IS Services

Annual Report

2005/2006

Highlights of the Year

One of the highlights of the year was the major change in the implementation of staffing policies, especially in relation to the appointment of staff on short term contracts. It was possible to convert several long standing, short term contract positions to permanent posts or to contracts of indefinite duration. The creation of such long term positions has eliminated the continuous turnover of contracts with the consequent rounds of internal recruitment and change.

The appointment of the MIS Manager has helped to provide leadership in the area of academic administrative support. This was a key strategic appointment and was vital to the implementation of support structures that will be required by the continuing change process in College.

A number of major technical innovations were undertaken, some of these were delivered during the year and others will be delivered in the coming years. Services such as the online connection of student computers to the network were highly successful in expediting what had been a difficult process and will have implications for facilitating staff connections in the future.

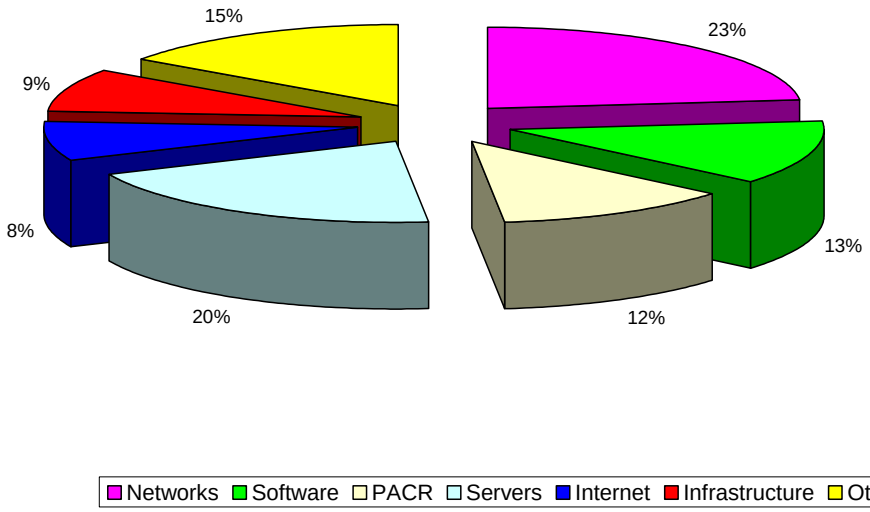
The extension of the College's wireless network to most areas of the College and the enablement of the roaming facility "EDURoam" continues the process of implementing a mobile information service to staff and students.

Financial Review

Non-Pay Costs

An outline of the major non-pay expenditures for the year is shown below.

Non-pay Expenditure 2005/2006



It is worth commenting on some of the major cost items shown above. The single largest item is the College network which continues to expand to new areas and to require constant upgrading and maintenance in order to provide the continuous and reliable levels of service expected. Major investments were made in the wireless part of the network which doubled in size over the year.

In preparation for major new email and online storage facility service initiatives, extra resilient servers were installed which increased the server spend to 20 per cent, compared to 14 per cent in the previous year.

Another cost item worthy of mention is the spend on the upgrade of the physical infrastructure in the server rooms in College (9 per cent). These had fallen behind acceptable levels and major investment was required on power, fire suppression and enhanced security, as well as on the replacement of air conditioning.

Following the staffing difficulties of the last few years, a more stable position was reached and a major investment was made in staff training, included in miscellaneous, to ensure the modern services expected by users could be provided in an optimum manner.

Staffing Review

Manager: Management Information Systems Group

The long recruitment process to appoint a replacement MIS Manager was concluded with the appointment of John Lawlor in November 2005.

The appointment of the new manager removes a great deal of uncertainty amongst the staff and provides a renewed sense of leadership in the provision of management information services and will alleviate some of the pressure on the Director and Deputy Director.

Short Term Contracts

A concerted effort was made to minimise the time consuming recruitment exercises involved with reappointing short term contracts on an annual basis.

Where possible, short term contracts were converted to permanent positions or to contracts of indefinite duration. This should result in a decrease in recruitment activity in future years. In some cases, staff are funded by other College areas and attempts will be made to crystallise the funding for these positions so that contracts of indefinite duration can be provided for these staff.

In the year, IS Services conducted a total of 19 recruitment processes, some of which were external, resulting in 13 new staff members. The remainder involved extensions to internal staff contracts or the conversion of contracts to permanent positions.

Five staff left or moved to other areas in College. Four staff are on College-sponsored family friendly breaks and most of these are on a year to year basis, so it is inevitable that there will be multiple recruitment exercises to fill these positions.

The move towards longer term contracts and permanent positions should mean that the benefits from staff training are retained in College and the overall costs of recruitment are reduced significantly in future.

There was a notable tightening in the market for IT specialists in Ireland during the year. This could have an effect on future recruitment and IT development due to shortages in trained staff.

Formal IT Service Standards

Following many years of IT development in IS Services, some more formal standards and practices were introduced during the year. These will result in changes in ways of working in coming years as components are adopted from the formal standards.

The service standards include “ITIL” and are regarded as world class for service delivery.

A system of formal Change Management has been introduced and all changes in service provision must be agreed by the designated group in IS Services.

The formal standards will be most apparent in the User Support and Helpdesk areas where changes will be introduced to provide more information for users on the status of work and the expected delivery time of requests.

External Environment

Security

Whilst there was an overall decrease in the major external threats to IT Security during the year, constant vigilance had to be maintained to ensure the integrity of the College’s information systems.

