Analysis and Strategic Development Of University of Wales, Aberystwyth's Debt Management Systems

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A dissertation submitted in partial fulfilment of the requirements for the degree of Master of Science in Computer Science in the University of Wales.

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Declarations

The content of this dissertation is the result of my own independent work and investigation except where otherwise stated. All sources are acknowledged by explicit references to the bibliography.

Signed:………………………………………….. (H M Thomas)

Date:……………………………….

I declare that this work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree.

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This dissertation is being submitted in partial fulfilment of the requirements for the degree of Master of Science in Computer Science in the University of Wales.

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Abstract

Support for the hardware used by the University's existing student records system is due to cease in 2004 and developments are therefore underway to provide a new students system to handle students' records. These developments could also have included students' financial records, however, it was seen as an ideal opportunity to evaluate existing procedures and to analyse the use and development of another existing system. The University proposes to record all financial records on a single financial system and as such the purpose of this paper is to discuss current practices and to evaluate the proposal in order to establish its validity, which will include surveying other UK Universities' practices.

The University uses a commercial system to handle its accounting requirements. The central question addressed in this dissertation is how the treatment of student finances should be divided between the accounting system and the student system.

After a preliminary requirements analysis, an initial division of responsibilities between the two systems was produced. In order to validate this, a questionnaire was sent to other universities asking how they handled the situation.

The results of the questionnaire broadly confirmed the feasibility of the approach adopted but led to a number of detailed changes.

The final design is described and the lessons learned from the process are discussed

Contents

1   Background and Content

1.1 Introduction

The University of Wales, Aberystwyth (UWA) maintains many Management Information Services (MIS) [1] applications [2], the majority of which currently run on a Sequent server and Oracle database. The current Students, Admissions, Staff and Payroll systems are all part of the Sequent System, which is a mainframe system developed in-house run on the Sequent Server. The commercial Financial System QL-x also runs on the Sequent server however, the original QL system runs on a Sun server along with the in-house accommodation system, Halls Management System (HMS).

The Sequent hardware will cease to be supported from December 2004. Enhancements to many of the existing applications was imminent in order to improve functionality and in particular reporting facilities and as such this was seen as an ideal opportunity to completely re-develop applications and procedures. New Dell servers have also recently been installed to improve the overall performance and efficiency of the MIS resources. Please see Appendix A for information relating to current and proposed hardware profiles and Appendix B for further details relating to MIS databases.

1.2 MIS – Brief History

In 1988 the funding of universities was under the control of the Universities Funding Council (UFC). The UFC was coming under pressure from the government to provide much more financial and statistical information about the universities, information that the universities had great difficulty in providing because of the inadequate nature of their administrative computer systems. In order to satisfy the demands for information, the UFC launched a centrally funded initiative, the Management and Administrative Computing Initiative, generally known as the MAC initiative [26].

The purpose of the MAC initiative was to encourage all institutions to improve their management and administrative computing systems relating to students, admissions, staff, payroll, accommodation, finance, etc through the introduction of a single integrated management information system in each institution. In order to reduce development costs, universities were grouped into families with similar requirements. The intention was that, for each application area, a single package would be developed for each family, thus sharing development costs and, later, ancillary costs such as training and maintenance. UWA joined the 'Delphic' family, which had decided to adopt Oracle as its underlying database management system.

UWA's first administrative computer was installed in the late 1970s; this was replaced with an IBM System 36 mainframe in the early 1980s [10]. These systems were primarily used for accounting purposes and, although the System 36 allowed on-line input from the Finance Office, reporting to departments was inherently in batch mode, with each department receiving a set of reports each month.

The target date for the full implementation of the MAC initiative developments was March 1993. However, Oracle, who was responsible for developing the software as well as providing the database management system, experienced many problems; with hindsight, they had totally failed to appreciate the complexity of universities. Eventually, the contract with Oracle was terminated in January 1996. Before that, however, most of the institutions in the family had started to make their own arrangements. Oracle's failure to provide the application software did not affect their provision of the database management software however.

