IS Services

Annual Report

2001/2002

Highlights

As well as continuing the on-going development of the College network and services to staff and students four major programmes of work were undertaken:

- a) The project to replace the <u>Student Administration System</u>, which was started in 2000, entered the specification phase this year. The main work was to translate the information-gathering phase into a detailed description of the proposed system that would be sent out to potential suppliers who would describe how their systems would fit the Trinity requirements. The project was divided into two parts and a detailed specification of the timetabling component was completed and tender proposals were received from suppliers for evaluation and selection. The development is a joint project with the Senior Lecturer's Area.
- b) Following on from the Risk Assessment process, a number of <u>risk reduction</u> <u>programmes</u> were put in place. These comprised of the upgrading of the power supplies and physical security in the main server room. The production of and implementation of a College wide security policy was initiated.
- c) The increase in <u>unsolicited bulk email</u> has been tracked for several years, but this grew into epidemic proportions during the year. Indeed, the usefulness of email was severely degraded by being swamped by junk. A solution to allow user controlled email filtering was implemented and provided a large degree of relief to the problem.
- d) <u>Security of information systems</u> was a continuing problem; several major virus attacks degraded service to users and weak security on localised systems operated by users allowed these machines to be compromised by unauthorised access. While it is possible that much work can be done centrally on the security issue, the protection of individual machines must be the responsibility of the user.

Staffing Issues

The economic downturn that started in 2001 continued throughout the year and as a result there was a greater level of stability in staffing than had occurred for many years past. There were several internal movements of staff between groups within IS Services. This sort of movement and reorganisation is to be expected in a fast moving discipline such as IS Services

External Environment

Security

Following several submissions to the College Estimates process and a letter from the College external auditor expressing the need for a College-wide IT security officer, finance was made available for a two-year contract position.

The post was filled in November 2001, but unfortunately fell vacant in August 2002, resulting in a whole new recruitment exercise.

Whilst the IT Security Officer was working in College, a number of security briefings were held with the key system administrators, outlining the proposed security policy. Advice was provided to users as to how they should protect their systems and the data that they were working on. A presentation on the state of IT security was made to the College Audit Committee.

Work was started on the production of a College wide IT Security policy as well as the implementation of the ISO 17799 standard for IT security.

As in previous years, there were a range of security incidents where external and internal people gained access to information and services that they were not entitled to use. The Security Officer pursued these and appropriate defensive measures were put in place to prevent a recurrence of these incidents.

The number of such incidents is increasing year by year and the exposure that College faces is also increasing. Similarly, virus outbreaks are becoming more numerous and more damaging. The continued existence of the IT Security Officer post is vital in the protection of College's information assets on the network.

Virus outbreaks

A number of serious virus outbreaks occurred during the period. Each one of these tends to be more virulent and damaging than the one before. Whilst email and files can be scanned for viruses, it still requires users to behave in a responsible manner in order to avoid loss of data and reputation and to prevent wasting scarce resources. A virus infection on a machine can take several hours to remove and the machines of some individual users seem to get infected again and again.

The best approach to protecting machines against a virus outbreak is to ensure that the latest version of the anti-virus software is always installed on users' PCs. A new system has been implemented to load automatically, from the central server, the updates on a regular basis and to load special updates should the need arise. As this service is installed on more machines in College, the damage caused by viruses should be minimised. In theory, all machines in College should be required to have the up-to-date software installed, but it is difficult to achieve total compliance.

Support Activities in IS Services

User Support

With the continued increase in the number of computers in College, the demand for assistance increased yet again. User Support staff attempt to provide tools so that users can help themselves. The reworked IS Services web pages have helped to provide this. Similarly the proactive pushing out of anti-virus updates should help those users who have this system installed on their machines.

Work was started in trying to apply industry "best practice" in the User Support area, based on the ITIL IT service management framework and the IT Service Standard BSO15000.

New IS Services web pages

As the web is the place that most users go to find information in the first instance, a major review and re-write of the IS Services web pages was undertaken with staff dedicated to produce a user friendly and informative website. The new website went live just before the start of the 2002/03 academic year and solves many of the problems of getting relevant information to users.

