The Implementation of a New Student Management Information System (MIS) at an Irish Institute of Technology – An Ex Post Evaluation of its Success

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Abstract: This paper is a case study examining the impact of the introduction of a large-scale student ICT system into an Institute of Technology (IoT) in Ireland. The system in question addresses all functions related to the ongoing administration of student affaires. It was implemented as part of a national project driven by the Department of Education and Science and the Council of Directors of the IoTs to standardise the ICT systems of the IoT sector. However, system introduction was problematic and it was necessary to support the new system with a number of additional software tools. The case study considers how well the current ICT arrangements satisfy the IoT's requirements and it identifies remedial action for future success.

Keywords: ICT evaluation, ex post evaluation, ICT problems, ICT benefits, functional-operational match, ICT in third level education

1. Introduction

There are 14 Institutes of Technology (IoTs) serving the third level education sector within the Republic of Ireland. These IoTs have recently undergone an extensive transformation of their ICT systems. A national project launched by the Department of Education and Science and the Council of Directors of the IoTs performed a nationwide implementation of a suite of integrated Information Systems for library, human resources, finance and student management functions. This case study evaluates one IoT's ICT project and in so doing addresses the Institute's experiences of the new Student MIS. The student system is an American product and offers functionality for course and subject management, student data, admissions application processing, student registration, maintenance grants payment, accounts receivable and fees assessment, examinations and academic history, student progression and graduation. The case study outlines some of the system implementation issues, their impact on the Institute and an analysis of the fit between functional system capabilities and the Institute's requirements. This case study (Remenyi et al, 1998) was carried out through a series of one-hour interviews between the 22 and 28 March 2006. Ten members of staff offered their experiences including project team personnel, system end-users and members of the academic staff.

System implementation on a national basis was carried out in a series of stages referred to as waves. The Institute described here was a participating member of the first wave, with the system start-up date being September 2002. Prior to the project, student data was managed on a number of un-integrated databases and legacy systems, which were limited in functionality and gave rise to a number of problems. Hence, the new student MIS was perceived as offering potential to improve this situation. The student MIS resulted in benefits and problems Institute wide. Many of the problems have been addressed through additional custom built systems that meet specific administrative needs. These are linked to the student MIS's underlying database and this more advanced implementation offers greater capabilities and potential to significantly improve organisational operations. In addition to evaluating what has been achieved, this study also considers steps required for continued future success.

2. The student MIS project within the institute

Two distinct attitudes were displayed towards the introduction of this system. It was either welcomed or seen as a threat. Some felt that the new MIS would offer a significant improvement over the legacy systems. Others were apprehensive, demonstrating reservations towards change. There existed concerns regarding the implementation effect of the new MIS on user workload and the complexity of the system.

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Probably because the project was driven by the Department of Education and Science on a national level, Institute staff were uninvolved in the system selection process. Their involvement and consultation throughout the project was also minimal. Emails were distributed by management staff and the project manager outlining to system users general information on the nationwide implementation. The Directors of the individual IoTs simply signed up to the system when it was selected by a central, national working group. According to a number of system users:-

> *"there was an overwhelming feeling that the system was imposed from the top down", "there wasn't a lot of information about the system initially so it was very much going into the unknown" and "it came in over night without anyone really having full warning".*

Training sessions prior to system start-up were the staff's first introduction to the system. This resulted in some confusion about the system and what it could do. There were calls for greater communication with end-users and administrative staff on the changes that would take place and the impact it would have. The following sections outline key aspects of the MIS project.

2.1 The project team

Within the IoT, a project team consisting of a project manager, two technical team members and two functional "*super user*" personnel was created. This team was under significant pressure to meet the September 2002 deadline for the rollout of student registration. They were involved in the clean up of legacy data, data conversion, provision of on-going training and support and system implementation and development. Their main source of support was a central helpdesk in Dublin. There was frequent interaction between the Institute and this service desk, to solve problems encountered, provide training on different software releases, and negotiate system change requests. This project team was in place for 2 years and 4 months, and was disbanded approximately one year after the implementation was finalised. It has been replaced by an MIS unit which supports the technical aspects of 4 MIS applications for Student, Finance, HR and Library, and in-house Developments. An interesting comment was made about this team which was:-

> *"the MIS team is like a mechanic in a garage, if the engine fails they fix it for you but they don't drive you to work in the morning".*

As a result of this disbandment, the applications are no longer supported from a functional perspective and there exists a feeling among staff that the functional team members were removed too early. It is suggested that they need to be reinstated to address administrative aspects and ensure the day-to-day business functions are carried out in an optimal manner.

2.2 System implementation

The Institute's implementation of the student MIS was commissioned for September 2002. The process was carried out over one year and the implementation strategy applied was a "*big bang*" approach for first year registration. Implementation of the remaining modules was phased in accordance with the cycles that occur during an academic year. This approach was chosen as parallel running with the legacy systems would give rise to data integrity and end-user ownership implications, and would require greater resourcing. This conformed with the template for systems' implementation prescribed by the national project board. Servers for the student MIS were initially locally hosted and supported within the Institute. These have now been centralised as part of the national agenda, with servers managed by a server-hosting organisation in Dublin. This change has given rise to concerns over loss of control over data, communications and response time for mission critical activities such as student registration, and processing of grant payments and examination results.