Automatic updating systems for virus updates and Windows operating system patches worked successfully and have seen an increased uptake by users. These systems allow for emergency fixes to be installed on machines when external threats are identified. However, until all machines and users subscribe to these services, it is possible that unprotected systems may jeopardise the security of the infrastructure.

The number of external incidents was small; however there has been a distinct change in the perpetrators. Incidents have now moved more into the realm of criminals who are harnessing large numbers of hijacked computers for the purposes of personal gain; for example, a number of targeted emails were sent to users which sought to have them divulge personal financial information. It is impossible to prevent this sort of email arriving so users must be aware that such requests for personal information should be treated with a large degree of scepticism.

Availability

Security of information services in College involves not only ensuring the integrity of information, but equally making sure that services are available to users whenever and where ever needed. Many areas in College are totally unable to function when there are breaks in the network service.

When new applications or services are installed on the College network, it is now practice that duplicate systems are also installed to maintain services should one component fail. The requirements for a 24 hour, 365 day a year service mean that extra investment had to be made to provide this resilience. In future this will be a requirement for all new systems in College.

In particular, the College's web presence is a vital service to users inside and outside College. A separate copy of the website is maintained in a data hosting service outside of College which provides a safe environment should the main web service fail for any reason.

Support Activities in IS Services

User Support

The User Support area suffered the greatest degree of vacancies and staff turnover during the year. At the start of the period, the group was running at 50 per cent capacity and help had to be provided by external contractors. Following a major recruitment drive, however, the team was rapidly brought up to strength and many of the positions were appointed on a permanent basis or as contracts of indefinite duration, thus eliminating some of the previous insecurity of positions.

Major efforts were put into connecting student computers to the network in a timely and secure manner, however it was clear that a technological solution would have to be provided to replace the manual checking of software on student computers. A Network Admission Control system (described fully in the section on Student Owned Computers in this report) was developed to lower demands on the User Support staff. The implementation of the NAC solution eliminated delays in connecting student computers to the network.

Training Programme

The training programme for staff and postgraduate students continues to attract a large number of participants with over 1,400 sessions attended during the year. There has been a marked growth in the number of postgraduate research students attending these courses and they now account for almost two thirds of the attendees. As a result of this growth some courses have been specifically tailored for research students.

Courses have also been targeted at staff who have little computer experience, or would not traditionally be computer users, so that they can perform activities that require internet access.

The training unit continues to play an active role with the work of the Trinity Access Programme.

Audio Visual and Media Service

Audio visual installations have become an integral part of the teaching facilities in College.

During the year a maintenance contract was arranged for the equipment installed in the main lecture theatres. Under this arrangement, the systems in the Senior Lecturer's pool rooms will be serviced a number of times a year and any breakdowns in the interim will be repaired by one of the College's audio visual suppliers on a call-out basis. College staff will continue to check the correct operation of the equipment and will also provide first level support to users of the theatres and seminar rooms.

Data and display elements of the audio visual equipment were updated during the year, so the lecturer in a classroom or theatre need only interface with one unit when encountering a problem. Theatre audio visual facilities are now serviced by the same team servicing the computers which has eliminated a number of frustrations for the lecturing staff.

In line with existing practice, a number of lecture theatres had their AV facilities upgraded with new projectors and the standard control unit. One interesting development was the installation of a three projector system in Goldsmith Hall to address the unusual layout of the room.

Pilot facilities for videoconferencing and podcasting of lectures were installed in some theatres. The location of the pilots was driven by lecturers who wished to take part in the podcasting exercise and will be extended as other rooms are upgraded.

A system for the broadcast of television stations was installed to satisfy a requirement of the language area; this could be rolled out to other users in the College if licensing and other issues can be resolved.

One of the notable system upgrades was the replacement of the audio system in the Public Theatre. This system presented some challenges with regard to the architectural environment of the area and restricted access due to heavy use of the Theatre. The new system provides a much improved audio experience for people attending events in the Theatre.

A new College-wide information system was implemented on the video screens installed for the BA Festival of Science. The screens provide up to date information on activities in College and can be tailored so that site specific notices can be restricted to specific locations. The information content of the screens is managed by the Communications Office.

Student Facilities

Student Induction

Traditionally, Junior Freshmen students attend a one hour induction programme to familiarise themselves with the way IT services are provided in College. This year the bulk of the courses (1,800 out of 2,100) were provided in an online interactive manner rather than as a face-to-face class.

The online induction course takes the students through the use of the College computer rooms, email and specific pointers on the College website. When students use the online system, they log onto a machine in College, with the username and password that they were provided at registration and they are taken through the induction tutorial before they can perform any standard functions on the PC.

Student Computer Rooms

In keeping with standard practice – to ensure students have access to the most modern computing equipment possible - about a third of machines in the student computer rooms were upgraded during the summer. Machines that are replaced in this process are installed as stand-up email stations in public areas in College.

A new computer room was opened in Trinity Hall so students can continue to work on computers without having to travel to the main campus.

Due to the wear and tear of the student computer rooms because of their high usage, a number of them needed and underwent major refurbishments, including painting, lighting and carpeting.

Extra stand-up email stations were installed in various places around College where space permitted, including a cluster in a new location in the Arts Building near the Davis Theatre. A number of these stations are equipped with furniture that allows access from a wheelchair.