The website uses a range of navigation tools to make it easy to find appropriate information and will continue to be developed with a view to being the primary source for the dissemination of information and software for College users. As well as providing information, the site can be used to manage facilities such as network and email accounts on a self-service basis.

Training Programme

An extended training programme was provided for staff and postgraduate students with many courses being redesigned and updated. The courses on web page development proved to be especially successful and were oversubscribed throughout the year. In all, there was a 70% increase in the attendance at the training courses over the previous year.

As part of the overall training programme, online courses in the European Computer Driving License (ECDL) were provided and IS Services continues to be a certified testing centre. The ECDL programme has been taken up by a broad range of staff in the College, many of who do not use computers in their daily work.

A new online software package to assist users work towards the ECDL was installed for the new academic year and is being offered as part of the curriculum in a number of faculties. The package provides online training as well as sample testing, prior to a person sitting the examination.

The introductory handbook to the facilities provided by IS Services was given to all students at registration and was later sent to College staff by post. The booklet attempted to differentiate between the services that are applicable to staff and students whilst ensuring that staff are aware of the facilities used by students.

The prefab between Physics and Botany provided extra usable space for computers and this permitted the merging of the computer rooms from Arch 1 along with the smaller Aras an Phiarsaigh room into a large computer area. This move allowed a dedicated training room to be established in Aras an Phiarsaigh. The room is equipped with 12 PCs along with computer projection and allows for a wide range of courses to be run in a relatively intimate environment. An advantage of the dedicated room is that the PCs can be configured to resemble the PCs that the users will eventually use on their desks and hence they do not have to be reconfigured each day for student use. This makes it easier to teach courses in specialised software packages and products.

Centre for Learning Technology

IS Services work very closely with the Centre for Learning Technology (CLT) in the preparation and delivery of course material to students. CLT has a close relationship with the academic staff and has provided assistance in the development of computer-based programmes for students.

One and a half staff equivalents from IS Services are on assignment to the CLT to assist in the coursework. With this arrangement, it is possible to have very tight coordination between the work of CLT and IS Services to optimise the delivery of the academic programme.

Computer Shop Closure

As reported last year, the Computer Shop closed and was replaced by the College PC procurement arrangement as well as the Stationery Store, which carries a wide range of computer peripherals and supplies.

In order to fill the gap in the provision of computer purchasing information a "Purchasing Advice and Repair" Centre was set up in Aras an Phiarsaigh. This service allows staff to configure appropriate systems with people who are expert with the products; the staff members then purchase the machines directly.

The centre also provides a first level repair facility for machines that have been bought through the College designated suppliers but are outside the standard threeyear warranty period.

Audio Visual and Media Service

The start of the year saw the formal transfer of the Audio Visual and Media Service from the Senior Lecturer's Area to IS Services. For the AVMS staff, this was a big change and follows several such changes in the recent past.

The integration of the two areas progressed throughout the year and several joint projects were initiated. In the longer term, the benefits of the integration will become apparent with the expansion of the role of computer based learning in College.

Whilst the non-pay allocation for AVMS is low and covers the ongoing maintenance of some AV equipment, the Deans' Committee provided a tranche of funding that allowed the upgrade of the data projection teaching equipment in several locations around College. Equipment in a number of lecture theatres was upgraded during the long vacation in: Arts Building, Museum Building, Hamilton Building, IAMS, Aras an Phiarsaigh and Goldsmith Hall. A data projector was provided for presentations in the Board Room.

In general, the level of AV and data projection equipment in many areas falls very short of that required by a modern university. Similarly, the availability of staff to support the AV requirements is very poor; frequently breakdowns in equipment may take several days to be rectified. The shortage of attendant and technical staff is exacerbated by the high use of the teaching rooms, which means that it is very difficult to schedule contractors in to repair equipment.

Student Facilities

Student computers

It has been practice to ensure that the student computing facilities are maintained at a high level of serviceability. One technique for this is to replace the machines in the main computer rooms on a three-year cycle. This means that the students always have the opportunity to use the fastest and best computers that are available on the market. In line with this policy, one third of the student computers were replaced during the long vacation.