In many ways the MAC initiative was naïve and badly managed. The prospect of developing requirements specifications that would be acceptable to all the institutions in the family was remote. The members of the Delphic board had no experience of managing a large software

procurement and the principles on which this would have had to be done were inimical to them. The other families encountered similar problems. Nevertheless, the MAC initiative was successful in raising universities' awareness of the need to improve their management and administrative systems and it provided the resources necessary to get these improvements off the ground. At UWA it funded the purchase of the Sequent computer and the establishment of the MIS section within what was then the Computer Unit. Once it became apparent that the Delphic family was unlikely to deliver useful software, UWA developed in-house systems for student records, admissions and accommodation, and purchased commercial packages to handle payroll, personnel and accounting applications.

1.3 MIS – Current Practices

The University's MIS section is responsible for maintaining many MIS applications as detailed below, the majority of which are part of the in-house Sequent System [6]. Please see Appendix C, which portrays how the applications currently interface.

1.3.1 Admissions

The Admissions system consists of an Undergraduate and Postgraduate element. The system is based on an in-house system from another institution however with further enhancements

Undergraduate Admissions

The Undergraduate element deals with reports and queries relating to new undergraduates applying for a place in UWA through Universities and Colleges Admission Services (UCAS). Once an undergraduate applicant's record has been completed successfully, it is transferred to the Students System for processing relevant future transactions as a student at the University. These records are normally transferred automatically *en masse* via the MIS section at certain key periods such as when the 'A' level results are provided by UCAS, however individual records may be processed manually if required.

Postgraduate Admissions

The Postgraduate element deals with reports and queries relating to postgraduate and distance learning applicants. Again, the record is transferred to the Students System once the application has fulfilled the requirements and has been processed as complete.

The Halls Management System can also access the Admissions System's data for processing applications for University accommodation from applicants for future sessions.

1.3.2 Cyborg

This commercial system records staff and payroll information relating to UWA staff members. The financial information relating to the payroll element is subsequently recorded against the relevant nominal ledger codes on the accounting system via monthly journals.

1.3.3 Students System

The current Students System is an in-house development that records information relating to all students at Aberystwyth including personal details such as address details, student entry qualifications, module details, course details, personal tutor details, financial details such as tuition and accommodation fee invoices and payments, details relating to the Student Loan Company and short term loans and bank details relating to direct debit fee payments.

The Students System refers to the same data as the Halls Management System and they interface on many levels as described below.

The financial transactions relating to tuition and accommodation fees are posted to the relevant nominal ledger codes on the QL-x Finance System via monthly journals. Students are able to access some details held on the system to ensure the details are correct [7]. Module and address details are published regularly to the web and students are encouraged to

check the data held and to inform the necessary personnel of requested amendments. Students can also access their own examination results on the web.

The Students System also interfaces with the Direct Debit Management System (DDMS), which is an independent application maintained by the Finance Office. Although this system is not maintained by the University's MIS section, they were involved with its purchase and produce information for import and export purposes between the two systems.

1.3.4 HMS - Halls Management System

The HMS is an in-house system run on a Sun server and independent of the Sequent System. It was developed and introduced in the summer of 2000 for recording all University accommodation related information for the 2000/01 Academic Session onwards. The HMS application records information relating to students' accommodation in the University, such as applications for accommodation, status of contract, status of resident type, current accommodation details etc.

The purpose of the system was to standardise procedures relating to recording residents' information in the University's halls of residence such as applications, contracts signed, payments made, personal information, hall, room and block information, movements in, out and between the halls etc. The halls of residence staff are responsible for maintaining the information relating to residents in their particular halls which includes ensuring all relevant requirements are fulfilled by the student and are correctly recorded on the HMS. It is imperative that the information is maintained accurately and promptly as students' hall addresses and accommodation fees due are based on the information processed by the halls.

The HMS references the same data as the Students System, which enables many of the views to display academic and personal information. Residential Services staff update students' hall and term time addresses automatically as they populate relevant date fields relating to when the residents key was issued and returned. The update is simultaneously posted to the HMS and Students System. The Students System and HMS also interface when processing deposits and relevant charges as the systems are simultaneously updated.

