitate the publication of documents in multiple forms. The University will therefore need to invest in an enterprise-wide document management and production system that supports structured document standards, such as SGML and XML.

An important research supporting initiative in which the ANU is already a partner is the Australian Digital Thesis Project (ADTP) which seeks to establish a distributed database of digital versions of theses produced by postgraduate researchers at participating institutions. These theses are made available via the World-Wide Web, first in portable document format, and at a later date

in structured document formats. The IPWP believes that the University should strengthen this initiative by moving to mandate electronic submission of theses. This would reduce the cost of archiving and storing new theses, enhance the international research presence of the University, and encourage students and staff to develop expertise in electronic publication as well as the kinds of generic communication skills identified by government as an essential component of future research training.

3.1.2 TEACHING

Goals:

B1: Provide an environment for innovative development and enhancement of teaching materials

B2: Provide an environment for enhancing teaching methods and effective and efficient management of course delivery

B3: Develop and maintain a quality learning environment for information and IT literate staff

A primary role of a university is to educate students. Education involves the collection, understanding, attainment and dissemination of knowledge: the role of information in education is paramount. Increasingly, access to information is becoming cheaper, easier and more widespread. These developments have been to a large extent driven by changes in technology. Therefore it is argued that technology, information and education are almost impossible to separate.

There are two main facets in the educational process that are considered essential. First, there is the design of courses and units reflected in such things as teaching materials, syllabus design and assessment tasks. While syllabus design for specific learning outcomes is normally based in discipline knowledge, effective syllabus design is heavily grounded in core or generic principles. However, the application of these principles can be hindered by a lack of suitable and effective infrastructure in the educational environment.

The second important facet is the delivery of courses and units. Delivery methods vary considerably and there is much debate about the optimal method. Different disciplines require different methods that can range over laboratory settings, fieldwork trips, classroom contact and self-study. The rapid advancement in technology has opened new doors to delivery opportunities. The variety of delivery methods, mix of learning objectives across disciplines and the diversity of students require a great deal of flexibility in the infrastructure and support environment. Moreover, successful delivery relies upon efficient and effective course management systems. Administrative costs of course management are often borne by individual instructors and these costs limit optimal delivery methods. As a simple example, the use of email as a means of student contact can be highly inefficient if quick and reliable email address lists cannot be readily generated.

In this section three broad goals are proposed. They focus on the development of teaching materials, on the environment for teaching methods and course management and on a quality learning environment for information and IT literate staff.

B1: Provide an environment for innovative development and enhancement of educational materials

Leadership in education depends on having an environment which allows for the development of best practice. Teaching materials, in any form, are vital to the teaching process. Staff cannot be expected to develop quality teaching materials on their own. Such an expectation is inefficient and unrealistic, given the constraints on staff time and their limited range of expertise. Although staff are expert in their disciplines, they are not in general expert in the full range of design, development and production of materials, particularly in an era of major technology change. To assist with this process, a central unit that possess this expertise should be established. That unit needs to be a 'one stop shop' where staff can come and translate their ideas into reality.

Significant synergies can be expected if such a unit is also able to pass on information relating to teaching developments across the University and the larger sector. To maximise the effectiveness of this information transfer, points of contact need to be established at the local area to act as a conduit and facilitate the flow of information. Such points of contact need also to be strongly

integrated into the local area, through consultative and representative committees/groups. This structure has at its core the concept of information-sharing.

To be effective in the information era, staff will need to have access to global information resources and the skills to integrate these for teaching purposes. This will necessitate seamless communication linkages and an appropriate policy framework for intellectual property issues.

Finally, in order to provide incentives and encouragement for educational developments to occur, appropriate recognition and reward structures need to be established.

B2: Provide an environment for enhancing teaching methods and effective and efficient management of course delivery

This goal should be considered as complementary to B1. The challenge is to design flexible delivery methods and an institution-wide capacity to deliver such methods. The University needs to position itself to take advantage of changes in technology and advancements in teaching strategies by a change in culture to one where flexible delivery is not regarded as exceptional but rather as standard practice. Reliable, efficient and ubiquitous access to information sources is a fundamental prerequisite for flexible delivery. Consistent access must be provided from both inside and outside the campus to information within the ANU linked to national and global sources. Such access must be authenticated, authorised, efficient and equitable.

Development of teaching infrastructure must become an integral part of the planning process. Funding should be linked to planning that is based on enrolment figures, projections and demand. Changes in teaching methods and delivery, and educational technology developments require that teaching room developments are consistent with course plans and student enrolments. Teaching room developments must become fully integrated into and prioritised within the Capital Management Plan.

The infrastructure must be developed through a strong commitment to consultation within the academic community and a strong commitment to training. Test beds need to be developed to trial innovative developments. Consistent with other scholarly activities, teaching developments should be viewed as a form of research. Hence, just as we provide experimental facilities for traditional research, we should also establish environments to evaluate and establish best practice in teaching.

B3: Develop and maintain a quality learning environment for information and IT literate staff

An existing problem in the University is the wide variation in information literacy across campus. There is little point investing in new technology and developing new course delivery methods if staff cannot effectively utilise the technologies. The rapid pace of change exacerbates this problem. The University must accompany investment in technologies with investment in its human capital. Current levels of staff information literacy should be established, and required levels of information literacy specified, to inform an information literacy program. This will also involve the development of information literacy standards and policies and the coordination of a campus-wide set of training programs. Further, a rich flow of information concerning these developments should be established along with a central depository of technical advice that services local areas.

3.1.3 LEARNING

*Goals:**C1: Develop and maintain a high quality infrastructure for student information**C2: Develop and maintain a quality learning environment for information and IT literate students****C1: Develop and maintain a high quality infrastructure for student information***

Students are dependent on information infrastructure for their learning. This infrastructure needs to be coordinated across campus and integrated into University planning. At present, the quality of infrastructure varies greatly having been developed in some areas on an ad-hoc basis. A lack of a coordinated oversight of student infrastructure also manifests itself through problems in communication. To overcome these difficulties a responsive and accountable management structure needs to be developed. That structure should have responsibility for computing laboratories, IT facilities based in libraries, teaching rooms and associated infrastructure. Existing support units need to be integrated into this framework.

From the graduate student point of view, variation in infrastructure is driven in part by budget differences and priorities between local areas. A central policy needs to be developed that specifies and provides for a base level of information and IT resources. The needs of graduate students, particularly in teaching areas, can be different from undergraduate students, however there is a substantial overlap. Specialist teaching laboratories and areas for independent study in on-campus and off-campus environments, assisted by specialist advice on demand, will be required to take advantage of new technologies and teaching methods.

Postgraduate research training should include an induction process whereby students are assessed for their knowledge and skills in information technology. Structured programs to bring students up to minimum standards should be set by the Graduate School in consultation with the relevant disciplines. In addition, throughout the candidature of the research student, opportunities should be provided to fulfil both the generic and the specific requirements of their research training. These programs should be subject to quality assurance and evaluation. Consideration should be given to formal accreditation of expertise and skills acquired through successful completion of these programs.

C2: Develop and maintain a quality learning environment for information and IT literate students

The ANU is a place of learning and the provision of a stimulating and effective learning environment is a key, if not the, primary goal. The University expects staff and students to form a learning community and should provide effective support structures to that end (*First, to learn the nature of things*). Increasingly such support will be technology-based. The infrastructure will need to be flexible, useful, responsive and accountable and driven by policies which link strategic directions, funding and planning. In addition, staff and students require information and IT literacy. The University should determine the common levels of information literacy it requires and then implement strategies to ensure that information literacy is achieved and advanced over time.

The diversity of the student body is, in part, reflected in varying levels of information literacy. The variation must be respected in the design of curricula. Required levels of literacy should be established and courses made available, perhaps for credit. There is little doubt that each generation of students enters the University with higher levels of information literacy. This in turn will affect the extent to which IT skills are embedded in core units in the early years of a student's degree. Moreover, for those students who fall well short of set standards, bridging courses need to be developed and coordinated.

Flexible learning arrangements have always existed. The University does not now, and will not in future, bear all the costs of a student's learning infrastructure. Further, students do not perform all of their learning tasks using University facilities. Policies should be developed to define the infrastructure which the University will provide and students should be clear about what they are expected to provide for themselves. The latter in particular is important with respect to ownership of personal computers and the associated need for interoperability with the University's infrastructure.

More generally, flexible learning strongly supports the concept of information commons which are independent of discipline. The concept can best be viewed as providing access to infrastructure for a 'generic' student. Even without the strong interdisciplinary nature of the ANU, as reflected in our combined degree programs, an information commons has become an essential part of campus facilities. Such commons will also serve our general community—visitors, the public, alumni, students and staff from other organisations.

3.1.4 MANAGING

D1: Design and implement effective management methods, systems and support structures which are designed to collect, transform and deliver relevant information for analysis, modelling and strategic decision making

Many members of staff have an administrative or management role. For many academic staff this role is undertaken in addition to their primary function. Therefore administrative tasks need to be well defined and supported by effective information systems. Some academic staff, for example Deans and Directors, need access to management tools and methods to undertake their increasingly complex and demanding management roles.

D1: Design and implement effective management methods, systems and support structures which are designed to collect, transform and deliver relevant information for analysis, modelling and strategic decision making

New management methods, systems and support structures which are designed to collect, transform and deliver relevant information for analysis, modelling and strategic decision making will improve the ability of the University management to determine true costs of services or courses, predict future trends, and develop strategies for the introduction, improvement or elimination of services or courses.

Management systems will include Activity Based Management information, University Planning and Simulation information, and Performance management.

Information systems and services must provide timely and relevant information to the desktop of staff who have a management or administrative role. Functions such as obtaining class lists, timetabling, meeting scheduling and communication must be readily accessible, and effectively integrated, so as to save time and effort.

3.2. INFORMATION SERVICES

3.2.1 SCHOLARLY INFORMATION

Goals:

E1: Provide timely access to scholarly information for research and teaching

E2: Consolidate access to scholarly information through appropriate training and resource provision

E3: Optimise the generation and distribution of scholarly information

E4: Develop strategies that encourage innovation and optimise resources

E1: Provide timely access to scholarly information for research and teaching

Libraries in Australia are facing significant challenges, particularly as a result of the monopolisation of scholarly information by a small number of multi-national firms, who operate both on the Internet and in print. Other contributing factors are the decline in higher education funding and the lack of a nationally coordinated approach to maximise resource provision.