Student Owned Computers

A system to allow the secure attachment of student computers to the College network was developed during the year; this is called Network Admission Control (NAC). This system, which depends on a dedicated network appliance, detects a computer connecting to a specified network point and starts a process to check the machine for compliance to standard College policies. The system is implemented by an identical pair of computer appliances to ensure a resilient service for students.

If the computer complies with current policies on (i) the version of the operating systems, (ii) presence of appropriate security software and (iii) absence of identified viruses or spyware, then the machine is connected to the appropriate section of the College network for that particular user or area.

In the event that the computer does not comply with the defined standards, the machine is placed in a quarantine network and the problems are described to the user with solutions suggested. Once the appropriate repairs are made the user can then connect to the College network.

Where new threats are identified during the coming years, the NAC will make it possible to force machines to apply patches or other software downloads to ensure that machines do not jeopardise other activities or users of the network.

A measure of the success of the system is that 80 per cent of computers were connected to the College network out of normal working hours, in the students' own time. In the past, a student was required to bring their computer to a special network clinic, most of which were held during normal office hours. The transfer of staff effort from reactive problem solving to proactive solution provision has improved overall service and has meant that individual difficulties could be addressed in a timely manner.

In the first four weeks of operation of the new system more than 1,100 new student computers connected successfully to the network, most of which did not require the student to contact IS Services for assistance.

Future plans for the system will include the connection to the wireless network and its implementation for machines on the staff and postgraduate network.

Social Networking

A range of new services have grown up on the internet in its short life. One which saw rapid growth during this year was social networking. Social networks include such things as photograph sharing sites, personal diaries (blogs) as well as systems for linking up friends across the world.

Concern was expressed by some students at what they considered was inappropriate use of the student computer facilities by some people using these social networks. This activity can result in students spending inordinate amounts of time on computer facilities and at stages during the year many of the student computers were used for this purpose.

Calls were made to ban or censor such activities resulting in a campaign to educate students in the appropriate use of computer facilities. It was felt that a blanket ban could not be enforced effectively and that invoking such a process would not be appropriate in an environment like Trinity. It is likely that new activities such as this will develop in the future with educational benefits and easy access to such new environments should be part of the learning experience at university.

College Networks and Services

Identity Management

The most common problem which users call the Helpdesk about is their password. The use of multiple passwords causes problems; also users tend to forget their passwords following periods of vacation. A new service is being implemented which will allow users access to create new passwords online when they answer some personalised questions and this should eliminate many calls to the Helpdesk. This system will also facilitate improved password security when policies are put in place for regular password changes and better password selection.

It is planned that the new email system and the extended facilities for sharing calendars will similarly connect to the system and will allow the users easy access through their standard username and password.

Email Service

Extensive planning to introduce new email systems for both staff and students was undertaken during the year. A review of best practice in universities was carried out and it was determined that the demands of the two groups are disparate enough that different technologies should be provided for each.

Modern email systems provide more than simple email and usually integrate a range of personal productivity tools that can be linked to personal digital assistants or the functions built into mobile phones. For the last few years, a limited shared calendar system has been provided to some staff and, on the basis of increased demand for this service, the extensive use of shared calendars was made a requirement for the new system.

The new system, for staff and postgraduate students, will continue to provide the existing email services, so there should be no major change for users. A new Webmail system will be implemented at the same time. As well as email, the new service will provide online calendars for all staff and postgraduate students, available on the computer desktops as well as on the web. Thus, a calendar user will be able to manipulate their diary over the web, even when they are out of the office.

The new system will integrate with the Identity Management system, eliminating the requirement for users to remember multiple passwords.

It has been noted that the existing Webmail system in College, whilst used very extensively by both staff and students, lacks some of the modern features expected in a mail system and presents problems for users with visual impairment. Though access problems can be alleviated in most cases, plans were undertaken to set up an alternative service for undergraduate students which would provide them with extended features and larger online storage space.

Negotiations were undertaken with a number of companies offering modern email facilities as part of their primary business. These facilities are used world wide and provide vastly more storage and functionality than the existing College email systems. Unfortunately, it was not possible to complete these negotiations for the start of the new academic year; however the arrangements will be pursued in the coming year with a view to implementing the enhanced service on a phased basis whereby students can opt to use either the new or existing system.

As part of the implementation of the new email system it is intended that students would retain the email and account facilities after they have left College and this would provide the “email for life” concept for University Alumni.

“SPAM” Email

Most users will have noticed the inexorable rise in the number of junk emails received, both on their College and personal accounts. It is exceedingly cheap to send spam email and whilst the return on any individual email is low, substantial fraud can be inflicted by large numbers of emails.

The identification and trapping of spam email is very much a cat and mouse affair. Once effective measures are put in place, the spammers evolve their techniques to bypass the defences that are put in place.

With the new email system in College, effective measures will be implemented to prevent spam and other dangerous payloads in email messages. This service will be provided to College on a managed, commercial basis and will be actively monitored by College under a Service Level Agreement.

College Network

The College network was enhanced and expanded in several stages throughout the year. Extra fibre-optic links were installed between the major networking hubs which, coupled with replacement hardware, allows for extra resilience and throughput to the major areas in the main campus.

Through using the Dublin MAN (Metropolitan Area Network) provided by HEAnet, it was possible to link the Trinity Enterprise Centre in Pearse Street into the College network.