Over the years, it has been observed that there is a growing shift in usage by College teaching staff away from the Apple Macintosh systems to PC type machines. This shift was measured by the large decrease in bookings for the teaching facilities and by student demand. In line with this change, it was felt that some of the PC rooms should be upgraded in preference to the Macintosh ones. The balance between Macintosh and PC facilities will be re-examined in the coming year, in consultation with the User Group.

The student online storage facility proved to be very reliable with only very brief interruptions in service throughout the year. This is in stark contrast to previous years when the service was unreliable, to say the least. A measure of reliability was the strong request from the students that extra space be made available and this was implemented for the start of the 2002/03-year when 100MB was provided for each student, an increase from 30MB.

One of the first dedicated student computer rooms in College was the Railway Arch 1, sometimes known as "The Arches"; this was established in 1986 and was the start of the exploitation of the areas under the railway viaduct. Due to the imminent start of building work on either side of the viaduct, the computer facility in Arch 1 was relocated to the prefab between the Physics and Botany buildings. This location, which is close to the Arch, should provide a quieter and better work environment for the users. Extra space and computers are available in this area. It is planned that a specialist print and scanning facility will be installed in a room in the prefab. The computers from the student room now used for training in Aras an Phiarsaigh were moved into the new prefab location.

There was a citywide power break at the end of September 2001 on a Sunday morning that caused problems for students who were finalising their theses for delivery on the 30th of September. Service was finally restored by 14:30 on that Sunday, but the level of demand for service in periods where there are no staff scheduled to provide cover, begs the question as to whether College should consider if it could provide support on a 24-hour basis. Whilst services are usually kept running on a 24 hour basis, human support is usually only available during normal working hours.

Extra printers and support at end of term.

Printing is a perennial problem, over the last few years a number of schemes have been tried, the provision of "free" printing where the students provide their own paper was continued during the year. Extra printers were provided in the computer rooms and staff were assigned in these rooms at some critical periods to assist the students. Despite this, over long weekends, which coincided with the start or end of term printers rapidly ran out of toner and no staff, were available to refill them until the next working day.

Another aspect to the printing problem is the practice of staff referring students to web pages rather than provide them with handouts in class. This means that students are now required to print out large amounts of information. In fact, the number of pages printed increased from two to three million over the year. By the judicious purchase of toner cartridges, it was possible to increase the amount printed with no appreciable increase in costs.

Whilst it was possible to achieve this increase in one year, it is unlikely to be possible to continue this into the future. As a consequence, initial investigations were started to see if a premium print service could be provided that would have to be paid for, but would provide cover and support outside normal office hours.

It is quite clear that the increase in costs of student printing is unsustainable and that new solutions would have to be provided in the coming year. It was agreed that the spend of student printing would be retained at existing level and would be rationed out over the student year. If there were windfall savings on the costs of toners, then these would be used to enhance the service.

College Networks and Facilities

New email server

There are many different views as to what the most vital service is on the Internet; however it would be widely held that email is the most important service to most people. With this view in mind, a new multiprocessor email system with a high degree of fault tolerance was implemented and commissioned after Christmas 2001. Unfortunately, due to a design fault the machine behaved sub-optimally in the first few weeks of the Hilary term. The manufacturer took some time to identify the problem, and then rectified it by removing some memory before finally fixing the inherent design problem. Since then, the machine has been upgraded to cope with the filtering of Spam and has behaved in a satisfactory manner.

Email throughput increased across the year with no significant downturn in use over the summer. In previous years there had been a notable drop-off in email during the long vacation. It appears that the students are using TCD email, via the Webmail service, as their primary email address. This is an endorsement of the email service that is provided to the students. Following the introduction of the new email server, a system of scanning all incoming, outgoing and internal email for attached viruses was initiated. This helped prevent several major virus attacks having a serious impact on College users. The scanning of outgoing email also helps eliminate the risk of a College user sending a virus to outside organisations.

The design of the worldwide Internet email protocols did not take into account the concept of secure and signed email. Work started during the year on the provision of such a service; however the large scale implementation of such a system is hampered by the fact that both sender and receiver need to subscribe to the same techniques and there is not a great acceptance of this worldwide. It is expected that this will be a growth area in the future.