Libraries are currently in a transitional mode – a global term in current use is that of 'hybrid libraries', a mix of print and digital resources. On the former, Libraries still need to acquire a significant amount of material in print form. Currently the ANU Library takes in between 30,000-35,000 volumes per annum and has a stock overall, in twelve different locations, of nearly 2 million volumes. The responsibility for this print repository is still extremely significant in a university context particularly for those areas which rely on the print monograph as the principal outlet for scholarly communication, eg, Asian Studies, and parts of the Social Sciences and Humanities.

Strategies which adapt to changing print and electronic dimensions need to be put in place. Consideration should be given to transition funding models, while scholarly communications issues are addressed globally, to facilitate more campus wide electronic access particularly at the document level. Models elsewhere have shown the effect where integrated user and electronic services have been put in place across the spectrum of staff and students, for example the University of Queensland's award winning Cybrary. Library Committee deliberations on core values for the Library of the Future will feed into the campus wide debate.

In terms of access to scholarly information, delivery will be increasingly through the desk-top computer, Information Commons-based for undergraduate students. In addition many student needs will be met by customised packaging in print and multi-media format. Physical facilities, such as the Information Commons, will need to be designed to provide central, secure access and appropriate help functions. Postgraduate research students will be supported through the Commons as well as through their departmental environments.

E2: Consolidate access to scholarly information through appropriate training and resource provision

As mentioned elsewhere in the Report, services need to be provided on a local needs basis so that the overall picture is one of centralised help facilities that are linked to customised local facilities. It is apparent that, outside of specific subject disciplines (in which electronic resource access instruction is already taking place, e.g. in the Law Library), programs are required to provide training in generic web content, and information literacy programs. Assistance could be channelled through a central physical facility such as an Information Commons or through a decentralised coordinated model in which the Library as an "Information Centre" works with other units on campus to provide an integrated service.

E3: Optimise the generation and distribution of scholarly information

One of the major information issues being faced globally is the fact that many scholars renounce their copyright and cede both print and electronic copyrights to the multi-national publishers. A number of initiatives are taking place internationally which require close monitoring and involvement. It is quite clear that current University policy is quite fragmentary in the knowledge of, and collaborative action on, such issues.

In addition facilities have to be created for electronic publishing output in terms of ANU material, particularly grey literature which is not placed with commercial providers. A decentralised but integrated one-stop-shop for ANU publications is required. Help facilities may well be incorporated in an information commons type facility which also could be involved in the content integration of such areas as electronic reserve, lecture notes, digital lecture provision and anticipated changes to reading bricks access. There are significant opportunities for liaison with commercial providers in these areas, particularly if branded physical or virtual facilities are provided.

E4: Develop strategies that encourage innovation and optimise resources

The Library, like many other parts of the University, will need to review its role in the information era. Some activities will need to be dropped because of resource priorities, others will change simply because the mode of access no longer requires physical visits to the Library and new roles will be adopted because of the need for integration of the different information components in a net environment.

Libraries will be responsible for the organisation and certification of information through generic and specific portals. The role of the Library will be that of a facilitator for print and electronic information. Issues to be addressed in this context will include copyright, authentication, and the ability to be able to access at the desktop the cutting edge of global information. Strategies will require the identification of core values to support research and teaching as well as innovative trials to impact on scholarly communication habits.

3.2.2 CORPORATE INFORMATION*Goals:**F1: Provide quality corporate information services to staff and students of the University which will streamline administrative processes and facilitate decision-making at all levels**F2: Develop an information literate community within the University*

In the current economic climate ANU must be prepared to change and streamline its administrative processes, policies and administrative structures, to change the cost base and improve outcomes over the next five years. The use of quality information to improve service, reduce redundancy and save resources, together with programs to move to flexible team-based structures and open networked organisations, must be undertaken. These needs are recognised in the Enterprise Solution Project initiative which, at the time of writing this report, has developed substantial momentum.

F1: Provide quality corporate information services to staff and students of the University which will streamline administrative processes and facilitate decision-making at all levels

Prior to 1990, ANU administrative systems were transaction-based and staff were mainly data processors. Information (data that has been processed into a form that is useful for decision making) was ill defined and considered unmanageable. Rarely were such systems designed to meet the planning, monitoring, and controlling requirements now being imposed. Organisations could manage data, or systems, or records (usually the responsibility of the Computing Services or IT Department) but information was considered too nebulous a commodity to declare a

corporate function. Today, information management which ensures that the information used in the decision making process, is accurate, complete, up-to-date and protected (if appropriate) is critical/crucial to the effective operation of the organisation. Information issued by one School, Centre, Faculty or Division may for instance arouse expectations or give rise to demands from a different School, Centre, Faculty or Division. The major challenge is to assess what impact information in one area of responsibility may have in others, and develop corporate solutions accordingly.

As the applications and information become dispersed throughout the organisation, ways of managing and deploying resources required to plan, manage and operate in that information environment must be rethought. The proliferation of personal computers across the campus, and the use of spreadsheets and desktop packages has increased interest in administrative information and blurred the boundaries between operational data owned by Divisions, ownership of data needed for University-wide activities and the information required by the decision makers. Lack of coordination between areas, and the traditional planning processes used in the past, have resulted in Divisions, Schools, Faculties and Centres tending to reflect a very inward view of their own requirements. This has re-enforced the differences, real or perceived, which exist across those areas. This inward view has caused a stovepipe effect, a feeling of control within areas, and has discouraged and hindered inter-area or whole-of-University initiatives. The resulting diversity of current solutions, a lack of up- to-date and simple policies and standards, or difficulties in their enforcement, has created gaps and overlaps, and difficulties in the integration and sharing of information. It is essential that security, timeliness, validity and integrity of data are always considered.

F2: Develop an information literate community within the University

A strategy to establish effective coordination and flow of information and communication both internally (within and between Divisions, Schools, Faculties and Centres) and externally (to students, Government, the public etc) is needed. This would ensure that information is managed as a corporate resource, coordinated and integrated to support decision making, meet operational requirements and protect legal, financial and other interests of the University and staff and students. It would ensure the widest possible use of information by ensuring it is organised to facilitate access by those who require it, when they require it, subject to legal and policy requirements. It would eliminate unnecessary or duplicate collection of data and identify and conserve that information which is necessary to reconstruct or assist in the decision making process. The strategy should include aspects such as data planning and definition; collection or creation; organisation, transmission, use and retrieval; storage, protection and retention; disposal (archives or destruction). It would impact on operational (transaction processing) systems (Financials, HRIS, Students etc.) as well as information systems (Executive Information System (EIS), Electronic Document Management etc).

3.3 INFRASTRUCTURES

Goals:

G1: Provide universal connectivity from all points on each ANU campus to access all types of network services - voice, data, video etc - in a consistent connection manner

G2: Establish integrated and collaborative services from a seamless, software menu of services - wherever possible with a common look and feel, understood by all members of the community

G3: Develop a desktop computing environment which enables members of the University community to freely exchange information and effectively fulfil their roles as a member of the University

G4: Maintain a set of information services which have high quality control standards, provide safeguards to privacy and emphasise a client service culture

G5: Maintain the information infrastructure available to Australian academic activities at the leading edge, nationally and internationally

3.3.1 INTERNAL INFRASTRUCTURE

G1: Provide universal connectivity from all points on each ANU campus to access all types of network services - voice, data, video etc - in a consistent connection manner

Until recently, there have been three different areas within the University operating the voice, data and video networks. It is now common practice in most universities and corporations for all network cabling infrastructure to be integrated to obtain economies of scale and benefits from merging cabling and network technologies.

As the technologies merge, it is prudent to review policies, management practices and funding mechanisms to achieve consistency over all of the service provisions, and to remove redundancy.

With integrated practices, policies, and consistency of funding and charging models there should be an improved planning base to meet the electronic communications expectations of the academic community.

G2: Establish integrated and collaborative services from a seamless, software menu of services - wherever possible with a common look and feel, understood by all members of the community

In the devolved environment within the University, the issues of consistency of software interfaces, services and interoperability have not been fully addressed, as more of the work of the University is carried by the networks and software systems.

To achieve corporate identity and efficiencies, the many information skills and systems around the University require improved levels of integration to reduce confusion and frustration at the end user level. It is proposed that planning and interaction between central and local area providers be strengthened to meet common goals University-wide. Better trust between the central and devolved service providers would lead to a reduction in redundant and shadow services, to improved service levels and to some cost savings.

G3: Develop a desktop computing environment which enables members of the University community to freely exchange information and effectively fulfil their roles as a member of the University

The major window-into-the-information-world is the desktop machine, be it in the laboratory, office, or home environment. Creating consistency of desktop services is one of the major issues in accessing information sources.

To achieve the consistency in a cost effective manner, bulk purchasing of hardware and software licences for standard applications is required along with coordination of software support between local central services.

G4: Maintain a set of information services which have high quality control standards, provide safeguards to privacy and emphasise a client service culture

The consistency of service sought for information services can be obtained by University-wide planning against agreed standards and quality control mechanisms.

To effectively use the rich information environment at the University, all members of the community must be “information and IT literate”. Part of the literacy includes the respect of privacy, copyright and the intellectual property of others, at both the personal and corporate levels.

3.3.2 INTEGRATION WITH NATIONAL AND GLOBAL INFRASTRUCTURES

G5: Maintain the Information Infrastructure available to Australian academic activities at the leading edge, nationally and internationally

The University has participated in bringing into Australia many of the building blocks for the information age – AARNet, collaborative research networks and international linkages to advanced infrastructure developments and scholarly information resources. It will need to continue that activity in order to retain its reputation at the national and international level. Such building blocks will be essential to maintain academic leadership, competitive edge, and as a foundation for building academic consortia and global learning systems with a high visibility for ANU participation.

3.4. GOVERNANCE AND MANAGEMENT

Goals:

H1: Provide a governance framework which fosters an information oriented culture and strategic development of the information infrastructure

H2: Develop a management structure for the information infrastructure which is closely linked to the corporate goals in a devolved system of responsibilities

Changes wrought by information technologies are transforming higher education. They are being drawn very deeply into our institutions by competition and student expectations. And this is happening at a rate which is racing ahead of the evolution of a culture which might otherwise welcome the changes and value their impact.

Competitive advantages are accruing to institutions which have a clear model for linking the impact of technologies to their academic objectives. The challenge in setting up effective governance and management arrangements is to ensure those linkages are in fact established.