The HEAnet Dublin MAN also allowed for specialist research links to be set up on a fibre-optic network to researchers in Dublin City University. This sort of collaboration would be extremely expensive, or even impossible, to set up and operate on an ad-hoc basis. It is likely that future research collaborations will be facilitated by the modern networking facilities that are currently being put in place.

Wireless Networking

The demand for extra wired network points continues as extra space is acquired by the College and as users install multiple machines in the existing spaces. The expansion of the wireless service has proceeded according to plan with 100 per cent growth in wireless coverage during the year.

Whilst much of the main campus is wireless-enabled, areas remain which will be addressed in coming years. Areas with high numbers of mobile users will be targeted first. New wireless access points were added in D'Olier Street, Westland Square, Trinity Hall, some buildings on the St. James's campus and the entire Trinity Centre at Tallaght.

Servers

Previous reports have highlighted the problem of "server creep", where more and more servers are required for each application, and this issue became more apparent during the year.

The requirements for security and access to data have demanded that fault tolerant systems be implemented with duplicate machines at either end of College, doubling the number of servers.

Even though servers are tending to become physically smaller they require more power and generate more heat which has to be dissipated.

Whilst it is possible that a move to "virtualisation", where a single machine can be logically split into several virtual machines, might help in the future, testing of this technology in College is at an early stage and it is apparent that some software suppliers may not support their products when run in a virtual environment.

As well as the two server rooms on the main campus, a rack of servers are situated in a secure hosting site in West Dublin. A number of College systems on these off-site servers are installed to provide services in the case of a major outage on campus. For example the College's web presence would be provided from this site in the event of a major problem with the server on the main campus.

Server Room Upgrades

The physical infrastructure in the two main server rooms in College had fallen behind industry best practice in a number of ways and major investment was put in place to remedy the problems.

An automatic fire-suppression system was installed in the Pearse Street server room so that in the event of a fire it would automatically be extinguished before major damage could occur. The uninterruptible power supply system was also upgraded, as was the air-conditioning system. However, it is clear that the physical space is neither suitable nor adequate for

the expected developments in the area in the near future and will need major refurbishment or total relocation.

Major work was initiated in the server room in the East End to bring the power, security and air-conditioning up to a standard where this room could be used as an expansion area for the Pearse Street room as well as providing hot-standby services for the main College servers.

All of the work in the two rooms was performed by outside contractors who were supervised and managed by the Buildings Office working with staff from IS Services.

Online Disc Storage

A limited amount of online disc storage has been available to all users for many years; however it has only been available to those directly connected to the main College network.

Increasingly, users are working away from the College, either at home or whilst travelling, and require access to files in their central storage. During the year, a system was implemented allowing all users to access their central storage in an authenticated manner through the web. This means that files can be easily up and down loaded to and from the online file storage.

An extended file storage system called a “Storage Area Network”, or SAN, has been in use for a few years and allows large scale storage to be shared amongst a range of servers. A new and larger SAN was installed during the year which allows some research projects to hold very large data files securely on the College network. It is expected there will be an increased demand for this sort of secure file storage in the coming years and suitable archiving mechanisms for infrequently used files will need to be developed.

Research Team

It has become apparent that the general IT service that has been provided to all users in College over the last few years does not cope well with the requirements of top tier researchers. Limited funding has meant that some specialised services could not be delivered in a timely manner to research groups.

The advent of Science Foundation Ireland and overheads funding has allowed a team of staff to be employed to facilitate researchers in their work and to deliver leading edge services. There is now a team of three staff who are directly funded to provide support and facilities to the research community in College.

Whilst it was considered these staff would form part of a dedicated team, funding did not allow for sufficient staff with the right skills to form such a team. Therefore a virtual team was created whereby individual members have

easy access to the specialist skills of their other colleagues thus providing a high level of service to the researchers.

Most of the research active areas in College are now covered by a blanket wireless network as requested by the research groups. Other requests facilitated include the provision of specialist networking facilities to allow easy communication with a commercial partner, and the provision of dedicated fibre-optic connections to researchers in another Irish University. This type of service could never be provided in a general style service without specifically targeted funding.

Internet Developments

College's Connection to the Internet

The College's network connection speed and the number of physical connections to the network increased during the year, minimising some potential points of failure. The automatic switching of the duplicate network connections was tested during the year and services continued uninterrupted on other links when each circuit was physically unplugged.

As part of the ongoing development of the academic internet service provided by HEAnet, a new charging scheme was introduced which allows for rapid changes in the connectivity bandwidth to the College. This means that some network intensive teaching or research functions could be facilitated by enhanced connectivity if required.

HEAnet has also provided specialist research support for College and has provided dedicated fibre-optic circuits across Dublin for some of the SFI funded research programmes. It is expected that these non-standard networking requests will increase in the future. HEAnet will be able to provide these services in Ireland and will also be able to use its contacts worldwide so that advanced research projects can span the globe.

Guest Service for Conferences and Visitors

It is now expected that a visitor from another institution can have ready access to the internet when they visit an institution such as College and the guest service implemented in the previous year continued to provide visitor services for a range of College conferences and events. The system, which is run off a network appliance, makes it easy for authorised College visitors to access the internet in a controlled manner. Currently the visitor system is restricted to the wireless network, which is where the demand usually originates.

Extensive support was provided for many conferences over the summer and a dedicated cluster of PCs was installed outside the Davis Theatre in the Arts Building to facilitate guests attending conferences. These machines were subsequently redeployed around the College for students.