Security and power upgrade to Server Rooms

One of the items identified in the security audit and the risk assessment was vulnerability in the power supply to the main computer room. A persistent and unidentifiable fault caused systems to trip out at random intervals during the year, thus causing breaks in service.

In order to solve the power problem, a new power system was installed with a high capacity uninterruptible power supply coupled to a generator. This means that the server room in Pearse Street is now protected against mains failure and can continue to operate as long as there is diesel for the generator. A number of physical security changes were made in this area as well.

As an extra security measure, a number of servers were moved to the computer room in the O'Reilly Institute to provide extra resilience. Unfortunately, this room requires new power supplies backed up with a stand-alone generator and air-conditioning in order to bring it up to the standard of the main room. It is planned to upgrade this facility in the coming year in order to conform to best practice and eliminate risks to College.

It is now common practice that new IT applications require more than one server, usually two, but sometimes more. This is causing several problems, one is the increase in management resources required for these extra servers and others are the physical space, heat and power requirements for them. The physical space problems can be alleviated somewhat by the use of rack-mounted servers where many servers can be physically mounted in a rack in the computer room. At present there are 23 major databases in the administrative area running on 20 servers and the ongoing management of these servers and services is becoming very difficult. As operating system changes are made, they must be made to all the servers in turn. Similarly there is a growing problem in terms of maintaining security of information. A solution will have to be sought in the coming years in order to contain this problem.

Unsolicited Junk Email

Most people will have been familiar with the tide of junk mail arriving in their post boxes and be annoyed about it. The delivery of junk email reached classic proportions during the year. This had been identified in the previous year and work had started to look at tools to ameliorate the problem. These were limited to advising users on what to do and how to setup filters to remove the junk or Spam, as it is known.

The concept of controlling Spam ran counter to the College policy that access to the Internet should not be restricted or censored centrally.

A number of systems were tried during the year with the final selection of a package called SpamAssassin which was written by an ex student of College. The basic package provides for the identification of possible SPAM, but provides no tools for the users to decide what happens to the email or whether to allow messages from particular users through. A series of such tools were written locally and integrated into SpamAssassin and launched to the user community in June, just after the examinations period.

The system provides great flexibility in the delivery of email, for example users are allowed blacklist sites and receive emails that look like SPAM but are actually valid messages.

By the end of the year some 800 users had opted for the filtering system. As Spammers get more sophisticated the tools will have to be upgraded to identify new classes of junk email.

A final solution is likely to be a global agreement on the sending of unsolicited email. Some European countries have legislation on place already and the EU may introduce a directive in the future. However this will not solve the problem of other non-EU countries sending SPAM email.

College Network

The main College network performed very well during the year, interruptions in service were minimal proving that ongoing investment in the infrastructure pays dividends in reliability and service delivery. Some extra links were installed in order to provide extra security and resilience. Extra switches were installed in many areas; it is now standard that 100Mb switches are installed by default.

A notable achievement was the removal of the final segment of Coax based Ethernet cable. This was the original design for Ethernet and used a shared bus structure with many users connecting to one length of cable. Clearly such a structure has a range of security and performance risks and the College network is now all the more secure and reliable with the elimination of the last vestiges of the original Ethernet cable. The modern Ethernet cabling system employs a unique cable from the computer to a network hub, improving security and providing a dedicated path from the user to the main backbone of the network.

The increase in the amount of College space on the St. James's campus meant that the data requirements needed to be reviewed. There had been two separate connections, one providing telephone connections and another providing data over a dedicated wireless connection. In conjunction with the Director of Buildings, a tender was issued for a joint link, which could provide for easy growth into the future. By using a commercial supplier of service, some of the risks inherent in the private wireless link could be transferred from the College to the supplier.

Use of SMS alerts

In the past there have been security breaches that have been undetected over long weekends and holiday periods. For the last few years, staff have monitored the various servers and systems remotely from home during these periods. A new scheme was implemented to monitor changes to systems and send a warning message to key staff if things were changed or went wrong. In particular, the top-level web pages are monitored for change, especially over long weekends and breaks such as Christmas and staff should be notified immediately when such events are detected.

Internet Developments

The College's Internet connection through HEAnet continues to provide a key service for research and teaching in College. Regular access to the Internet is now considered to be an indispensable tool to all staff and students.