H1: Provide a governance framework which fosters an information oriented culture and strategic development of the information infrastructure

There is much that can be done within a governance framework to promote an information-oriented culture within the University.

By affirming the relevance of the infrastructure to the institution's mission, and establishing leadership aspirations in areas intimately tied to research and teaching agendas, a firm foundation for the emergence of a suitable culture can be forged.

Because of the dramatic pace of technology developments and the rapidity with which convergence is happening at higher levels in the infrastructure, framework commitments to the infrastructure should be complemented by staff development policies which strongly encourage innovation and creativity in the use of information technologies. It is important to link such encouragement to University incentive schemes, including those bearing on promotion and reclassification, and to ensure that staff have information environments which are permissive in nature and as responsive to creative ideas as can be managed responsibly.

The quality of information access services delivered into staff and student environments is a critical issue. Environments which do not manage copyright and authentication issues, so as to provide ready access to research data and scholarly publications, will hamper research and learning activities alike. Moderated access services are also important, especially for learning environments. These and related issues should be addressed through policies covering the quality of access services. Standards for electronic publishing, including "meta-data" information, is a closely related policy issue.

Effective governance across information services and infrastructure areas should be based on policy and management plans which are developed on an annual cycle. Perhaps the most important dimension of bringing forward such plans is a clear recognition of close, multifarious linkages between information agendas and core research and teaching. To put this point more strongly, it does not make sense to develop a management plan for the University's information interests without having management plans for the other two areas, to provide an appropriate context.

H2: Develop a management structure for the information infrastructure which is closely linked to the corporate goals in a devolved system of responsibilities

Management of the information infrastructure across devolved funding and authority boundaries depends on a clear understanding by heads of areas, both central and non-central, of their respective responsibilities. The University should, as a priority matter, develop descriptions of processes for managing the distributed infrastructure and the duties of those responsible for planning and allocating resources within areas.

Coherence and quality of desk-top services across the distributed infrastructure rests on the adoption of standards, on local expertise and on effective communication arrangements. The area based local IT support unit and IT Sponsor system is designed to meet these needs and is effective for many areas in the University. However the system is not implemented in all areas. Further, in some cases, even though the support unit and IT sponsors are in place, the system does not meet the needs of the areas. Reasons appear to include internal funding arrangements, skills of the people involved, and the lack of assimilation of support units into the local area's planning and day-to-day operations. In any case the University should explore ways of strengthening the local support system and providing areas which are unable to participate in the system with services in lieu. Measures such as ensuring local area skills through training programs, and a registration system for IT support leaders, should be considered. In the end the system will be effective only if there is a strong planning and reporting ethos between central management and the devolved implementation teams.

The importance of local support arrangements to effective distributed management is far greater than the attention they receive in major management fora such as Deans, Heads and Directors meetings. This issue should be discussed at such meetings as part of the management process.

Although the management models for scholarly and corporate information services are different from those associated with information technology services, the former are none the less dependent for their effectiveness on heads of areas taking responsibility for outcomes. The

essential difference between the two management tasks is that in the scholarly and corporate information case funds for acquisition of new resources are held centrally and distributed through processes recommended by advisory committees.

In the information technology case, funds are held both centrally and locally. Local area and central service provider decisions about expenditure are not, for the most part, coordinated under the present system.

Management models for distributed information technology services need to be consonant with the overall level of funding and its distribution between the centre and areas. This is a complex matter but, in the ANU setting at least, has devolution to the greatest practical extent as a guiding principle. That principle does not of course go to the question of the overall level of funding appropriate for the University's long term goals, a question that needs to be tested against international benchmarks as well as shortfalls in expectations.

To ensure that the institution is on a firm footing with its management models and overall funding levels, high level steering advice should be obtained, both from a collegiate process and from area managers, on the University's information management and implementation plans.

Recommendation 2:

That the University develop its information infrastructure against the Goals A1-H2 described in Section 3.

SECTION 4: STRUCTURES FOR CHANGE

In considering the implementation of the Goals set out in Section 3, organisation, management and funding arrangements within the University were reviewed. This led the Working Party to consider ways of strengthening those arrangements.

The key issues are ensuring that policies are built around informed advice, are supported by our community, and are linked to their effective implementation.

Clear responsibilities, leadership and organisational structures which facilitate efficient management are critical ingredients. Although these ingredients are recognised in the University's culture, the Working Party is concerned to see their importance much more strongly reflected in the management of information agendas. To illustrate this concern, the Working Party noted the extract² from a recent Cause publication on leadership in IT. Of course, the IP Working Party has been tackling much broader issues than those addressed in the extract. We are trying to integrate at the information level - including policy and funding, not just at the information technology level.

With a focus on the broader issues, and taking into account the scholarly information areas and the executive structure of the ANU, the Working Party proposes the creation of an Information Portfolio addressing the following areas:

1. comprehensive planning and policy formulation about and management of information and its infrastructure,
2. an academic advisory structure to guide the development of the information infrastructure in support of strategic academic goals,
3. responsibility and authority for implementation of those information services which are centralised, and
4. an information competency program to ensure staff and students have the skills to access information resources, particularly those which are electronic-based, and the knowledge to face the challenges of the increasingly competitive higher education environment.

² “Leadership

Visible, consistent leadership for information technology on campus is an important ingredient in achieving integrated IT planning. There are several ways to accomplish such visible leadership. One is for the institution's executive management to publicly recognise individuals and the value of IT. Another is to place the individual with overall responsibility for information technology in the highest ranks of the institution's management structure.

Though it is not currently the most common model, increasing numbers of campuses are moving toward an IT organisational structure that consolidates administrative and academic computing, telecommunications, network services, and instructional media services under a chief technology officer, commonly known as a chief information officer (CIO). This officer usually has common access to the institution's decision makers and is as much a part of the executive management structure as institutional culture permits. Institutions that select this organisational model believe that this structure enhances their ability to optimise their use of resources and quickly seize opportunities to employ technology in new and creative ways.

With or without a CIO at its head, the IT organisation itself must have positive visibility at all levels of the institution and with all constituencies. An IT organisation's ability to be consistent, relevant, open and inclusive determines the level of trust and success it will achieve.”

Foster and Hollowell - in “Information Technology in Higher Education: Assessing its impact and planning for the future” Educause. (1999)

The Information Portfolio is thus a method of providing leadership in information and of integrating planning, policy, advisory and feedback structures, authority and implementation of central information services at a single point in the University.

While the IP Working Party considered various models for the leadership, direction and management of such a portfolio, it ultimately considered that this issues was one for resolution by the Vice-Chancellor in consultation with the Executive.

Recommendation 3:

That an Information Portfolio which encompasses planning, policy, advisory and feed back structures, authority and implementation of University wide scholarly and corporate information services be established. (Responsibility for the portfolio would rest within the Executive.)

4.1. STRENGTHENED UNIVERSITY-WIDE MANAGEMENT AND FUNDING ARRANGEMENTS FOR THE INFORMATION INFRASTRUCTURE

As described in Section 1, the University is managed through a highly devolved authority and funding system designed to give a high degree of autonomy to academic areas. This system recognises that the benefits of flexibility at departmental and research group levels outweigh the benefits of stronger management from the centre, however the cost of maintaining coherence is significant.

In general terms, coherence across the system, and where appropriate, consistency as well, is driven by University wide policies, processes and accountability measures. Under the model, centralised services are justified on efficiency grounds, and funded through either "user pays" or "common good" strategies. This is a common set up within universities.

In the case of the ANU's infrastructure, substantial components are justifiably located in the centre and equally substantial components are, equally justifiably, located in the areas. Further there are very strong coherence and interoperability constraints to be met for the infrastructure to operate efficiently and effectively. This is well understood. What is less well understood is how the infrastructure should be managed such that those operational constraints are met without overly interfering in the autonomy of area management, or worse, stifling innovation at departmental and research group levels in academic areas.

To some extent this situation is a product of current information technologies, however for the foreseeable future the difficulties appear to be persistent, especially in a university setting where the premium on interoperable components across the system is rapidly increasing. Major reasons for the increase include dependency on internal corporate information and on external information sources in global infrastructures. The increasing trend for intellectual property to take the form of digital assets is another reason for the University to ensure components across the infrastructure are interoperable.

The level of coherence sought for the infrastructure is not a particularly controversial issue and can be achieved in a highly decentralised system through policy and accountability measures. This approach though depends on three major elements. The first is that funding arrangements must provide the organisation with the potential to act within the scope of expectations embodied in management policies. The second is that there needs to be expertise and shared information on both sides of the central/area divide to ensure capability within the system. The third is the need for accountability between the heads of areas, the heads of the central service providers, and the Executive to ensure objectives are being met and that the system is well managed and balanced from a resource perspective.

One of the major responsibilities that heads of areas take on in managing the use of funding and related resources is to meet the University's commitment to staff. That commitment includes

provision of an information rich environment which facilitates innovation and creativity. In the information infrastructure context, this implies budget provision for maintaining a desk-top environment which meets functional standards, for the cost of information services appropriate for the duties of individual staff, and for the education and training costs associates with a constantly evolving environment. It is vital that heads have access to informed advice about these requirements and the associated budget consequences. For example, it is sensible to provide for the desk-top platform component (alone) on a per staff member basis using readily available market place estimates.

Students should have a rich information environment which is tailored to their needs. As discussed under Goal C1, higher degree research students receive variable support across campus. Central policy should be developed to guide areas on the level of support to be provided to such students. The information commons concept should be developed to ensure that this University remains competitive in respect of the information environment provided to coursework undergraduate and postgraduate students.

Ensuring an informed community and the availability of expertise within a school, faculty or centre is a more complicated topic. Some areas have expertise in-house and a learning culture with respect to information infrastructure issues. Others have communities which are small in number or for other reasons have difficulty in arranging their operations to incorporate a suitable level of expertise. The University must therefore develop the capability to provide core services into some areas, and to ensure that the IT Sponsors system is effective in others. In both cases the responsibility of heads of areas is crucial as is the provision of targeted services from the centre.

On the third element, and given the pressures on heads of areas to allocate resources for one purpose rather than another, it is difficult for the University to satisfy itself that commitments to information environments have been met without an accountability measure. Perhaps the least intrusive, and most flexible, measure for this purpose is a budget compliance requirement in which heads of areas explicitly budget for information infrastructure, perhaps on a per staff member and graduate student footing allowing explicitly for desk-top hardware, software licences and training costs.