In Europe, and to a lesser extent, the world, there is a wireless roaming system called “EDURoam” implemented in many third level institutions. This system allows authorised visitors to connect to the network based on the credentials with which they have to authenticate themselves in their home university. For example, a visitor from Trinity could log in on another university’s network using their Trinity username and password via the EDURoam system.

Following the integration of the College’s Identity Management system with the EDURoam system, it is now possible for College staff to log into a wireless network on an EDURoam enabled campus. The reverse is also true; any visitor to College who is enabled for EDURoam at their home institution can now use the Trinity network to gain access to the internet.

Web Developments

Access to the web in College has traditionally been provided though servers running specialist software which download web pages and deliver them to the user’s machine. Whilst these proxy servers have delivered trojan work down the years they have now been replaced by specialist machines, or appliances, designed to provide the same functionality in a highly reliable and secure manner.

A number of these appliances have been installed and have taken over the “proxy service” in College. These systems integrate into the Identity Management system so users only need one username and password. The appliances require less management effort compared to the computers they replaced. The appliances are deployed in a fault tolerant and load balancing manner so that they optimise delivery of web pages.

Also deployed during the year was a search-engine appliance which indexes all available web pages in College on a continuous basis and provides the search functionality available on most College web pages. The search appliance replaces a general purpose computer and implements a vastly improved deep searching functionality to users.

Administrative Developments 2005/2006

Appointment of the new MIS Manager has led to a change in the methodology of the development of systems and services for administrative areas. Formal methodologies are being applied which will lead to more robust systems and should speed the delivery of new systems.

Changes in the methods of systems development will be required in the future, in order to keep up with the developments in technology and the increasing demands of the user base.

Student Administration

As well as the work on the new Student Administration System, the existing student system had to be maintained and changes were required to support the new College structures. Whilst these changes may not be widely apparent, they involved considerable effort to ensure the continuation of academic processes to support the new structures, as well as retaining the old information for historical purposes.

Online information is the expected method of delivery and changes to the Student Information System were made to enhance this delivery as well as to enable the provision of student email addresses to other students in College in a manner consistent with best practice regarding the privacy of personal information.

Student Administration System (SAS)

Work on the implementation of the system progressed during the year. Extensive effort was made to ensure the system would conform to existing and future College structures.

A new hardware and software application architecture was designed to support the requirements of the SAS system. This architecture will be used for service delivery in a range of other systems and will lay the groundwork for systems to be implemented in the future.

As is normal management procedure of such large projects, an external review was commissioned. The recommendations of this review were delivered in the period after the reporting year in question and confirmed the Project Team's reports that there would be difficulties in going live with the system in summer 2007.

Treasurer's Office

Much of the work in this area comprised the consolidation of existing systems and the extension of online services, both to users in College and to external suppliers. Major system upgrades were performed on both the central ledger system and the payroll/personnel system.

The extension of online services meant that approximately 40 per cent of suppliers to College are now paid electronically. This has eliminated a large amount of paper handling, enhanced financial controls and saved staff time.

The online reporting system was enhanced and modified to cope with the new College structures as well as the additional retrieval requirements of the research area. Extra interfaces were provided to simplify the management of student accounts, especially in relation to their use of College residences.

Library

Allied to the work on the personnel systems, a time and attendance component of the existing central personnel system was installed and tailored to suit the needs of Library staff.

Work patterns in the Library tend to be varied and complex, so the system had to be designed to suit their requirements.

Research Support System

The Research Support System continues to be a key system for all researchers in College and provides a number of direct feeds that eliminate some duplicate entries for College staff. Information automatically flows from the RSS to the web and to publications such as the College Calendar. The system now acts as a central repository for research information in College.

A pilot system to store and promulgate documents in the form of a Digital Repository was implemented during the year and a number of areas deposited their theses into the system. There were some notable successes where documents and images were placed in the repository which resulted in them being widely searched by internet users.

Challenges for the Coming Year

As ever, the pace of change in both the technological arena and in the structures of the College will need to be tackled vigorously in the coming years.

All of the structural changes mean internal systems must be modified which has an impact on delivery of services to users. The uncertainty in the final College structure means many systems are repeatedly modified in an attempt to provide services to College users. Many of these changes are not apparent to the end user, but are required to keep the background systems in operation.

Solutions must be found to the management of information systems in College and the appropriate delivery of relevant information to all users. This information is required so processes in College can be managed and planned in the best manner possible.