2.3 In-house developments

Following implementation, significant additional work was undertaken by the technical team in order to meet Institute specific needs. These developments were primarily in the area of reporting. The student MIS was weak in its report offerings; its reports were generic in nature, and did not meet individual IoTs exact requirements. They were slow, inflexible and restrictive, and could not be amended, saved or e-mailed. This was critical as staff previously had access to an advanced reporting facility in their legacy systems. According to one team member:-

> *"if you want a successful system, you can't pull away everything and say you're not allowed to have any of that anymore. Here's your new and improved system that doesn't do any reporting really at the moment".*

The problem was solved by importing the existing systems reports and linking them to the MIS database through Open Database Connectivity (ODBC). Today, more than 200 or 300 reports have been developed to cater for exam parchments, single subject certificates, registration forms, exam timetabling, exam entry letters etc. 99% of reporting in now Institute

specific which offers greater flexibility to end-users. In-house development work is on going. Thus, while "*a step backwards*" was experienced initially, the Institute now has an advanced implementation. Greater levels of development have taken place in comparison to other IoTs, with a custom built system now working in tandem with the student MIS.

2.4 Training and support

End-user training commenced in March 2002 and was provided by the Institute's project team. Initial sessions addressed an introduction to the MIS and system navigation, and were followed by specific training on student registration and other specialist tasks. Users were trained on the remaining functional modules as they were utilised throughout the academic year. Post system start-up the functional project team members provided a call centre support service, addressing user queries or problems and talking staff through system functionality. The support provided was "*hand holding*" in nature to help develop end-user confidence and encourage system adoption and ownership. The technical members of the project team were relied upon for database administration and problem solving, and development of additional reports and forms. At present, end-user training is not provided due to the disbandment of the project team. The training initially received is insufficient for staff movement to different positions. No functional training structure exists for staff in new, specialised job roles. Rather, other end-users assist in passing on knowledge which may have become "*filtered or watered down*". According to one system user:-

> *"it's such a complex system, it can do so much. Really anybody that comes into a job where this system is being used needs to have training before they sit in the chair to try and do the job".*

Further, many processes within the Institute follow an annual cycle, hence the need for refresher and on-going staff training. Some staff demand a greater overview of the system and how their work impacts other areas. System users are still unaware of the MIS's full capabilities; hence the lack of formal training is considered as disadvantaging the Institute as a whole.

2.5 Reaction to the student MIS now

Following system start-up, end-users demonstrated both frustration and fear towards the new student MIS. Staff lacked system knowledge; hence they were unable to resolve many issues due to its integrated nature. There was a tendency to blame the system, sometimes quite erroneously, for any complaints end-users had. The system was not user-friendly in nature and it radically changed some end-user's work routines. There was resistance to take ownership of certain administrative processes that were no longer performed by the project team. Further, many of the system benefits such as improved quality procedures, provision of audit trails, and improved Institute planning and analysis were delivered on a higher managerial level, not immediately apparent to the system end-users. Such issues are characteristic of any system changeover. While there remain elements of reluctance to use the system in some areas, in general staff have accepted it. Attitudes continue to improve as staff develop greater familiarity with its capabilities but the system does need to be further exploited to better advantage the Institute. However, without the in-house developed reporting system, the Institute's implementation of the student MIS would not be as advanced.

3. The student MIS: An evaluation of its impacts

The student MIS has resulted in a significant impact on Institute-wide operations. As yet no formal ex-post system evaluation has been carried out. However, an administrative review examining the procedures surrounding student administration has addressed the impact of the MIS in supporting this work. A full evaluation however, would enable the Institute to address any shortcomings and further capitalise on the systems potential. The problems and benefits surrounding the system are discussed in the following sections.

3.1 The problems at system start-up

Table 1 identifies the problems experienced in the Institute at the time of system commissioning. Many of those factors are characteristic of any complex system implementation. The problems are listed in terms of those identified most frequently by informants with the number of individuals identifying the problem shown in brackets. The table also categorises the problems according to informant type. For example, from the table it is apparent that system usability and resistance to change are both identified by 9 of the 10 individuals interviewed. Both problems are most recognised at a project team level being identified by 5 such stakeholders. The following discusses each problem experienced in detail:-

Table 1: System Start-up Problems

	Stakeholder Category			
Problems at System Start-up	**Management**	**Project Team**	**End-User**	**Academic**
System usability (9)	1	5	3	-
Resistance to change (9)	1	5	2	1
Team Pressure (7)	-	5	2	-
Business process re-engineering (6)	1	5	-	-
System Glitches (6)	-	3	2	1
Problematic Effects of integration (5)	1	3	-	1
Performance drop (4)	1	1	2	-
Change requests (4)	1	2	1	-
Americanised System (3)	-	1	1	1
Lack of Knowledge/Familiarity (2)	-	-	2	-
Modularisation Issues (1)	-	-	-	1

System Usability: Poor system usability was reported as one of the most negative issues surrounding the MIS at the time of system commissioning. Problems experienced centred on the system's unintuitive nature, poor navigational abilities, unwieldy and multi-formed screen layouts, spread of data through numerous forms, haphazard naming conventions and limited data validation and search facilities to mention a few. Particularly in the early days, it was regarded as a complex system that was not user-friendly. The problem was most evident on a project team and end-user level. These were the two groups impacted most by usability-related problems – administrative end-users in using the system to facilitate their day-to-day tasks and team representatives in supporting user problems and queries.