In respect of training, it is essential, as a first step, to carry out a University-wide survey of the information competency of members of the University community. To raise the level of information literacy a coordinated program of training should be established to meet the needs identified in the survey.

On a related issue, under other actions in this report, a staff information environment, which meets minimum standards, will be available for download from centrally supported servers into each desktop, and so a minimum level of functionality could be assured through a budget compliance measure of the kind proposed. There will of course be areas that will want to build their own information environments and compliance. In such cases these should be implemented in a flexible way.

Recommendation 4:

The University to develop a management and funding model for the information infrastructure. The model should include:

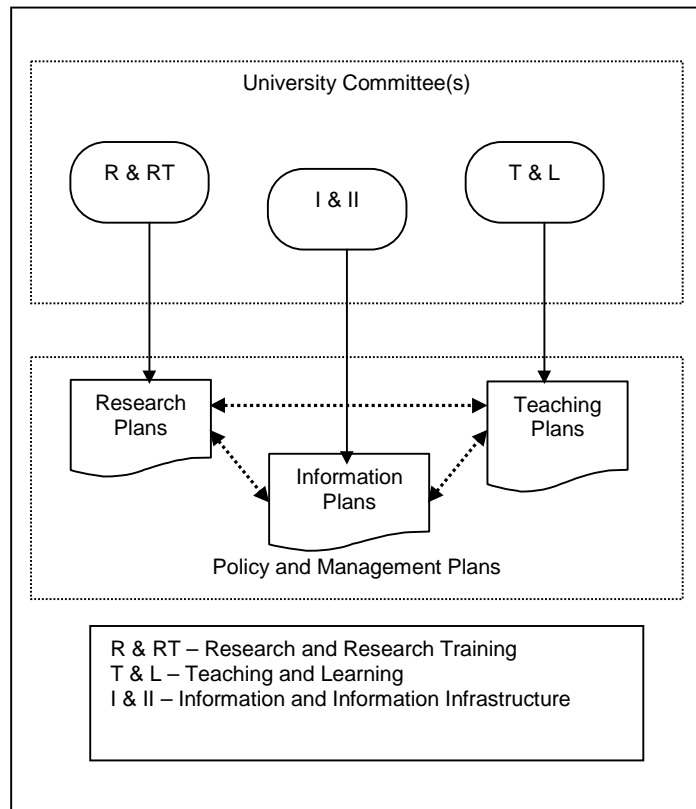
- a) the information resource provision responsibilities of heads of Schools, Faculties and Centres and those of the directors of the central service providers; and
- b) the process for monitoring its operation.

4.2 STRENGTHENED ADVISORY AND STEERING ARRANGEMENTS FOR INFORMATION RESOURCES AND INFRASTRUCTURE

Many of the issues faced in formulating policies and strategic plans for the University's information infrastructure are closely related to policies, plans and processes associated with research and teaching programs.

The problem of linking strategic plans of all areas across the University is a general one. However the particularly tight coupling between research, teaching and information strategy and management plans argue for arrangements whereby all four plans are developed as an integrated set of documents. In any case for the purposes of the Working Party's brief, the need to assume a framework encompassing plans for these three areas is inescapable.

The framework used by the Working Party envisages the equivalent of three committees; one for Research and Research Training, one for Teaching and Learning and one for Information and Information Infrastructure. These bodies, or their equivalent, would be advisory to the Academic Boards. They would also be available for providing advice to the Executive. They would provide "campus wide" assessment of the University's position, and would have a special focus on quality and developmental issues.



Most importantly, the "three committees" would take responsibility for the processes by which Policy and Management plans were brought forward. The importance of these plans is reflected in the move within the Higher Education sector whereby Universities are required to publish their plans on research management and on teaching management.

Throughout much of its work, the Working Party was mindful of the need to assume the equivalent of an advisory structure along the lines of this three part model. The kinds of linkages which surfaced repeatedly during the preparation of this Report are indicated by the IT competence goal for all graduates. For coursework students at least, strategies for meeting this goal proceed from syllabus development policies on the one hand and on policies for the provision of extra-curricula courses on the other.

Another example of the need to derive information policy from teaching or research policies is the problem of formulating management plans for flexible delivery of accredited courses. It seems inevitable that the University will move to support fully accredited degree programs through distributed delivery practices, including examinations. As policies are worked through to allow for this outcome, there will be substantial consequences for information infrastructure policies, especially in identification and authentication areas.

Currently most of the advice to the University on information infrastructure policies and related management issues is obtained from the Information Strategy Committee (ITSC), the Management Information Systems Advisory Committee (MISAC) or the Library Committee.

These committees carry responsibility for a range of important policies however there remain major areas not covered.

The Working Party recommends establishment of a more broadly based advisory committee to overcome the current lack of a forum for the increasing range of issues involving both scholarly and corporate information services. Topics such as electronic publishing, copyright, authentication, document standards and information literacy are among concerns which require a "whole of University" approach.

Under this model the Information & Information Infrastructure Committee would:

- be advisory to the Academic Boards and to the Executive;
- have membership which included representatives from heads of academic units and directors of areas carrying resource responsibilities in information and information infrastructure areas;
- provide review level advice on the adequacy of the University's information infrastructure in both scholarly and corporate information domains;
- report on quality assurance and planning arrangements for processes in both scholarly and corporate information domains;
- monitor advisory and feedback mechanisms, such as the IT Sponsors and library discipline-based committees;
- be a Reference Committee for publishing I&II Strategic and Management Plans in the context of corresponding plans in Research and Research Training, and in Teaching and Learning;
- provide advice on the effectiveness on funding arrangements for information services;
- meet about 4 times a year.

The terms of reference for the Committee would cover those of the ITSC and the Library Committee, and could well be constituted by a merge of the expertise on those two committees.

Recommendation 5:

That the University establish an Information and Information Infrastructure Committee with broad advisory responsibilities and in particular with responsibility to act as a reference body for the development and publication of information policy and information management plans linked to corresponding plans for research, teaching and learning.

4.3 STRENGTHENED ORGANISATION FOR CENTRAL INFORMATION SERVICES

It is clear from the goals identified in Section 3 that the University needs to develop its organisational structures to provide infrastructure and services which currently do not exist. Services such as those needed to support multi-media based digital publishing and course management are unlikely to emerge without structural change. To illustrate the extent of the need for organisational change the Working Party derived, from Section 3 goals, the following list of concerns as priority issues which are not catered for in a consistent University wide manner under current organisational arrangements:

- integrated corporate and scholarly information services,
- institution-wide staff development programs in information literacy
- desk-top access to authenticated international scholarly information services,
- server support for innovative teaching materials,

- multi-media publishing standards and support,
- digital asset management services,
- information commons,
- web based corporate information management,
- consistency of official publications,
- standard services for desk-tops.

It is important to recognise that underlying technology change is ongoing, and if anything the rate of change is increasing. There is therefore a premium on creating structures and responsibilities which are informed, flexible and responsive. That is, the University should establish an organisational framework in which expertise and skills within operational units can readily be assembled to form targeted project teams on relatively short lead times. This requirement argues for a divisional structure with strong internal planning capability.

To meet this requirement it is recommended that a Division of Information be created. Determining the internal structure of the new Division is outside of the scope of this report however from the Working Party's perspective, the outline in the attached panel is indicative. It has been derived from the concerns listed above.

The following describes the main responsibilities envisaged for each of the components. The structure as indicated in the panel, recognises five components:

1. Information Services
2. Information Competency (Literacy) Programs
3. Infrastructure
4. Advanced Computation and Modelling
5. Policy, Planning, Coordination and Standards

In more detail:

1.1 Scholarly Information Services

Acquisition and management of the University's collections of scholarly materials, whether in print or digital form. Facilitation of access to and distribution of scholarly materials, independent of location, in response to staff and student needs. Management of copyright issues associated with copyright and related IP matters for both internally and externally sourced materials.

1.2 Corporate Information Services

Design, implementation and management of enterprise level systems in support of the University's administration. Coordinated publication, in print and electronic form, of University handbook and related official information. Design and support for web-based information systems serving staff, students and the general community. Course management systems and their authenticated linkages to staff and student information environments

Indicative Components of the Division of Information	
1.	<p>Scholarly Information Services</p> <ul style="list-style-type: none"> * Access and distribution * Information portals * Copyright coordination <p>Corporate Information Services</p> <ul style="list-style-type: none"> * Management information * Official publications * Web based information systems
2.	<p>Information Competency and Review Programs</p> <ul style="list-style-type: none"> * Help-desk operations * Competency and quality programs
3.	<p>Integrated Servers and Delivery Systems</p> <ul style="list-style-type: none"> * Desktop environments (staff/students) * Teaching environments * Collaboration systems * Education tech. and course management <p>Integrated Network Services</p> <ul style="list-style-type: none"> * Telephony, data, video, multi-media * Network infrastructure management
4.	<p>Advanced Computation and Modelling</p>
5.	<p>Information Standards and Planning</p> <ul style="list-style-type: none"> * Access (desktop) standards * Interoperability standards * Document standards * E-commerce interfaces * Archiving standards

2. Information Competency and Review Programs

Education and help programs related to staff and student information literacy and competency. Quality assurance programs for the operation of centrally provided information services.

3.1 Integrated Servers and Delivery Systems

The design and maintenance of information environments for staff and students, the former with respect to staff desk-tops and the latter with respect to access points in an information commons. Implementation and support for teaching venues such as lecture halls, tutorial rooms and other information rich environments related to teaching activities. Deployment and support for collaboration systems.

3.2 Integrated Network Services

Design and management of campus based converged networks and their interconnections with national infrastructure. Procurement of network level services and management of quality assurance processes.

4. Advanced Computation and Modelling

Collaborative design of high performance computational models and their implementation on technically advanced facilities. Large scale data stores and management of archived digital assets. Advanced visualisation systems and services.

5. Information Standards and Planning

Evaluation and adoption processes for standards which mediate campus-wide access to scholarly and corporate information services, including version management and management of archived information formats. Specification of interfaces to enterprise systems. Planning evolution of the University's information infrastructure and associated policy proposals.

A special note is appropriate on the status of Advanced Computation services. The ANU Supercomputer Facility, currently the operational unit responsible for advanced computing services, is likely to become a joint APAC/ANU centre, in which case it may end up being located outside of a new Division.

This report stops short of detailing management and funding arrangements for the proposed Division. However the assumption is that the Division would be funded through existing funding lines for IT Services and the Library, and by transfer of resources from some other divisions in accordance with transfer of responsibilities. In addition, these lines would be augmented by support through management plans such as the CMP and the proposed ITSMP.