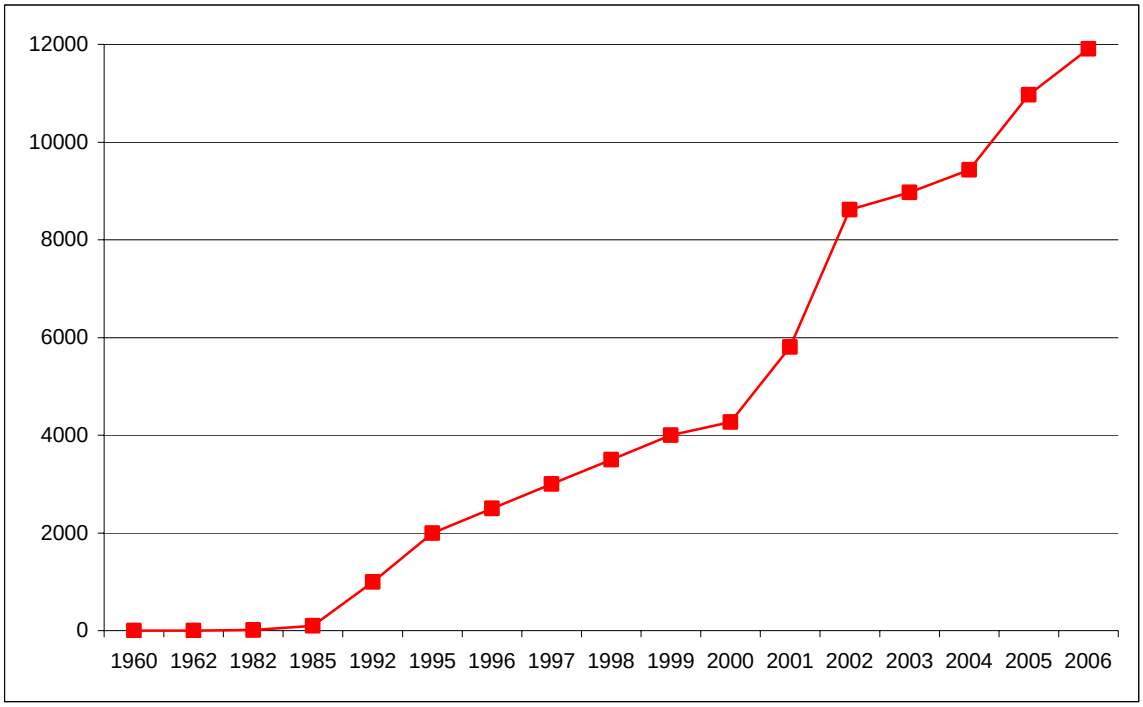
In a post-reporting year development, a review of the ongoing implementation of the new student system (SAS) suggested the system may not deliver the expected solutions within the required timeframe. Following on from the review, the project was paused to ensure the student management process could continue without fear of interruption in the coming year. The project will be reviewed to ensure it can deliver the services required by the new structures in College.

Technologically there are many challenges ahead. We are in a state of permanent change, driven by the demands of staff and students now more than ever before.

Mobility, access to information 24 hours a day and the social needs of users are likely to drive technological change into the future. New devices and services are being developed on a daily basis and techniques will have to be implemented to provide these to the students who have an expectation of College being at the forefront of technological change.

Appendix Statistical Information 1995 to 2006

1. Estimated Number of Computers in College



2. Changes in funding and staff numbers in IS Services & AVMS

	Non-Pay Allocation €	Pay Allocation €	Total €	Staff Count
1995/96	1,511,793	1,414,120	2,925,913	48
1996/97	2,076,542	1,633,463	3,710,006	52.5
1997/98	1,866,738	1,730,324	3,597,063	59
1998/99	1,766,748	1,999,171	3,765,919	63.5
1999/00	2,049,200	2,371,637	4,420,837	62.5
2000/01	2,172,768	2,723,611	4,896,379	61.5
2001/02	1,691,278	3,729,419	5,420,697	70.5
2002/03	2,816,756	4,021,089	6,837,845	72.5
2003/04	2,283,696	4,500,842	6,784,538	76.5
2004/05	2,230,060	4,351,791	6,581,851	85.1
2005/06	2,620,398	5,376,335	7,996,733	87.1

3. Number of Public Access Computers and Laser Printers

	Number of Computers	Number of Printers
30th September 1995	223	18
30th September 1996	247	19
30th September 1997	367	56 (trials using small printers)
30th September 1998	379	29
30th September 1999	408	38
30th September 2000	494	38
30th September 2001	526	38
30th September 2002	534	38
30th September 2003	540	38
30th September 2004	625	35 (service externally managed)
30th September 2005	650	30 (service externally managed)
30th September 2006	802	34

4. Internet Connection speed

Date	TCD Internet Speed
30th September 1992	64 Kb
30th September 1993	128 Kb
30th September 1996	512 Kb
30th September 1997	2 Mb
30th September 1999	5 Mb
30th September 2000	8 Mb
30th September 2001	30 Mb
30th September 2002	40 Mb
30th September 2003	1 GB (effective speed 125 Mb)
30th September 2004	1 GB (effective speed 180 Mb)
30th September 2005	1 GB (effective speed 180 Mb)
30th September 2006	2 x 1 GB (effective speed 318 Mb)