Resistance to Change: Resistance to change was identified across all informant categories. This problem was exasperated by system complexity, by staff's familiarity with their existing systems, and the fact that legacy applications were exactly matched to their job roles. There was reluctance to take ownership of certain new administrative processes. Much of this negative attitude was linked to fear of a new system being introduced.

Team Pressure: In the ex post phase, the project team worked in both an implementation and a support role. They were under significant pressure to develop a custom built reporting system; they tested and improved functionality; and further provided on-going training and support. Due to the nature of the work involved, this problem was most evident on a team level.

Business Process Re-engineering: No formal process analysis and re-engineering were conducted prior to implementation. However, the system required a change in administrative operations and the introduction of new procedures to match the system's model. Staff not only had to adopt new system functionality but had to simultaneously change their policies and procedures and introduce new work practices and processes, for which they were unprepared. For example, students were now registered at an individual subject level as opposed to a course level. It is surprising that this issue was recognised mainly on a project team level, rather than the user level which was most impacted by changes in work practices. Perhaps it is explained by their increased workload as the mismatch between system and staff processes lead to development of an additional custom-built system to "fill the gaps".

System glitches: Problems existed in areas of the system resulting in the need for manual workarounds to carry out day-to-day tasks. These inadequacies were predominantly focused around examination and accounts functionality. These problems impacted end-users and academics in using the system and project team members in resolving issues through rollout of numerous patches or development of in-house alternatives.

Problematic effects of integration: Due to system integration, relatively small problems in one area generated greater issues and problems elsewhere. For example, a change to a student's registration record had implications for fee assessment giving rise to incorrect transactions in student accounts. Users were unaware of their work impacts on other areas, being unfamiliar with the "*big administrative picture*". It was "*a cultural shock*" for staff in that data entry at registration needed to be correct in order for examinations to be properly processed.

Performance drop: Using the student MIS to perform day-to-day work tasks was time consuming. Because the MIS was multi-screened, and the design of registration documentation no longer matched the layout of the input screens, the data entry process was materially slowed.

Staff worked longer hours and additional administrative staff were required to register students in the first year as greater volumes of data were captured. Work performance was also slowed initially while staff became familiar with the new system and work practices.

Change requests: The inflexibility and bureaucracy of change requests was an issue of contention and frustration. For any improvement or localisation required, the Institute needed to compete with the opinions of 14 other IoTs. Only those changes requested by the majority were considered by the central support team. According to one team member, the Institute had a larger volume of more radical change requests, the majority of which were unanswered. A marginally greater number of team members suggested this as a problem experienced, perhaps due to the level of additional in-house developments required.

Americanised system: The student MIS was designed for the American education market. In some cases, it did not ideally suit the Institute's needs or have relevance to the Irish third level education sector. Unnecessary changes to staff work practices were required as the system could not be adapted to match the operations of the Irish IoTs. It was identified as a problem by project team, academic and end user categories, each of whom were directly affected in system usage.

Lack of knowledge/familiarity: Despite tailored training, administrative personnel lacked understanding of the system's capabilities, of its cross-functional impacts, of the data recorded and information produced, and made mistakes in system usage. Much disruption stemmed from the fact that the MIS required integration of the different functional areas. Staff required much functional team support in the initial stages to develop confidence levels. Hence, this problem was mainly experienced by the end-user informant category.

Modularisation issues: At the time of system commissioning, the Institute was not modularised. Because the new MIS was a modularised system, aspects of it needed to be rewritten or re-configured. For example, it calculated the overall student's average mark on the basis of subject credits. This did not match the Institute's normal work practices and gave rise to problems for academic staff members.

3.2 Current problems

As outlined in section 2, the student MIS has been enhanced significantly since its initial rollout through a series of custom built in-house developments. As a result, many of the original problems have been overcome. However, a number of concerns remain and table 2 identifies these issues. The table is similar to that outlined above in that it lists problems, categorised by stakeholder type, in terms of those identified most frequently by informants.