Management responsibilities within the proposed Division would be undertaken by senior appointments. Attachment 4 lists a description of the responsibilities and duties that would have to be undertaken by leadership positions within the Division. There are currently two director level appointments, the University Librarian and the Director of IT Services, associated with the proposed Division. It may be that a third position is appropriate however that issue is closely related to the modus operandi of the division with respect to Executive decisions. In any case the internal structure is a matter to be resolved during implementation if the proposal proceeds to implementation.

The concept of a broader, more integrated information portfolio mentioned at the beginning of this Section is closely linked to this divisional model. Essentially the operations of the division would fall under the overarching control of an existing position within the Executive with several senior Directors within the Information Division carrying out planning and operations. The strong and broad dependence across campus on information and its infrastructure would be taken into account through decision making processes within the Executive.

Recommendation 6:

That the University create a Division of Information as an organisational unit for developing and managing integrated services relating to production, storage, access and distribution of scholarly and corporate information, and to support the University in planning the future of its information infrastructure. The structure of the Division would be guided by this Report as outlined in Section 4.3.

SECTION 5: ACHIEVING THE GOALS

The organisational changes recommended in Section 4 will enable the University to pursue the Goals described in Section 3 in a purposeful and informed manner. This Section recommends actions that the University should take to move rapidly towards achieving those Goals. The prior assumption is that the organisational recommendations in Section 4 are accepted.

The Working Party's belief is that within a few months the University could have: operational units which correspond to the components of the Information Division; an advisory and steering committee tackling gaps in enabling policy areas; commitments to run education and competency programs for staff and students next year; and a number of special programs designed to facilitate change.

These developments would allow the University to move to the front foot in information agendas, and to seize leadership in strategically important aspects of the University's information infrastructure. They would be underpinned by a number of steps which firmly link the Goals to the work of the Information Division (for ease of reference, a consolidated list of those Goals is provided in a panel on the opposite page). The main step is to assign to the Division, in its standards and planning role, the task of preparing an implementation plan in the form of well defined projects and programs. To guide this planning task, the Working Party has produced action lists for each of the Goals and incorporated them in this report at Attachment 5.

Recommendation 7:

That the Information Division be charged with developing an Implementation Plan for the Goals described in Section 3 and further developed by the Actions in Attachment 5. The Implementation Plan should group the Actions into projects and programs which specify time-lines, resource requirements and responsibilities.

Commissioning preparation of a detailed Implementation Plan is seen as the most important step to take to get long-term change under-way. However there are a number of additional steps which should also be taken at the outset to ensure that funding arrangements are as clear as is practicable and that processes which address high priority goals are launched as soon as possible.

To frame goals which are realistic from a resource standpoint, the Working Party considered the likely budgets available over the next five years and the ability to move that funding, centrally and within areas. The challenge of coordinating funding across the University is reflected in the following list of budget lines associated with information services and infrastructure (the figures are approximate amounts based on 1998 budgets):

- Library (\$14m recurrent)
- IT Services (\$6m recurrent)
- IT Strategy Committee equipment vote (\$2m recurrent)
- Projected funding for lecture room development within the Capital Management Plan (\$0.1m recurrent)
- IT related budget from The Faculties (\$0.8m recurrent - under review)
- Projected funding for networks within the Capital Management Plan (\$1m multiple years)
- Projected funding for PABX replacement within the Capital Management Plan (\$4m multiple years)
- The ITSMP funding initiative (\$16.5m multiple years – \$5.5m committed to ESP)
- Recurrent IT related budgets within Schools, individual Faculties, Centres and Administration (it is difficult to provide an estimate for area IT budgets in aggregate however the figure needs to support desktop access for more than 3000 staff and 1300 graduate research students, in addition to local servers and IT based laboratories).

GOALS

The Goals listed below are described in Section 3 and are further defined through implementation Actions in Attachment 5.

Research Goals

- A1: Optimise the ability to catalyse research and to enhance competitiveness
- A2: Maintain high quality communication infrastructure
- A3: Establish access to computation-based facilities which are of world standard
- A4: Coordinate support for access to scholarly information
- A5: Provide support for publication of research outcomes (especially in electronic formats)

Teaching Goals

- B1: Provide an environment for innovative development and enhancement of teaching materials
- B2: Provide an environment for enhancing teaching methods and effective and efficient management of course delivery
- B3: Develop and maintain a quality learning environment for information and IT literate staff

Learning Goals

- C1: Develop and maintain a high quality infrastructure for student information
- C2: Develop and maintain a quality learning environment for information and IT literate students

Managing Goals

- D1: Design and implement effective management methods, systems and support structures which are designed to collect, transform and deliver relevant information for analysis, modelling and strategic decision making

Scholarly Information Goals

- E1: Provide timely access to scholarly information for research and teaching
- E2: Consolidate access to scholarly information through appropriate training and resource provision
- E3: Optimise the generation and distribution of scholarly information
- E4: Develop strategies that encourage innovation and optimise resources

Corporate Information Goals

- F1: Provide quality corporate information services to staff and students of the University which will streamline administrative processes and facilitate decision-making at all levels
- F2: Develop an information literate community within the University

Infrastructure Goals (Internal, National and Global)

- G1: Provide universal connectivity from all points on each ANU campus to access all types of network services - voice, data, video etc - in a consistent connection manner
- G2: Establish integrated and collaborative services from a seamless, software menu of services - wherever possible with a common look and feel, understood by all members of the community
- G3: Develop a desktop computing environment which enables members of the university community to freely exchange information and effectively fulfil their roles as a member of the University
- G4: Maintain a set of information services which have high quality control standards, provide safeguards to privacy and emphasise a client service culture
- G5: Maintain the information infrastructure available to Australian academic activities at the leading edge, nationally and internationally

Governance and Management Goals

- H1: Provide a governance framework which fosters an information oriented culture and strategic development of the information infrastructure
- H2: Develop a management structure for the information infrastructure which is closely linked to the corporate goals in a devolved system of responsibilities.

The need for management arrangements to ensure coordination across these funding lines is covered by Recommendation 4 (Section 4). In order to establish a firm planning framework, it is important to link implementation of that Recommendation to the planning process in Recommendation 7 above. In large part the linkage would be focussed on identifying specific budget provisions, especially those in central areas, and determining clear boundaries between central and non-central responsibilities for funding components of the infrastructure.

Recommendation 8:

That the implementation of Recommendation 4 be linked to the development of the Implementation Plan to clarify responsibility and funding boundaries between central and non-central areas. This linkage will require coordination between several members of the University's senior management .

Although it is envisaged that the ongoing cost of the proposed changes would, in the longer run, be covered by normal RTB processes, there are a number of pressing areas where one-off funding is required to manage change, or to create a service which cannot otherwise be supported, or to ensure timely outcomes. By considering existing responsibilities and resources, the Working Party identified the following programs as requiring one-off funding if they are to make an impact in the near future. The planning and policy work to develop these programs will be funded from existing planning resources within the Offices of the PVC (Academic), the Librarian and Director IT Services. (Goals served by these programs are indicated in parentheses.)

1. Competency/Training/Literacy program (Goals A1 C1 C2 E2 F2)
2. Portal development program for Scholarly Information (Goals A1 B1 E1)
3. Network development program (Goals G1 G5)
4. Staff and research student desktop access and environment program (Goals G2 G3 G4)
5. Information Commons development program (Goals C1 G3)
6. Education technology systems and facilities program (Goals B1 B2 C2)
7. Information and software distribution server program (Goals G2 G4)
8. Advanced Computation and Research Infrastructure program (Goal A3)

Having in mind the purpose of the Information Technology Systems Management Plan (ITSMP) and the terms of reference for this Report, the Working Party recommends that this list of programs be used to structure the use of one-off funding available for information purposes, especially the ITSMP.

Recommendation 9:

That, for the University to achieve its goals in a timely way, the programs listed in Section 5 (numbered 1-8) be considered as priority items for support through the ITSMP and CMP (as appropriate), noting that the level of such support would need to be approved by the Vice-Chancellor on the basis of detailed proposals.

There is one further topic to be addressed in relation to implementing the recommendations of this report. Although most of the Goals can be achieved through policies and programs for which an Information Division can be made responsible, programs for enhanced teaching delivery methods (Goals B1, B2, , C2) need to be driven by education development policies. To meet this need the Working Party recommends that the education technology activities of the Information Division be closely linked to flexible delivery initiatives in the University and that associated policy development be steered by the University Committee for Teaching and Learning (or equivalent).

Recommendation 10:

That the University establish a process to tightly link development of education technology activities within the Division of Information to a flexible delivery program, including the design of course materials, steered by a teaching and learning advisory group established if necessary for the purpose.

Lastly, the Working Party sees monitoring of the implementation of proposals in this report is vital to their success. The IP Working Party recognises the close links between this report and the Strategic Directions Plan. Accordingly it would be productive to make review and monitoring the responsibility of the member of the Executive responsible for the Information Portfolio, drawing on advice as appropriate from the Information and Information Infrastructure Committee.

Recommendation 11:

That a review and monitoring process be established by the Executive under arrangements that take account of the University's Strategic Directions Plan, drawing on advice from an Information and Information Infrastructure Committee as described in Recommendation 5.

SECTION 6: RECOMMENDATIONS

Recommendation 1:

That the four foundation policies :

- commitment to staff, students and the broader community,
- commitment to information values,
- commitment to information infrastructure
- commitment to governance and management

described in Section 2, be adopted by the University.

Recommendation 2:

That the University develop its information infrastructure against the Goals A1-H2 described in Section 3.

Recommendation 3:

That an Information Portfolio which encompasses planning, policy, advisory and feed back structures, authority and implementation of University wide scholarly and corporate information services be established. (Responsibility for the portfolio would rest within the Executive.)

Recommendation 4:

The University to develop a management and funding model for the information infrastructure. The model should include:

- a) the information resource provision responsibilities of heads of Schools, Faculties and Centres and those of the directors of the central service providers; and
- b) the process for monitoring its operation.

Recommendation 5:

That the University establish an Information and Information Infrastructure Committee with broad advisory responsibilities and in particular with responsibility to act as a reference body for the development and publication of information policy and information management plans linked to corresponding plans for research, teaching and learning.