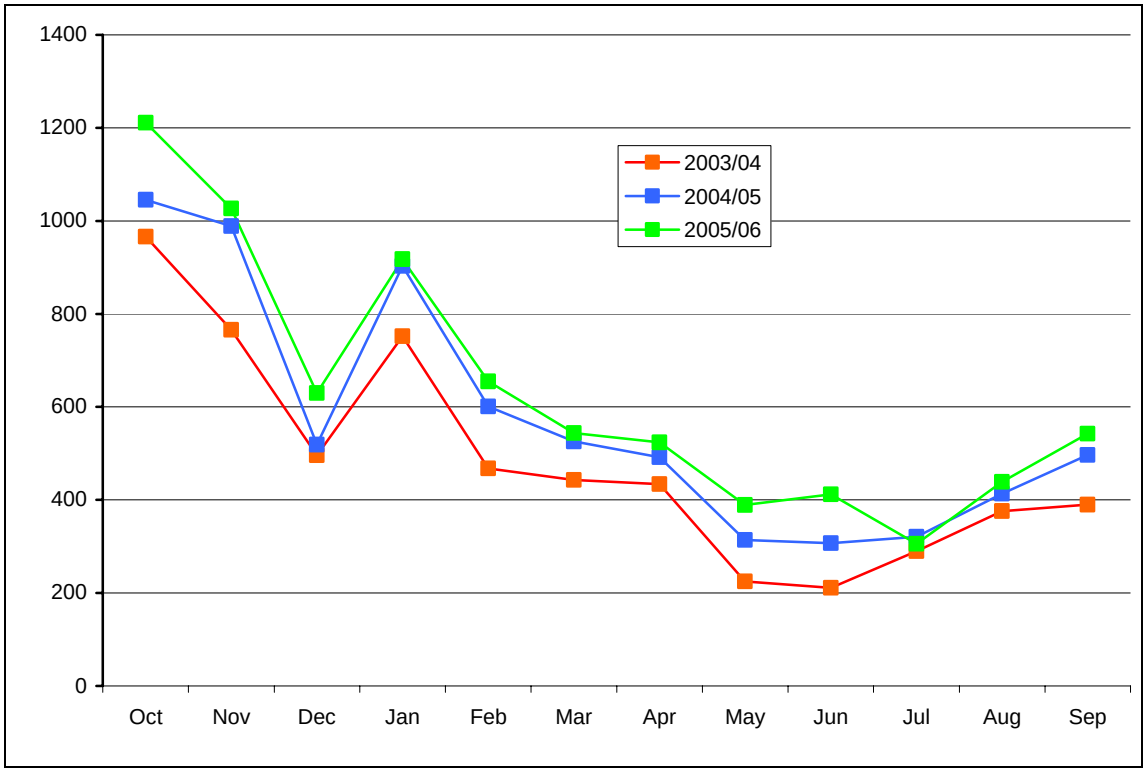
5. Documents Retrieved By Proxy Servers

Year	Number of Pages
1998/99	197,857,969
1999/00	333,983,923
2000/01	525,977,517
2001/02	791,051,179
2002/03	883,301,476
2003/04	923,679,308
2004/05	1,516,445,814
2005/06	2,300,024,991

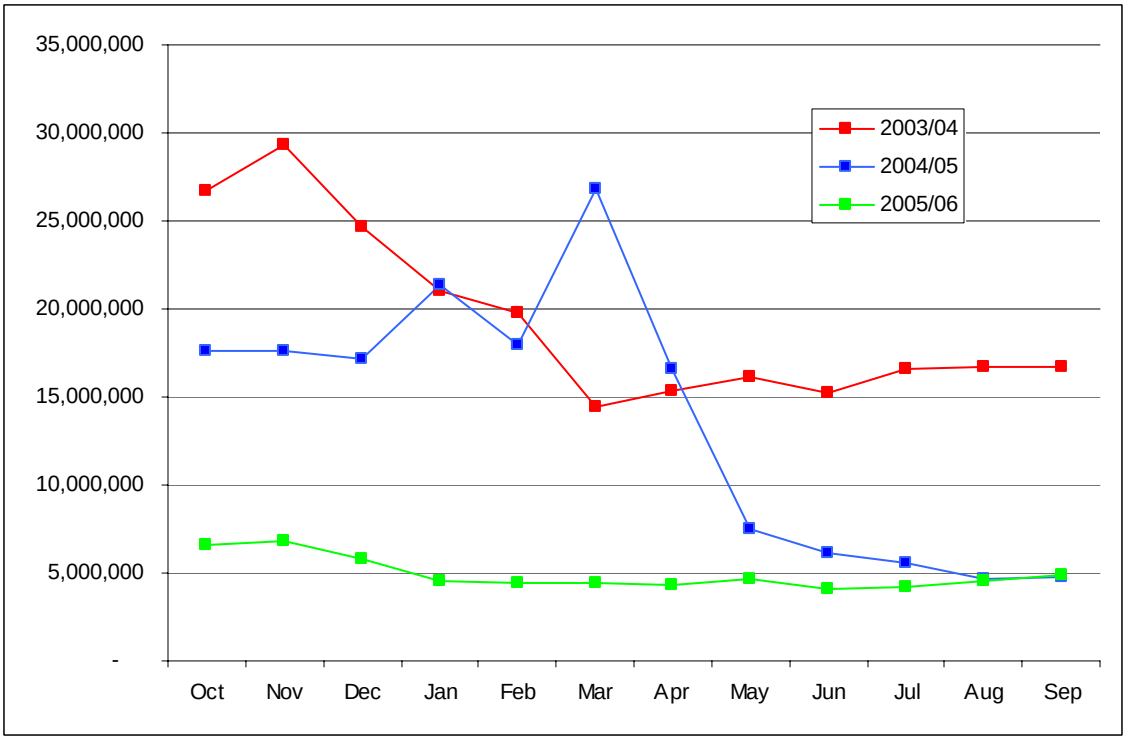
6. Pages Printed in Student Computer Rooms

Year	Number of Pages
1999/00	2,066,667
2000/01	2,393,939
2001/02	3,216,362
2002/03	3,317,923
2003/04	3,780,123
2004/05	2,920,000
2005/06	3,278,043