Table 2: Current Problems

	Stakeholder Category			
Current Problems	***Management***	***Project Team***	***End-User***	***Academic***
Training (6)	1	3	2	-
Software glitches (5)	1	3	-	1
Functional team (5)	-	4	1	-
Staff Turnover (4)	1	3	-	-
Lack of integration between systems (3)	1	2	-	-

Training: At present, a training structure does not exist within the Institute due in part to a lack of financial resources and disbandment of the functional project team. This impacts the entire organisation. A lack of system knowledge and awareness of new developments, and unfamiliarity with processes run irregularly adversely affects the Institute's ability to leverage advantage from the system and exploit its potential.

Software glitches: Problems in the system's underlying functionality have not been significantly alleviated since time of system commissioning. Issues continue to surround examination and accounts functionality and have yet to be resolved by the national central project board. These pose the greatest problem at project team level due to the additional work they create.

Functional team: While the Institute has an MIS unit to maintain technical aspects of the system, it does not have a group to support day-to-day administrative needs. This problem affects both team and end-user informant categories due to the lowered response to user demands and the increased pressure on remaining team resources.

Staff turnover: A further problem is constant staff turnover. Many administrative personnel work in specialised positions, such as registration, admissions, accounts, and require specific

training for those areas. The issue of maternity leaves or availability of higher-grade positions can result in staff movements, resulting in knowledge loss for specific tasks. The absence of ongoing training for those impacted by role changes magnifies this issue.

Lack of Integration between systems: Integration between the student and the other MIS applications for Finance, HR and Library functions is not fully achieved. Data is simply passed between applications through a series of interfaces, data feeds and file transfers. The interfacing of all systems requires significant maintenance, testing and rework when any application changes take place and adds to the workload of project team personnel.

3.3 Benefits of the student MIS

Despite the problems experienced ex post, the Institute has realised material benefits from the student MIS implementation. These are the result of greater system integration and capabilities, and improved volume and integrity of data, and should be seen as the joint result of the purchased package and the in-house developments working together. Table 3 outlines the most common positive effects that emerged from an open-ended discussion with informants, listed in terms of those identified most frequently and categorised by informant type.

Table 3: Current benefits

	Stakeholder Category			
Current Benefits	***Management***	***Project Team***	***End-User***	***Academic***
Beneficial Effects of Integration (9)	1	5	3	-
Benefits of in-house developments (6)		3	3	
Improved Data Standards (5)	-	3	2	-
Volume and nature of data stored (5)	-	3	2	-
Functionality related benefits (5)	1	1	3	-
Basis for the future (3)	-	3	-	-
Improved planning and analysis (2)	-	2	1	-
Improved quality procedures (1)	1	-	-	-

Beneficial Effects of Integration: The student MIS is an integrated system, storing all student information in one single data store. This offers beneficial knock-on effects, with real-time, streamlined data accessible across various modules. The MIS helps to break down functional divides and fosters liaisons between departments such as registration and examinations that previously worked in isolation. Security aspects are maintained through the provision of access rights, which prevent user groups from changing the system. This and the system's links with other MIS applications develops the concept of being part of one organisational operation. Project team members account for greater than 50% of those who identify integration as a key benefit. This may be due to the fact that technical team personnel were previously responsible for supporting disparate applications. The integrated nature of the student MIS eliminates the need for such work.

Benefit of in-house development: Due to significant in-house developments, it is perceived by project team members and system end-users that the Institute has benefited from a "*more advanced implementation of the system".* According to one end-user, without such in-house development "*we wouldn't be able to do our day-to-day business*".

Improved data standards: The MIS has improved data standards within the Institute. Due to the system's rigid rule-based nature, it forces users into greater levels of accuracy and assists in resolving duplicate records with the result that information supplied is more consistent, structured and of an improved standard. The benefit is most recognised by project team members, which may be due to a reduced need to clean data because of the system's integrated nature.

Volume and nature of data stored: The student MIS offers a more extensive data store that captures more student related data. This enables the Institute to track student's performance throughout their academic careers. This greater information can be used for more detailed reports and statistics and is also of use to specialised departments such as learning support.

Functionality related benefits: Within the Institute, the principle functionality related benefits include student registration at an individual subject level, the linking of subject instances to an Approved Course Schedule (ACS), resolution of duplicate records and exam related efficiencies and statistics. Such benefits have lead to a number of organisational efficiencies such as optimised resource utilisation and improved costing.

Basis for the Future: The MIS and its underlying Oracle database present the Institute with a technological foundation. It provides an integrated platform, offering capabilities for on-line applications and automation. This benefit is identified by project team members since the in-house technical resources can develop additional applications to further enhance the system.

Improved Planning and Analysis: The system's greater volumes of accurate data facilitate improved future Institute planning. Studies such as unit costing and greater organisational analysis are more straightforward. As outlined by one team member:-

> *"a lot of the benefits are not to the users on the ground who are doing data entry; a lot of the benefits are at the higher level of bringing things together and having it a lot more uniformed".*

Improved Quality Procedures: The Institute reports improved academic quality standards through better data transparency, traceability and audit trials. This benefit is recognised by the management informant category. Quality assurance is of greater concern to the managerial levels of IoTs. For legal and ethical reasons, they need to comply and fulfil the service they purport to deliver to students.