Recommendation 6:

That the University create a Division of Information as an organisational unit for developing and managing integrated services relating to production, storage, access and distribution of scholarly and corporate information, and to support the University in planning the future of its information infrastructure. The structure of the Division would be guided by this Report as outlined in Section 4.3.

Recommendation 7:

That the Information Division be charged with developing an Implementation Plan for the Goals described in Section 3 and further developed by the Actions in Attachment 5. The Implementation Plan should group the Actions into projects and programs which specify time-lines, resource requirements and responsibilities.

Recommendation 8

That the implementation of Recommendation 4 be linked to the development of the Implementation Plan to clarify responsibility and funding boundaries between central and non-central areas. This linkage will require coordination between several members of the University's senior management.

Recommendation 9:

That, for the University to achieve its goals in a timely way, the programs listed in Section 5 (numbered 1-8) be considered as priority items for support through the ITSMP and CMP (as appropriate), noting that the level of such support would need to be approved by the Vice-Chancellor on the basis of detailed proposals.

Recommendation 10:

That the University establish a process to tightly link development of education technology activities within the Division of Information to a flexible delivery program, including the design of course materials, steered by a teaching and learning advisory group established if necessary for the purpose.

Recommendation 11:

That a review and monitoring process be established by the Executive under arrangements that take account of the University's Strategic Directions Plan, drawing on advice from an Information and Information Infrastructure Committee as described in Recommendation 5.

SECTION 7: ATTACHMENTS

ATTACHMENT 1: INFORMATION POLICY WORKING PARTY - TERMS OF REFERENCE

As part of the Implementation Plan for giving effect to the University's Strategic Directions 1999-2001, it has been agreed by Council, *inter alia*, that a comprehensive Information Policy for the University be developed. Such a Policy is seen to be crucial to the future of the University's research, and its teaching and learning functions.

An Information Policy is to be developed that will support, in a coordinated fashion, those elements of the University's operation that are essential to its core function. Not only are research, teaching and learning in this category, but so are the supporting roles of the Library, Information Technology Services, Student Administration and the ability generally to communicate rapidly and effectively, with appropriate bandwidths, across campus and to the wider community.

In this context, it is important also to examine the organisational arrangements of the University to see what new entities might be necessary, with the support of the Library, Information Technology Services, CEDAM, etc., to position the University effectively for a future more heavily invested in new information technologies.

In recognition of the need for future coordinated planning and development of the University's information infrastructure Council, at its meeting in December, 1998 approved funding for the Information Technology Services Management Plan. While there are current commitments against that Plan (eg the Enterprise Solutions Project) it is planned that further expenditures will occur against the Policy to be developed in this study.

Terms of Reference

The Information Policy Working Party is asked to develop a draft Information Policy for the Australian National University which will cover the immediate period 1999-2001 but will also be sensitive to the longer term needs of the University. In doing so it is asked to respond against the following Terms of Reference:

1. Information Access

How should the University plan for effective and equitable information access in support of research, teaching, learning and administration? Such consideration should include the likely closer and more formal relationships between the future roles of the Library, Information Technology Services and other units on campus dealing with the preparation, distribution, storage and handling of information.

2. Education Technology

An Education Technology Policy and Strategy needs to be developed for the University. By way of an appropriate Working Group, the Working Party is asked to undertake the development of such a Policy and Strategy. It is expected that the Working Group would involve academic and general staff with interest and or expertise in flexible education.

3. Electronic Publishing

What plans should be developed by the University for electronic publishing and other support for scholarly communication? These plans should consider issues regarding intellectual property. The Working Party may consider establishing a Working Group for this purpose including, but not limited to, representatives from the Library, CEDAM, BIAS, BTF, RSO and ANUTECH Pty Ltd.

4. Information Infrastructure

- (a) What coordinated planning is required for integrated information technology infrastructure
 - (i) to support future research and research collaboration,
 - (ii) as an outcome of the Working Party's deliberations on flexible education, to support student access to learning environments and associated materials, and
 - (iii) to deliver efficient and secure administrative information services.
- (b) What coordinated planning is required for the physical environment including the need for information services facilities, readily accessible by postgraduate and undergraduate students?
- (c) What program of refurbishment of the University's lecturing and tutorial facilities is needed?

(d) How adequate is the communications infrastructure of the University for supporting future research, teaching and learning and administrative roles? Consideration here should be given to the adequacy and commonality of communication protocols to ensure that effective and efficient electronic transactions are possible across the whole campus.

5. Consultation and Governance

What coordination, governance and consultative arrangements will be necessary to support the University in the new information era? Consideration should be given to committee structures and whether there is a need for a Flexible Education Office or Centre to be established in the University.

The Working Party should note current work in administrative information handling through the Enterprise Solutions Project and University developments in high performance computing through the APAC initiative.

Membership

PVC (Academic) - Convenor

Librarian or delegate (Mr Colin Steele)

Director ITS or delegate (Dr Robin Erskine)

One representative of Heads of Research Schools (Professor John Hearn)

One representative of Deans of Faculties (Professor Tim Brailsford)

One representative of Directors of Centres (Professor Iain McCalman)

Director, Enterprise Solutions Project (Ms Fay Gibbons)

Others coopted, as required

Modus Operandi

The Working Party is asked to report to the Deputy Vice-Chancellor by 31 July, 1999, who will then carry the Working Party's recommendations to the University Council for approval.

Apart from the Working Groups specifically mentioned in the Terms of Reference, it is expected that the Working Party will engage in a widely consultative process, drawing on as many people and organisations within the University (and external if necessary) as appropriate.

It is proposed that there be a Reference Group to act as a sounding board for the Working Party's deliberations. Two meetings of the Reference Group are anticipated - one mid-term and one two weeks before the Working Party is due to report to the Deputy Vice-Chancellor. The Reference Group will be chaired by the Deputy Vice-Chancellor and, again, will be broadly representative of the interests of the University, including the student body.

It is expected that in framing its recommendations the Working Party will also specify timeframes and broad cost implications and will, wherever appropriate, identify opportunities for partnerships and alliances, both internal and external. It will also consider and comment on development of staff and student information literacy.

ATTACHMENT 2: CALL FOR SUBMISSIONS

Background

As part of the Implementation Plan for the University's Strategic Directions 1999-2001, the Information Policy Working Party has been established to develop a comprehensive Information Policy for the University. Policy-driven planning in information areas is crucial to the future of the University's research, teaching, learning and outreach activities.

The research and education sector is highly competitive. We compete for students and research funding in national and international arenas. Excellence, relevance and leadership more generally underpin our competitive advantage. Strategies for creating, accessing and integrating scholarly information are critical to our leadership aspirations. In a similar vein, the management of enterprise information and processes is vital for efficient administration, effective publicity and for managing resources in support of academic goals.

The Information Policy Working Party is seeking submissions from the University community on actions which the University should take to ensure the development of a strong information environment to achieve these strategic objectives.

Consultation

The Working Party plans to report at the end of July. Consultative arrangements during the preparation of the report include:

- - submissions from members of staff and students;
- - three joint meetings with the IP Reference Group,
- - discussions at the IT Strategy and Library Committees,
- - The Issues Guide* (see below) lists issues which the Working Party has identified and on which it particularly welcomes advice.

The Working Party would appreciate receiving submissions which:

- a) are succinct, and include headings for each separate issue. Responses to issues developed by the Working Party should include the reference number;
- b) are email-based - ie an email message or an email attachment;
- c) take account of resource constraints by focussing on areas of priority need. Please list up to 10 issues regarded as having the highest priority for action in the near future;
- d) relate to strategic University-wide issues.

*The indicative issues guide is available at: <http://its.anu.edu.au/ipwp/issues.html>

Submissions were received from the following:

Submission No.	Name	Area
1	Professor Michael Greenhalgh	Professor of Art History, Faculties
2	Dr Craig Savage	Dept of Physics, Faculty of Science
3	Dept of Physics, Faculty of Science	"
4	Dr Andrew Torda	Research School of Chemistry
5	Dr Peter Wood	RS Astronomy & Astrophysics
6	Dr Bob Williamson	Dept of Engineering, FEIT
7	Professor Eric Weigold	RS of Physical Sciences & Engineering
8	Ms Joye Volker	Institute of the Arts Library & Resource Centre
9	Dr Michael Green	Assistant Dean, FEIT
10	David Baldwin	Head, Teaching & Learning Technology Support Unit
11	Professor Fyfe Bygrave	Dean, Faculty of Science
12	Dr John Hooper	Dean of the Graduate School
13	Ms Margot Pearson	Director, CEDAM
14	Ms Margot Pearson	Director, CEDAM
15	Dr Herbert McQueen	Research School of Earth Sciences
16	Mr Owen Jepps	PARSA
17	Ms Helen Stitt	ANUSA
18	Professor Jeremy Mould	Chair, High Performance Computing Advisory Committee
19	Professor Matthew Spriggs	Department of Archeology and Anthropology, Faculty of Arts

Invited Submissions

20	Ms Michele Huston	Project Officer, IT Services
21	Dr Paul Turnbull	Centre for Cross Cultural Research

Written Comments on Report by Members of the Reference Group*

22	Dr Jeremy Shearmur	Faculty of Arts
23	Dr Brian Molinari	Faculty of Engineering and Information Technology

*These written comments were provided after the final meeting between the Working Party and the Reference Group on 26 August, 1999.

ATTACHMENT 3: EXISTING POLICIES AND LEGISLATIVE FRAMEWORK

Below is a list of ANU policies which are related to an aspect of information and together form the University's Information Policy. Also below is a list of Legislation within which the University operates. Links to these University policies can be found on the ANU internal web site at: <http://www.anu.edu.au/cabs/policies/policies.html>

Reference	Title
	The Australian National University Act 1991
	Confidentiality of Personal Information - Statement to Students 1993
	Copyright and Disclaimer Notice/s
275A/1997	Electronic Information - Monitoring and Privacy of
575/1998	Email Lists, University-wide
	Freedom of Information Policy, ANU
1601/1995	IT Security Policy
	IT Services Statute, Rules and Orders
	IT Systems Management Plan
1281E/1998	Intellectual Property Guidelines
971/1998	Internal Audit Charter
	Library Statute, Rules and Order
	Mailroom Policy and Procedures
	Mass Data Storage Systems, Policy on access to
	Media Guideline Statement
2604/1995	Network Access Policy
	Privacy and Use of Information Provided by Students (ANU Students Guide)
834/1994	Privacy - Statement on the Collection, Use and Control of Personal Information
	Records and Archive Management, Policy - Draft
	Records Management Manual
	Research Management Strategic Plan
	Software Licensing and Copyright - User Guide
283/1997	Web Publishing Guidelines, ANU
1401: F&B Manual	Overview of Retention of Financial and Accounting Records
1402: F&B Manual	General Disposal Schedule for Financial and Accounting Records
Forthcoming - 2000	Disposal Authority for all ANU records

Legislation and information-related policies of outside bodies with which the ANU must comply

Reference	Title
http://www.avcc.edu.au/avcc/aarnet/aarnpols/poldir.html	Revised Policy on Allowed Access to AARNet (Provision of Carriage Services)
http://www.austlii.edu.au/au/legis/cth/consol_act/ca1968133/index.html	Copyright Act 1968
Legislation Search Facility http://scaleplus.law.gov.au/	Archives Act 1983 Freedom of Information Act 1982 Evidence Act 1995 Privacy Act 1988 Commonwealth Authorities and Companies Act 1997 Audit Act 1983 Telecommunications Act 1997 Broadcasting Services Amendment (Online Services) Bill 1999

Note: The Goods and Services Tax may have implications for the University in respect of sale of publications.