Extra facilities and services are constantly being installed on the Internet and many major research projects are demanding high-speed access to other institutions around the globe. To that end, HEAnet has forged alliances with the major research networks in Europe and the USA. There are formal agreements with the European network Geant and in the US to Abilene and Internet-II.

College's connection to the Internet was upgraded twice during the year 2001/2002, from 30Mb to 34Mb in December 2001 and to 40Mb in April 2002. Because of the benefits of the academic community in Ireland making bulk purchases through HEAnet, no significant increases in costs ensued from the increase in bandwidth.

Services for the Provost and Officers

The new Provost and his team of Officers provided an opportunity to review the information technology requirements of the area. Following this review, a series of new systems were installed in the various offices, all linked to a central server to allow files be shared between the Officers.

A calendar and scheduling system was also installed to enhance the management of the Officers' diaries.

As well as the new machines, a wireless network was installed to allow mobility of the Officers throughout the area. This wireless network was installed with an enhanced security feature to ensure that information was not allowed leak out of the appropriate offices. It is expected that this model of working will be reproduced as wireless networking is rolled out to other areas of College.

AVMS provided a data projector and screen so that modern presentations can be made to Board members.

Library and Administrative Developments 2001/2002

Library

The Library system has been relatively stable with few developments; indeed it is time that the system is reviewed with the possibility of a system replacement being investigated.

The actual machine that the system uses was replaced by another machine that became available in IS Services. This allowed a separate machine to be allocated to the web front end of the Library system.

Treasurer's Office

A new integrated purchasing system was implemented in the Library Shop; the Treasurer's Office and IS Services on a pilot basis. The system in the Library Shop, which had some bespoke developments by the supplier, went into full production. The pilot system in IS Services was suspended after four months of the trial as the system was not delivering the expected benefits.

The existing method of delivering regular financial reports to user areas was reviewed and a pilot system implemented for the production and dissemination of the monthly reports electronically. The format of the electronic reports is almost identical to the printed version and the programs to produce the electronic reports will replace the older print system. This report program consolidation was part of a greater project to cut down and streamline the number of report programs in use on a regular basis. Under this system not only are the current reports readily available but also all the preceding year's reports are now online. This means that the reports are easily searchable by the end users and should enhance efficiency both there and in the Treasurer's Office.

The collection of student fees for the start of the 2002/03 year saw the introduction of a system whereby the fees could be paid by credit card. Students could either pay their fees interactively on the web or they could pay by telephone. This process made paying fees very easy for overseas students as it removes the problem of bank drafts etc, it also facilitates the work of the Fees Office as all the payment information goes straight into the main Fees system and the process of matching bank statements to the student fee is eliminated.

Student Administration

The main focus in the student administration area was the project to replace the College's home-grown student system. The joint project team, drawn from the Senior Lecturer's Area and IS Services, produced a highly detailed specification of requirements for the new system.

During this specification-phase, it was identified that the project could be partitioned into two parts, the central Student Administration System (SAS) and the Timetabling component. The SAS Steering Committee agreed that the project should be partitioned and formal tender for a Timetabling system was embarked on whilst the main SAS specification was being developed.

The formal tender for the timetabling system proved to be a very useful exercise in that it helped formalise a range of documents and procedures that would feed directly into the main SAS tender. The tender for timetabling was issued and a decision on the supplier was due to be made at the start of the 2002/03 year.

A formal EU tendering procedure was undertaken for the main SAS system to create a shortlist of suppliers who would then be asked to quote for the system. This "Restricted Procedure" was used to identify the main suppliers and ensure that there would be no waste of effort in suppliers bidding for the work if they did not have sufficient resources or a suitable solution already available.

While most of the major work was being done on the SAS project, a range of changes had to be made to the existing system, mostly driven by changes in reporting to the HEA and in other external bodies such as the CAO. All development work in this area was restricted to the minimum possible.

One area that was developed was the Student Information System (SIS). This provides staff and students with tailored information on students, courses, examinations, timetables etc. The system that had been in operation proved not to be robust enough for the uses that College demanded of it and was rewritten locally to provide tailored services to College. In the future this will act as a "portal" to College information.