3.4 Dis-benefits of the student MIS

Ex post evaluation reveals the following:

National Agenda: Due to server centralisation in Dublin, the Institute has experienced a greater loss of control. Greater levels of bureaucracy exist in that it is more formally tied to a common centralised system and a national development agenda. There exists a feeling that

> *"we have to wait until the slowest person comes up to the line before we can do anything and that's a big disadvantage".*

This inflexibility means the Institute cannot presently progress with aspects of functionality they desire, such as the provision of student online registration to further automate the system.

Increased Work Levels: The Student MIS has increased the workload of staff members, with greater levels of data entry and system maintenance required. For example, student registration on individual subjects has multiplied the work involved in the administrative office.

Increased Resources: The resources needed to support the system have increased. A permanent team is required for performing both technical and functional tasks. Constant training, system development and evaluation are required. However, when the necessary resources are not provided on a national level, it disadvantages the Institute as a whole.

3.5 Problems and benefits: The chain effect

It is no surprise given the comprehensive integrated nature of the student MIS that many of the problems and benefits experienced are connected and linked in a chain-like or snowball effect. Figure 1 graphically depicts how the various system impacts are connected.

4. Functional-operational match analysis

Changeover to the student MIS was hindered by issues such as Institute specific requirements and the systems inherent functionality. The following functional-operational match analysis examines the extent to which the MIS now meets the Institute's functional requirements and the extent to which the Institute utilises the full system capabilities. The analysis points towards a certain degree of functional-operational mismatch, reasons for which are put forward throughout the section. Prior to examination of the degree of functional-capability match, Figure 2 provides an overview of the core system functions and its operations in managing student administrative processes.