ATTACHMENT 4: MANAGEMENT RESPONSIBILITIES RELATING TO THE DIVISION OF INFORMATION

Structure of the Information Portfolio and the responsibilities within the Division of Information

The proposal to form an Information Portfolio assumes a member of the Executive will be given responsibility for a broad range of information agendas.

The member of the Executive responsible for the Information Portfolio will be supported by a Division of Information which will be managed by a number of Senior Directors. The number of Directors depends on the structure and level of expertise in the positions reporting to the Director(s).

The roles to be included within the Information Portfolio and the Division of Information are outlined below. They include the existing responsibilities of the University Librarian and Director, IT Services. To these have been added responsibilities identified within, or extrapolated from, the work of the IP Working Party. Potentially there would also be movement of responsibilities (and resources) from other areas of the University, which the University may consider to be better located within an Information Portfolio. These are principally in the areas of networking (Facilities and Services), official publications (Public Affairs Division), audio-visual services (Faculties Resources Office), and archiving.

Current responsibilities of the University Librarian:

Support research and teaching objectives of the ANU by the provision of access and distribution of scholarly information for staff and students in the appropriate subject areas by:

- Provision of 24 hour access to electronic information via the Library's website to full text journals and databases and customised subject gateways relevant to ANU research and teaching interests;
- Print material collection and access to such through extended opening hours;
- Information literacy programs targeted at specific subject based profiles;
- Linkages for electronic reserve material;
- Support for electronic publishing activities on campus and provision of access to digitised ANU publications to support research and teaching, e.g. digital theses, exam papers and course material;
- Development of University Metadata standards to enhance access to relevant web material;
- Support information flow and advice from the Research Schools, Centres and Faculties through the wide-ranging network of subject advisory committees (comprising over 100 academics and student representatives);
- National coordination responsibility for scholarly communication activities through national bodies such as the Coalition for Innovation in Scholarly Communication and the Council of Academic University Librarians;
- Overall financial planning and strategic development of the Library;
- Management and strategic development of the University Archives.

Current responsibilities of Director, IT Services (by reporting group):

High Performance Computation and associated services such as visualisation, mass data storage, national external use scheme. (This role may change with the development of the APAC initiative.)

Integration of IT support on campus through fostering information flow for local IT support staff (LITSS), software distribution and licencing, organisation of training courses for LITSS, development of policy papers.

Network Services, to be taken as support and development for the data network, internal and external, along with support of University servers – e-mail, web cache, news, general machine,

and currently the main web server. The latter is under review, but in any case would remain within the Information Portfolio.

Management Information Services, including project direction for the ESP. In addition to the traditional work around the Fujitsu global server and the Natural Adabas environment (to be maintained for at least a further 3 years), responsibilities include implementation of the PeopleSoft environment and associated business process review. Included also are the physical building of integrated infrastructure to support the software and the access to the systems by high profile and casual users. (This extension of the role of MIS has raised many issues of integration and support of University wide infrastructure, network connectivity, authentication and web support and design.)

Support for student computing laboratories. This area has been under review for almost two years. (This area needs to be better integrated to particular teaching infrastructure and the overall University infrastructure, many of the issues specified above raised under MIS also apply here. The Review of The Faculties, recommendation 4, has greatly assisted the move towards a more integrated structure.)

Overall financial planning and control for IT Services groups along with some specific University wide tasks are carried out through the IT Services Business Office.

Core aspects of a corporate web presence to improve the University's image, presence, competitiveness and use of electronic opportunities on the World Wide Web. (This has been recently added to the responsibilities of the Director, IT Services.)

Support for the PVC (Academic) in specific planning projects both within and outside the University.

Developmental issues requiring an expansion of current responsibilities:

Operational

- Authentication for access to, and charging for, information and charging services
- Mechanism for catalysing ANU academic information expertise, along with its flow on and development, into a test/production environment
- Mechanisms for feedback on service performance from students/customers
- Electronic publishing, metadata, electronic archiving
- Electronic reserve, support for course development, virtual help/reference.

Policy and Planning

- Creation of capacity to identify, promote, and evaluate opportunities for information services/collaborations
- Development of a coordinated information competency program
- Development of policies to support common desktop platforms

Further responsibilities, currently held in other areas on campus, for potential inclusion as management responsibilities of the Information Portfolio:

Responsibility for several services, currently run outside of the Library and IT Services, should be considered for inclusion in the Information Portfolio. Inclusion could be at the policy/planning level, or at the service delivery level.

Integration of:

- networking to include some services currently operated by Facilities and Services – PABX, cable installations, directories, charge back, negotiation with external communication suppliers;
- Web development, production of official publications (currently with Public Affairs Division), information presentation standards, and server side support;
- Student-oriented information services between the current IT Services and the current Faculties Resources Office (to flow from Recommendation 4 of The Faculties Review);
- educational technology services and support for academics having a teaching role;
- workflow patterns in the University around the receipt, actioning and long term storage of records – integrated archiving procedures with academic materials.

Many of these issues require discussion with members of the University Executive. Others to be consulted include the Directors of Facilities and Services, Human Resources and Planning and Policy Coordination, and Student Recruitment and International Education and Student Administration and Support Services in respect of student matters.

ATTACHMENT 5: INDICATIVE ACTIONS TO IMPLEMENT THE GOALS

The Working Party spent some time identifying actions that would give effect to the goals for the information environment. However, these need to be tested with the areas which would be charged with implementation. Actions have been listed under each goal - with some resultant duplication. The implementation plan will group these actions into cohesive programs, as outlined in Section 5 of the Report. The Goals and actions are set out under the four broad headings which were used in structuring the Report:

- Staff and Students
- Information Services
- Infrastructure
- Governance and Management

Staff and Students***A1: Optimise the ability to catalyse research and enhance research competitiveness***

1. Establish the components required for the "Library of the Future" - information and communications centre.
2. Continue the process of establishing links with other libraries to ensure international access for research and research-related information.
3. Establish facilities and services to enable 24-hour access to information for staff and students, from on and off campus.
4. Establish policy on ownership of intellectual property in respect of publication in journals.
5. Provide timely training and updating for investigators. Explore appropriate methods of providing this training.
6. Identify the need for and establish specialist support services in areas where it is inefficient to train individual investigators.
7. Create policy and infrastructure to facilitate collaboration and cooperation between institutions.

A2: Maintain high quality communications infrastructure

1. Develop a plan to move to standard hardware and software platforms with regular upgrading to keep pace with international communication standards
2. Develop the expertise to enable the University to establish laboratories to exchange datasets at real time performance levels.
3. Provide large storage and archiving facilities for research data.
4. Establish IT infrastructure to support research from on and off campus.

A3: Establish computation-based facilities which are of world standard

1. Adequate power to work with, and knowledge to access, international databases
2. Establish clusters of specialised high performance computing services, supported by expert advice and assistance.
3. Provide postgraduate access and training to computational resources.
4. Support the communication infrastructure needs of collaborative ventures.

A4: Coordinate support for access to scholarly information

1. Timely and cost effective access to scholarly information, particularly in electronic formats
2. Provide coordinated web gateways to ensure direct access to information sources.

A5: Provide support for publication of research outcomes (especially in electronic format)

1. Coordinate intellectual property issues to maximise the availability of scholarly information.

2. Coordinate standards and guidelines for publishing in all media types.
3. Develop metadata indexing standards and procedures.
4. Establish electronic information archives.

B1: Provide an environment for innovative development and enhancement of educational materials

1. Establish a 'one stop shop' multi-skilled unit capable of developing, assisting and coordinating the production of educational materials
2. Establish educational development officers at local area supported by a local area educational development committee
3. Recognise and reward innovative teaching development
4. Establish a database of, and provide desktop access to, developments in educational software and best practice
5. Develop and implement policies on storage, retrieval and ownership of educational materials

B2: Provide an environment for enhancing teaching methods and effective and efficient management of course delivery

1. Provide authenticated, authorised, efficient and equitable access to IT systems and the internet both on and off-campus.
2. Provide facilities for the efficient storage and retrieval of educational materials
3. Coordinate and facilitate staff training courses for web-related education development
4. Establish a laboratory for development and testing of teaching materials and methods
5. Establish efficient systems for the issue, maintenance and production of course/unit management information and reliable messaging for use by individual academics (eg. Student email lists, examination results)
6. Establish processes to ensure infrastructure and IT planning integrates with enrolment planning and course delivery schedules.
7. Provide high quality, cost effective video conference facilities
8. Integrate IT-related classroom developments into CMP

B3: Develop and maintain a quality learning environment for information and IT literate staff

1. Identify and achieve a common set of information and IT competencies
2. Establish the need for, and coordinate the provision of, staff training courses for IT-enriched teaching
3. Coordinate and facilitate on-going training opportunities in information and IT competencies
4. Establish a mechanism to obtain and disseminate advice on latest IT developments and 'preferred' hardware and software

C1: Develop and maintain a high quality infrastructure for student information

1. Develop a responsive and accountable management structure over computing laboratories, IT library facilities, teaching rooms and associated infrastructure
2. Restructure planning, advisory and central support of IT teaching support services (eg. TLTSU)
3. Establish a policy on and funding of graduate information and IT resources
4. Establish dedicated, flexible graduate teaching laboratories and study areas

C2: Develop and maintain a quality learning environment for information and IT literate students

1. Identify and achieve a common set of information and IT competencies
2. Develop and monitor a policy on required student access/ownership of a computer
3. Provide central 'information commons'
4. Integrate basic information and IT skills into introductory core units
5. Coordinate and facilitate the development of short IT 'bridging courses'

D1: Design and implement effective management methods, systems and support structures which are designed to collect, transform and deliver relevant information for analysis, modelling and strategic decision making

1. Implement Management systems, which will provide Activity Based Management information, University Planning and Simulation information, Performance management etc.
2. Improve the ability of the University management to determine true costs of services or courses and predict future trends.
3. Develop strategies for the introduction, improvement or elimination of services or courses.