7. Number of Walk-In Helpdesk Incidents

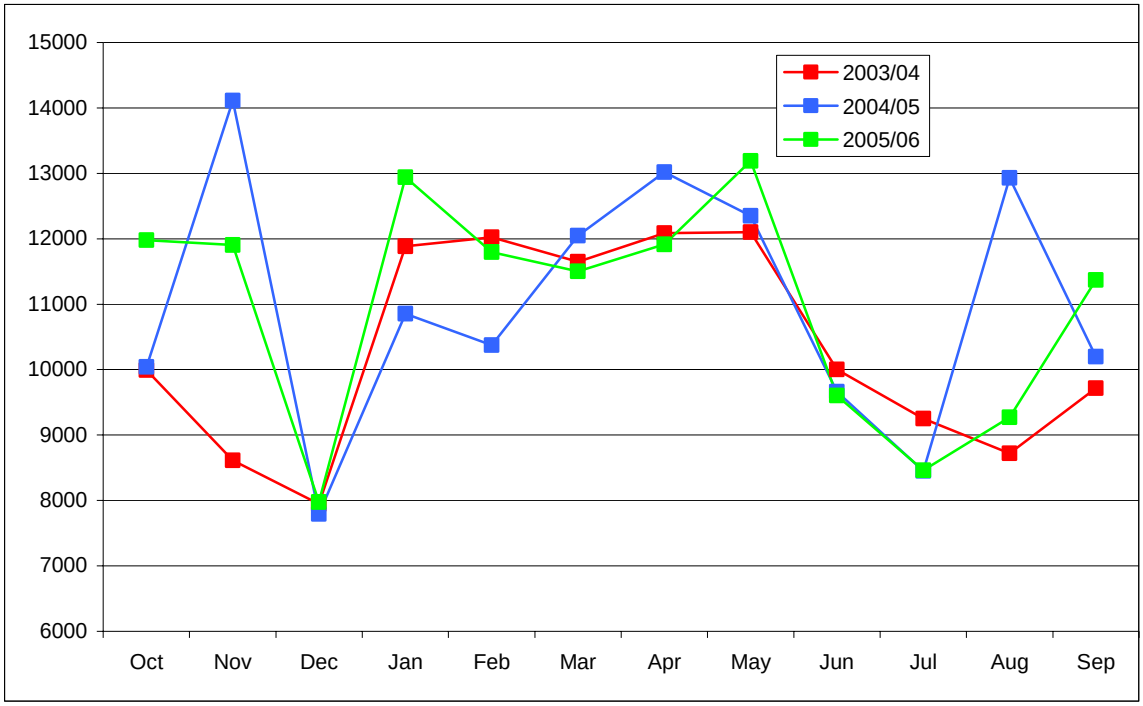


8. Count of emails delivered to users in TCD

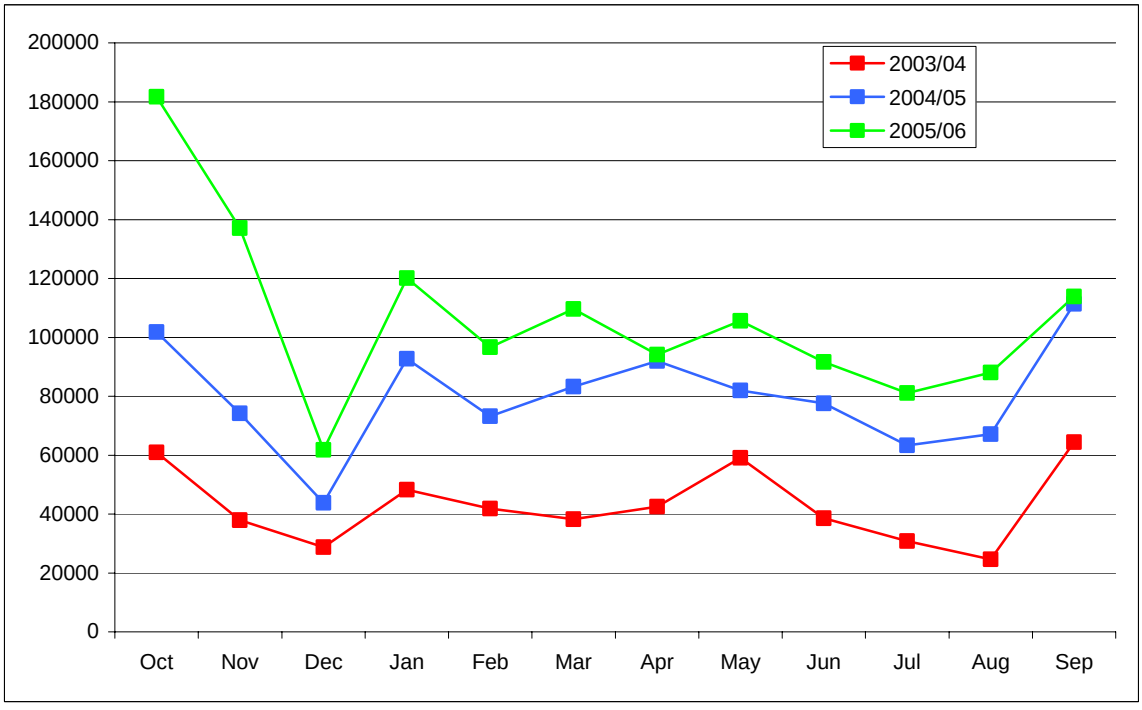


Annual decrease in email counts reflect the measures to control SPAM

9. Number of Accesses to TCD Home Page



10. Access Count of Web Portal



IS Services Structure: 30th September 2006