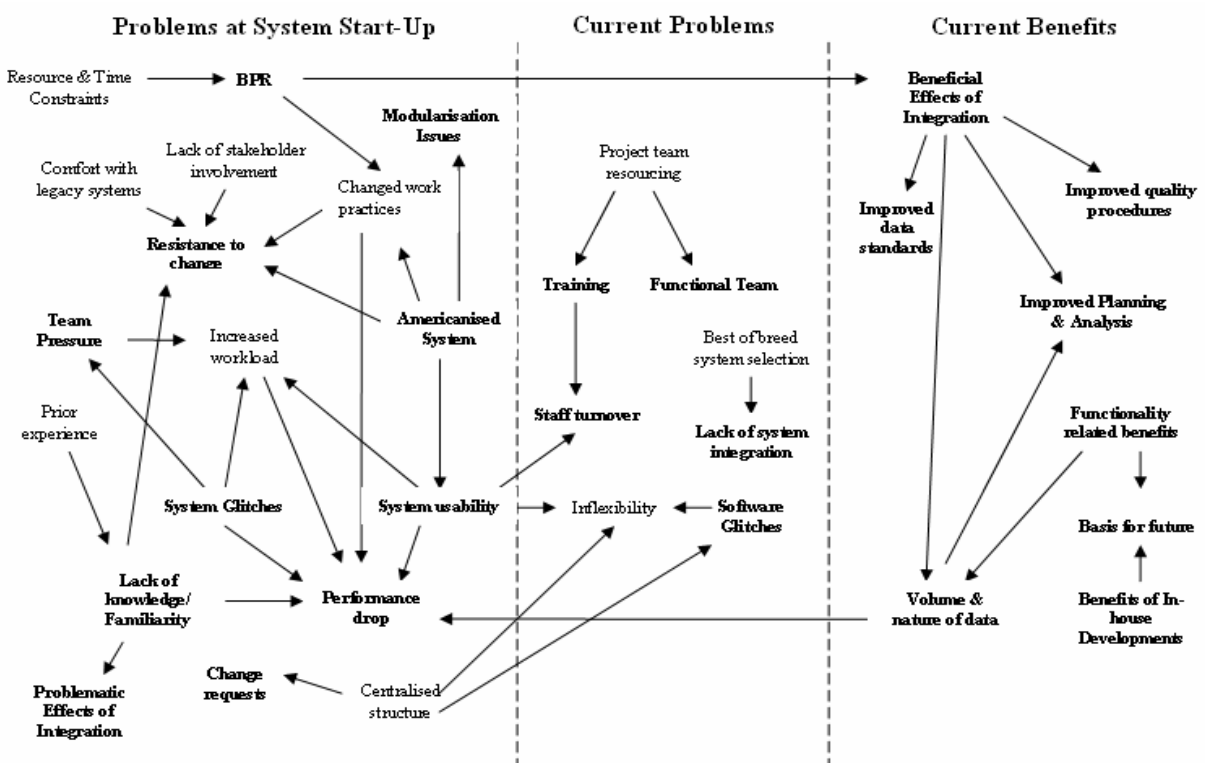

Figure 1: Problem/benefit linkages

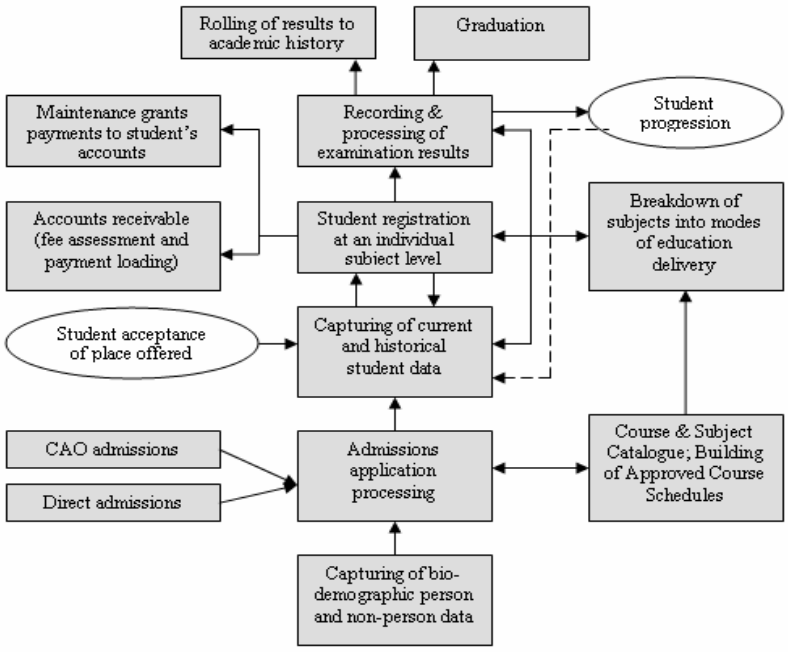

Figure 2: Functionality and operations of the student MIS

4.1 An examination of functional capability exploitation

Many potential benefits of the student MIS remain unrealised. Despite the availability of comprehensive functionality for addressing all aspects of student administration, within the Institute only the baseline foundation system is implemented, with work ongoing in streamlining basic operational processes. This platform needs to be further enhanced, through greater investment of resources for system and report development. As outlined by one team member:-

"there's probably a lot that it hasn't been utilised for, and there's probably a lot more you can do that we don't know about".

System end-users are unfamiliar with the broader functional capabilities and concentrate solely on their core work activities. According to one administrative staff member:-

"it's a disadvantage to put any system on somebody's PC and you can't use it to its full potential or you don't know what it's capable of doing". "It's an improvement on our old system and I think that really we should have explored the bigger, fuller potential of what it can do for us".

Many areas of the system remain unutilised due to in-house developments. The MIS in many cases is used solely for data entry purposes, with much of the output being derived from custom built reporting systems. According to a project team member, any of the areas that are used are being used to their maximum potential, through the aid of these in-house developments. The extent to which the various functional modules are exploited is as follows:-

Table 4: Functionality Exploitation

Module	Exploited Functionality	Unexploited Functionality
Catalogue	Stores all course and subject data	Needs further exploitation for semesterisation and modularisation
Approved Course Schedule (ACS)	Old and amended ACS stored	Lecturers attached to a course and rules pertaining to a course not recorded
Sections and Blocks	Exploited – Instances of subjects i.e. lectures, practicals, tutorials recorded	
CAO interface	Used for loading different rounds of CAO offers. Ratings recorded	CAO reporting is via the in-house system
Admissions	Records data for direct and CAO entries. Records subjects applied for, offers made and withdrew.	Direct entry interface unutilised. Reporting, letters and listings are via the in-house development
General Person	Exploited	
General Student	Exploited	
Registration	Exploited	
Maintenance Grants	Exploited	
Accounts Receivable	Mainly used for data entry	Many areas unexploited due to complexities and deficiencies. Invoices and statements produced on in-house development. Electronic integration between accounts receivable and the finance system unexploited
Examination	Used for exam grades, historical marks, Grade Point Averages, exam broadsheets etc.	Exam spreadsheets produced on in-house system; exam results are issued online but not via the student MIS
Academic History	Exploited	
Web for faculty		Unexploited – results remain recorded by school administrators
Letter Generation		Unexploited – letters and reports produced via the in-house system
Graduation		Unexploited
Other		Not exploited for strategic higher level analysis and reporting

Many of the above areas that remain unexploited represent a perceived source of benefit that is currently not brought to fruition. Failure to fully exploit system capabilities can be linked to a number of factors:-

- Staff Knowledge and Resources: Contributing factors are related to a lack of administrative staff knowledge of further system capabilities and the timeframe required for familiarity to be achieved. This is linked to the scaling back of project teams and the resulting training problem that

emerged in the ex post phase. The Institute explicitly cites the lack of resources as key in failing to explore the system's fuller potential and implement further modules.

- *Ability to Meet Requirements:* The inability of some modules to meet requirements and lack of system tailoring by the national project board to meet IoT specific needs are further factors in the failure to capitalise on system capabilities. The national board largely has a phased approach for system development, which is restrictive for the urgent requirements of the Institute.