Information Services***E1: Provide timely access to scholarly information for research and teaching***

1. Provide timely and appropriate access to print and electronic information to support research and teaching.
2. Negotiate campus wide electronic site licences to support scholarly access to information.
3. Examine and develop appropriate physical infrastructure facilities for maximisation of print storage and electronic access, e.g Information Commons, plug-ins etc.
4. Establish services to enable transition to “Library of the Future” concepts particularly in relation to electronic information.
5. Examine and provide alternative document access services to the desk-top.
6. Develop and or link to customised portals to assist web access to scholarly information.
7. Continue to foster links with national and international organisations to change the scholarly communication paradigm.

E2: Consolidate access to scholarly information through appropriate training and resource provision

1. Provide structured training to facilitate scholarly information access and manipulation.
2. Collaborate with campus wide providers in provision of information literacy programs.
3. Participate in central facilities such as an Information Commons to provide assistance in web training, electronic publishing in relation to scholarly information aspects.
4. Liaise with other information providers on virtual electronic/help desk facilities.
5. Develop with appropriate units on campus resource database facilities to assist in self-help or to maintain best practice e.g in teaching software.

E3: Optimise the generation and distribution of scholarly information

1. Coordinate and facilitate intellectual property and copyright issues in relation to scholarly information access and distribution.
2. Liaise on the twenty-four hour access to material to support teaching and learning, e.g. electronic reserve, course notes, reading bricks, etc.
3. Liaise with appropriate providers in central access to ANU electronic press initiatives and the maintenance of standards.
4. Establish and maintain metadata indexing standards and procedures in cooperation with other parts of the University.
5. Cooperate with other parts of the University to facilitate integrated web information access.
6. Cooperate with other parts of the University to provide for the archiving of appropriate electronic scholarly information including pre-print servers.
7. Cooperate with other parts of the University in access to multi-media resource provision, e.g digital lectures, electronic journals with digital/audio streaming, multi-media workstation provision etc.

8. Establish and develop entrepreneurial activities with commercial providers to provide alternative revenue streams.

E4: Develop strategies that encourage innovation and optimise resources

1. Identify information and information sources critical to the strategic decision making processes of the University.
2. Participate in policy and planning mechanisms to maximise information coordination arising out of the Information Policy Working Party.
3. Optimise use of library resources by collaboration with other units, institutions and service providers on campus to meet the needs of staff and students.
4. Participate in international developments, e.g. consortia to provide global information access to meet ANU and national research information needs.
5. Engage in regular strategic planning exercise to support teaching and research in the scholarly information process.
6. Measure library processes and systems against performance goals, client needs and the changing environment and continually review, improve, and redesign library process where appropriate.

F1: Provide quality corporate information services to staff and students of the University which will streamline administrative processes and facilitate decision-making at all levels

1. Identify all information and information sources that are required to effectively administer the University. (includes policies, legislation, procedures, EIS (data warehouses), operational data (ESP, admin systems))
2. Identify all systems, and repositories of data, both central and local, that are currently used and/or are needed, and should be rationalised, developed and/or shared in strategic decision making processes and eliminate redundant local systems and data storage.
3. Identify Data Managers/Stewards to develop policies and standards for the definition, collection and management of corporate data and to ensure the integrity and consistency of corporate data across the University (eg format and collection of names, addresses, units, location codes, corporate system tables that cross functional areas etc)
4. Establish a unit with the responsibility for standardising, monitoring and managing the publication on the University Intranet of University policies and for facilitating devolved content development.
5. Establish a framework of responsible officers in local areas who are responsible for the coordination of corporate information (eg in relation to ESP, copyright, Y2K, Records) with the central information infrastructure managers.
6. Implement new administrative processes, systems and organisational structures such as those proposed by the ESP refer (<http://www.anu.edu.au/esp>) and include enabling technologies (Interactive Voice Response (IVR), Internet/Intranet, E-commerce and Workflow) to support redesigned processes and collaboration.
7. Continue the review and replacement of other administrative processes, systems and organisational structures currently not included in the current remit of ESP (eg Records/Document Management, (including archival and retirement), Convocation, Parking, Grants Management, Executive Information Systems)
8. Define standards of performance and service level agreements for those activities (policy development, procedures, process and support etc) for which central administrative areas are responsible.

F2: Develop an information literate community within the University

1. Establish a program to encourage and educate staff to consider the global needs of the University and their role in this context and engender a culture of client service and satisfaction.
2. Educate all staff in methods to effectively access University administrative policies, procedures, systems and tools (eg computer desktop packages – Web browsers, Word, Excel).

3. Educate staff in the value of collaboration and information sharing as well as information management (eg records management, archiving and retirement, email, scheduling, shared directory structures, workflow) .
4. Include information management and IT literacy skills in duty statements and selection criteria for all staff.

Infrastructure

G1: Provide universal connectivity from all points on each ANU campus to access all types of network services - voice, data, video etc - in a consistent connection manner

1. Plan and manage centrally the provision of full network connectivity to the desktop/laboratory, with connection functionality appropriate to the academic and/or administrative task required
2. Integrate voice, data, video services under common management authority
3. Develop integrated policy and funding mechanisms for network connectivity, encompassing central and local contributions

G2: Establish integrated and collaborative services from a seamless, software menu of services - wherever possible with a common look and feel, understood by all members of the community

1. Integrate software implementation procedures between service providers, both centrally and at the LITSS level
2. Eliminate redundant services and shadow systems where satisfactory services are provided, promoted and supported at the corporate level
3. Develop and promote the training of LITSS and continue to run information seminars to encourage a broad view of requirements and integrated solutions across all areas of the University.

G3: Develop a desktop computing environment which enables members of the University community to freely exchange information and effectively fulfil their roles as a member of the University

1. Promote bulk licensing and support contracts of software for commonly required software packages and systems
2. Integrate software implementation procedures between service providers, both centrally and at the LITSS level
3. Develop standard desktop configurations and purchasing procedures.

G4: Maintain a set of information services which have high quality control standards, provide safeguards to privacy and emphasise a client service culture

1. Prepare and publish standards and quality control mechanisms for information presentation.
2. Implement a standard for authentication of users across University information services.
3. Include in all information literacy training, modules on information privacy and handling.
4. Develop a strong culture for acknowledgment of copyright and intellectual property issues in publishing, particularly on the web.

G5: Maintain the information infrastructure available to Australian academic activities at the leading edge, nationally and internationally

1. Play a leadership role in, participate in, and contribute to, the activities of national initiatives such as AARNet, collaborative research networks, and similar infrastructure.
2. Participate in international consortia, as a leading Australian member, to bring global infrastructure connectivity to Australia, particularly to meet national research goals.
3. Develop and showcase leading edge academic network applications, particularly for subsequent broad introduction into service to meet academic goals.
4. Ensure that there is universal (authenticated) access to information sources to which the University subscribes.

Governance and Management

H1: Provide a governance framework which fosters an information oriented culture and a strategic development of the information infrastructure

1. Bring forward an information policy which serves staff and students through relevance, openness and the assured quality of information and which recognises the value of the institution's information infrastructure.
2. Include "information infrastructure" as a mission oriented area in the University's Strategic Plan, and one which is informed by the institution's teaching and research objectives.
3. Establish a University level advisory body to ensure advice on information issues reflects collegiate knowledge and an integrated view of the University's information infrastructure.
4. Develop processes by which information policy and management plans are published annually and revised in the context of research and teaching management plans.
5. Develop policy covering responsibilities for the University's information infrastructure suited to the University's devolved authority structures.

H2: Develop a management structure for the information infrastructure which is closely linked to the corporate goals in a devolved system of responsibilities

1. Develop descriptions of the processes involved in deciding resources and responsibilities for major aspects of the University's information infrastructure.
2. Create a responsive client service environment with a good understanding of processes, roles and decisions by cultivating a strong planning and reporting ethos between the central management and devolved implementation teams.
3. Develop arrangements which more closely inter-links management of the information infrastructure with plans of senior academic and administrative managers.
4. Develop an advisory structure and associated operating environment which is characterised by transparency of processes and decisions and effective feedback to the academic and management structures.

GLOSSARY OF TERMS USED IN THIS REPORT

APAC	Australian Partnership for Advanced Computing.
CMP	Capital Management Plan. Under this plan funding is provided for buildings and physical infrastructure, eg. structured cabling. http://www.anu.edu.au/facilities/capital_works/capital_management.html
FRO	Faculties Resources Office. Provides support for teaching facilities common to all faculties.
Information Commons	Facilities, independent of discipline, providing access to information for students. Essentially the 'desktop' environment for students. These commons will also serve our general community such as visitors, the public, alumni, students and staff from other organisations. Information commons include teaching laboratories and training facilities.
Information Environment	The scholarly and corporate information resources available to the University community, sustained by coordinated policy and planning, adequate funding and quality support services.
Information Infrastructure	Those services which store, manage, serve and add value to information and are required for a person to gain access to global information, eg library buildings, networks, equipment, training, support services.
Information Literacy	Competency, relevant to the role of the individual, in accessing, organising and using information and associated access tools such as computers, the internet, libraries, databases; understanding and respect of intellectual property, security, privacy and copyright.
Information Portfolio	An inter-related group of functions which must be managed in a coordinated way to achieve an effective information environment eg: planning, policy, standards, advisory structures, centrally-provided services [scholarly and corporate information, networks, telecommunications, instructional media services, servers] intellectual property, and copyright.
Information Resources	The information content and the people who assist staff and students to organise and access information content.
ITS	Information Technology Services
ITSC	Information Technology Strategy Committee
ITSMP	Information Technology Systems Management Plan
Metadata	Attributes attached to documents which assist to define their content and facilitate discovery, ownership, security and so on.
PAD	Public Affairs Division
WWW	World Wide Web