Internal Database and Housekeeping

The central College databases use either Oracle or Microsoft SQL Server. There are frequent upgrades to the server operating system software, database software, development tools and software products. Keeping these up to date, at the appropriate security level, and in step with one another is an ongoing and time-consuming task. Problems can arise where suppliers are slow in migrating their packages to the latest version of the database or operating system.

The Future

1. Audio Visual and Media Service

The funding of the Audio Visual and Media Service has been at a relatively constant level for the last few years. This is in contrast to the increasing demands put on the services by the increase in student numbers and extra teaching facilities. The growth in demand for AV equipment reflects the increased sophistication of the lecturing community, but the facilities leave a lot to be desired.

The level of AV equipment in the many teaching rooms is below what could be reasonably expected by the lecturers, similarly the staffing levels and support of these facilities is very poor and little has been done to help this in recent years. Support for the off island campus locations is very poor and the lack of adequate staffing means that visits by AVMS staff are infrequent.

Extra flexibility in the timetabling of classes could be achieved by installing and supporting a higher level of audiovisual and display equipment in all the major teaching areas in College and by declaring these as shared rooms under the control of the Senior Lecturer.

2. <u>Responsible Behaviour by Network Users</u>

When a machine is connected to the College network, it is expected that a range of services will be available to that machine. As these services are provided, some responsibility must be taken by the user to ensure that the machine is set-up in an appropriate manner so as to avoid harming other users on the network.

It is possible that a formal procedure may have to be introduced whereby users may have to agree to have certain software installed, such as virus protection, and agree to maintain operating systems at appropriate levels.

3. The 24 hour, 7 day week University

College services are normally supported during the standard working hours Monday to Friday. The use of College facilities is carried out on a 24-hour basis 365 days per year. Some consideration should be given to the provision of support services on an extended basis, following an analysis of requirements.

4. Mobile Computing

Just as the mobile phone has revolutionised personal communication, the growth and prevalence of mobile computing is likely to change the way that people work and learn. The cost of lightweight laptops and personal digital assistants are dropping to affordable levels and will become a standard tool for staff and students in the near future. A suitable mechanism for connecting these systems together and to the College network will have to be implemented.

5. Digital Archiving

Digital information is growing at a greater rate than the print media. This, coupled with the ephemeral nature of digital storage techniques is going to cause a major problem for archivists. With the rate of change of digital equipment, it is impossible to retain appropriate systems to ensure that all forms of tapes and discs can be read in the future. The long-term storage of digital archival material needs to be studied and implemented to ensure that valuable information in College is not lost. The retention of structured information is well organised, however there is scant attention being paid to the retention of unstructured documents.

Post Year-End Issue

As a result of the financial cutbacks that have arisen since the end of the 2001/2002 academic year, many of the aspirations and plans for the 2002/03 year will now prove impossible to attain. The normal investment in student computing and the College network will be suspended and many facilities will be maintained at existing levels. Service levels will be cut and response times for the solution of problems will increase whilst there is an embargo on the recruitment and replacement of staff.

Appendix Statistical Information 1995 to 2002



1. Estimated Number of Computers in College

2. Changes in funding and staff numbers in IS Services

	Non-Pay	Pay	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

(Figures from 1st October 2001 include AVMS)

	Number of Computers	Number of Printers
30 th September 1995	223	18
30 th September 1996	247	19
30 th September 1997	367	56 (trials using small printers)
30 th September 1998	379	29
30 th September 1999	408	38
30 th September 2000	494	38
30 th September 2001	526	38
30 th September 2002	534	38

3. Number of Public Access Computers and Laser Printers

4. Internet Connection speed

Date	TCD Internet Speed
October 1992	64
October 1993	128
October 1994	128
October 1995	128
October 1996	512
October 1997	2 Mb
October 1998	2 Mb
October 1999	5 Mb
October 2000	8 Mb
October 2001	30 Mb
6 th December 2001	34 Mb
10 th April 2002	40 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

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



7. Number of Walk-In Helpdesk Incidents

8. Numbers of Undergraduate Students using email



9. Count of emails to and from TCD



10. Number of Accesses to TCD Home Page





11. Access Count of Student Information System