4.2 An examination of the extent of institute requirements met

The ability of the student MIS modules to meet requirements is significant in the Institute's degree of system exploitation. The core MIS package capabilities did not ideally match the Institutes needs and required a more "*Institute specific flavour*". The extent of requirements met by the baseline system is estimated by a managerial figure at 20%. Core functionality is too generic and deficit in reporting capabilities; hence the system is used primarily for data storage while all reporting, manipulating and controlling is done in-house on the additional custom-built system that suits specific needs. Table 5 outlines the extent to which the various modules meet the requirements of the Institute.

Table 5: Extent of Requirements Met

Module	Requirements Met	Requirements Unmet
Catalogue	Meets past requirements	Questions surround the future needs of semesterisation and modularisation
Approved Course Schedule (ACS)		Does not meet the demands of modularisation. Complex in handling elective subjects
Sections and Blocks	Meets requirements	
CAO interface	Meets requirements	CAO reporting is external
Admissions	Meets requirements - complimented by in-house reports	
General Person	Stores multiple names, addresses and historical data	Does not cater for custom data items such as for apprentices. Navigation is complex
General Student	Stores student biographical, demographic and course data	Americanised fields redundant. Navigation is complex
Registration	Registers students on subjects and subject stages.	Does not address students on multiple programmes. Displays raw data such as course reference number and subject codes. Changes to a students course requires re-registration
Maintenance Grants	Meets requirements – custom built for Irish market. Ensures grant records are consistent with student fee assessment rules and rate codes	Contract assignment process is slow
Accounts Receivable		Does not meet requirements. Small changes in registration or a rate code result in incorrect transactions on a student's account. Incompetent in handling student or Institute invoicing. Addressed by in-house developments.
Examination	Meets past requirements	Requires further development for modularisation. Pre-broadsheet process which compiles exam data runs on an Institute basis and needs to be co-ordinated for all Schools. No facility for recording FETAC results. Does not address pass by compensation awards or failed subjects elements.
Academic History	Meets requirements	Slow and structured process

Module	Requirements Met	Requirements Unmet
Letter Generation		Does not meet requirements
Graduation		Does not meet requirements
Other		FÁS interface is unworkable. Aspirations for greater system automation, yet building blocks for online applications do not exist

4.3 The systems operations mismatch gap

From the above analysis, a degree of systems-operations mismatch between the capabilities of the system and the requirements of the Institute is apparent. This mismatch impacts on the extent to which the system can effectively serve student administrative needs. The ability to overcome the inconsistencies experienced depends on a number of factors:-

- Site autonomy over the student MIS
- Degree of adherence to the common national standard versus in-house development.
- Degree of in-house development resource capability

Site autonomy. The ability of the Institute to overcome functional shortcomings and develop the system to meet specific requirements is restricted by limited site autonomy. Being under the remit of a national centralised project structure, it is restricted in its ability to customise the system due to the national requirement for a common standard and the need to submit requests for changes required.

Degree of adherence to a common national standard versus in-house development. IoTs under the remit of the central project structure are tied to a standard that can be supported on a national basis. However, the central development of the system to one which better matches the Irish education model is excessively slow. Development time for mission critical reports and for applications outside the full-time student population cohort is unacceptable and based on priority demand. Further, any development is generic rather than customised to IoT specifications. Hence, many IoTs have diverged to some extent from the common standard. This is primarily in developing external reporting capabilities that link to the MIS's database. For example, the Institute has produced an advanced additional reporting system that involved developing/reworking 200-400 made-to-measure reports in-house to meet day-to-day business needs. This divergence from the common standard has assisted in it benefiting from a more advanced implementation of the system than many other IoTs. In addition, these developments do not compromise the integrity of the student MIS as they are additional external developments as opposed to software customisations.

Degree of in-house development resource capability, while the existence of a technical MIS unit is advantageous, a lack of resources is apparent to a certain extent with the removal of functional team members. This disadvantages all organisational levels and:-

- Impacts on the Institute's ability to advance the system for future projects such as modularisation and semesterisation, and tailor it for the different student cohorts now being attracted.
- Impacts on the extent to which unutilised functional modules can be further investigated and exploited.
- Impacts the extent to which staff can be trained in the greater capabilities of the system and to which more efficient ways of work can be found.

5. A review of the student MIS implementation

During the past four years, the Institute has benefited from an advanced system implementation. In many ways, successes experienced are a function of the effort expended on in-house development to compliment the MIS. The need for such development was due to a number of factors:

This project started poorly. The evaluation process for software selection was not optimal; criteria did not reflect an in-depth analysis of system capabilities or a reflection of variances between IoTs. Hence, there was a missed opportunity to streamline all IoTs towards a common mode of business. The lack of consultation and the absence of a statement of requirements from the IoT made necessary a large amount of additional work. There was limited formal vision as to the type and value of the benefits which could be derived from the introduction of the student MIS. It appears that the critical nature of reporting to the business of the Institute was not highlighted when the package was being considered.

It was a top down decision made at national government level to purchase and implement this specific student MIS. However, the system was not ideally matched to the Irish IoT, being Americanised and unintuitive in nature. This made necessary a large amount of in-house additional work. The system should have development work completed and reports in-built before it was rolled out to the sector. Some staff maintain that a custom-built system, centred on staff needs and priorities would offer greater advantage.

Despite the Department of Education's desire to implement one common system, diversion in practice means that each IoT has its own specific customs. It is difficult to impose a common system on IoTs that emphasise different student offerings and ways of doing business. It is further difficult to impose such a system on one individual IoT where the nature of its courses differs greatly. The acquisition of one package for 14 different IoTs meant that the system would inevitably have inadequacies in each location. Even developments provided by the central project board served as a compromise, not accommodating exact Institute requirements. As one officer of the Institute said:-

> *"a system that was going to deal with more that just your own college, I suppose was never going to be ideal for you no more than it was going to be ideal for anybody else because it's just the nature of the different ways the colleges all do their business".*

Some flexibility was required for tailoring towards Institute specific processes.

Development of requirements was sometimes slow with the result that many IoTs needed to produce their own solutions. With similar problems experienced, a greater pooling of resources among the IoTs would have provided for more timely developments.

Appropriate levels of end-user involvement and consultation did not take place. Consideration for current work practices did not occur. There was a feeling that the student MIS was imposed from top managerial levels and a greater level of communication to administrative staff was demanded:-

> *"it came in over night without anyone really having full warning".*

This gave rise to greater levels of negativity and deterred against end-user buy-in.

Even when the project team was appointed it does not appear that it was properly staffed and resourced. It was continually pressurised to meet the deadlines of the national implementation schedule. The demand for a larger project team was more apparent here that within other IoTs due to its greater volume of in-house development. Management expectation of the implementation duration was too short. The functional project team members were also removed too early from the project. The disbandment of the functional team marked the end of on-going user training and training of staff filling new job roles.

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The Institutes processes were never formally re-engineered to match the underlying model of the MIS. Hence, staff not only had to adopt a new system but had to change how they operated and introduce new practices.

The decision to centralise the servers in Dublin seems to have been made without any concern for the views of the IoT.

There is little understanding on a national level of the amount of on-going activity required to ensure project success. This is especially demonstrated by the lack of on-going training and resources for system development and support. Hence, system implementation and exploitation is slower.

Staff movement was critical during system stabilisation and remains so today. It should have been structured in a manner whereby staff had to remain in a specific functional area for a number of years, or were at least provided with specialist training for administrative job role changes.

6. Student MIS: A source of advantage or disadvantage

The student MIS is perceived as both a source of advantage and disadvantage. Some believe that greater benefit would be realised if a custom-built system for the Irish IoTs was developed. However, the MIS has improved the Institute's operations significantly, providing an integrated platform and solid foundation for the future. It's more structured and accurate information can be used for higher-level analysis and strategic purposes. The Institute has undoubtedly benefited from a more advanced implementation due to the extensive degree of in-house developments.

7. The way forward

Realising further rewards requires the Institute to focus on a number of tasks. Nationwide, there is need for greater resource investment. In

comparison with other IoTs, the Institute, through its MIS unit, has more resources to support the MIS. It needs to capitalise on this by re-introducing a functional team. It is disadvantaged at present in that no functional personnel remain to support administrative staff and processes. A full-time functional team is required to address queries, perform data checks, provide on-going training, exploit system capabilities and provide staff with greater understanding of the system. On-going staff training must be recommenced and a detailed user manual developed. This would enable greater functionality exploitation and provide for administrative personnel delivering an improved service to staff and students. The area of data integrity needs to be re-addressed. Following project team disbandment, some staff have lapsed in their data entry quality, with the result that data errors now exist. Further data checks need to be performed to maintain and improve integrity. Greater validation is demanded to combat mistakes. The functionality currently unused needs to be researched in depth to determine its value to the Institute. Functionality empowering academic staff to record their student results would reduce the workload on school administrators during exam time. This area needs to be implemented.

8. Conclusion

This paper discusses the significant impact had by the student MIS on the Institute since its implementation in 2002. It is clear that the system's potential has not been fully exploited and its implementation was conducted under conditions which were not ideal. System usage is complimented by an extensive in-house custom-built system, as the MIS in many areas did not meet functional requirements and lacked in reporting capabilities. Reporting is a mission critical activity, which is today carried out almost entirely on the Institute's in-house developments. As a result of this additional system, many areas of the baseline student MIS remain unused. This jeopardises to a degree the nationwide desire to maintain a common standard. To date, attention has focused on streamlining core operations; thus some peripheral functions are overlooked. Further benefits would be experienced in exploiting other modules as within the Institute there is significant desire to further automate manual administrative processes. This is particularly in the area of online applications such as student registration. The further exploitation of system potential will only occur however with the re-instatement of a functional team to support administrative staff and the provision of on-going training. This combined implementation offers the Institute significant potential going forward, provided the underlying data remains accurate. It offers the reward of strategic informational usage and analysis for greater planning and direction of Institute operations. This advanced implementation represents a key source of success in the arsenal of the Institute's computerised support tools.

References

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