The Students System also provides a form that acts as an automated calculator based on information relating to a students term time address on the HMS. Should a student move from one hall to another and the movement is recorded on the HMS then the Finance Office can calculate the new fee due by crediting and debiting relevant halls by entering the relevant number of days resident per hall. The correct daily rate for the transactions is already provided based on the movement history on the HMS. The accommodation invoice is automatically credited or debited accordingly or a new invoice number is generated as appropriate. The relevant nominal ledger codes are then credited or debited accordingly via journals posted to the Finance System on a monthly basis.

The HMS maintains university residences address changes, which are simultaneously updated on the Students System; they must therefore be exported to the independent Direct Debit Management System (DDMS) to update the relevant records. An export should also be processed to QL-x to ensure student correspondence information is correct however this is not currently implemented. Amendments are currently processed upon request or should correspondence be returned from the existing address.

1.3.5 QL – The Finance System

QL is a commercial accounting package supplied by Distinction (formerly MicroCompass Systems Ltd) [15]. It uses client server architecture. The University purchased the original version (QL-f) in 1996 and moved to the QL-x version, with an improved user interface and increased functionality, in March 2002. Although support for QL-f ceased in March 2002, many users continue to use this version because of the limitations of their PCs. All subsequent references to the Finance System relate to the QL-x version.

QL-x records all financial information relating to the general ledger, sales and purchase ledgers, departmental codes for budgeting and financial reporting purposes. Journals are processed to transfer the information from the Students System and Cyborg to QL-x on a monthly basis. The University has the facility to use many modules on the QL-x system as part of their financial management provisions, for example, Accounts Receivable/Payable, Fixed Assets, Cash Book, Sales Invoicing, Purchase Order Processing, General Ledger etc. QL-x currently retains all financial information relating to accounts receivable, accounts payable and cash book entries; all of which are posted to specified nominal ledger codes for accounting purposes.

The main users of the Sequent System applications are members of staff in the University Registry however all academic staff are able to access the Students System [14]. Designated users can access the data held on the Sequent System via a terminal emulator such as KEATerm or Exceed Host Explorer. The HMS and QL-x applications are accessed by members of staff in the Registry and staff in other departments however the applications must be installed on their PC. Authorised users who have limited privileges according to their requirements can only access these networked applications.

The following two applications must also be introduced at this stage as they are relevant to the proposed developments and interface with the MIS applications.

1.3.6 DDMS - Direct Debit Management System

In 2001 the University purchased a new Direct Debit Management System [25] from Albion Business Machines Ltd [24]. The system is a complete direct debit management system and covers all aspects of Direct Debiting from creating the Direct Debit instructions, validating and re-formatting bank details, sending the advanced notices and all related correspondence via the in-built word-processor, managing dishonoured payments, suspended accounts etc. It is a multi-user system that obeys all the rules of the Direct Debit Scheme including all mandatory requirements.

Prior to this, recording, collecting and allocating tuition and accommodation fees via direct debit were processed via the in-house Students System. Initially the direct debit payment method was an optional payment method however this has since developed into being the only method of paying fees in instalments. As such the volume of direct debit instructions and transactions has increased to such an extent that a dedicated direct debit application was purchased to increase the efficiency and flexibility of service provided to the University's customers.

The current practice is that data from all completed direct debit mandates is input manually onto the Students System. Information relating to bank details and addresses etc is subsequently exported to DDMS on a regular basis however at the beginning of the session, once the relevant annual invoices are raised on the Students System, financial data relating to the fee due and payment frequency is exported to DDMS. DDMS has two modules, a client module which reocrds the account holder, the bank details, the correspondence address etc and the direct debit instruction module which records all the payment details. The client and instruction modules are linked by the students' unique nine digit reference number imported from the Students System however with a H- or T- prefix to denote whether the details relate to hall or tuition fees.

As with the Students System, any amendment to the initial fee due is processed manually. As such transactions are currently duplicated as they are initially processed on the Students System then processed accordingly on DDMS. The account holder must be informed in advance for each amendment to an amount due to be collected by direct debit and as such it is imperative that the correspondence address is correct. Official notifications and all correspondence relating to direct debit payments and instructions are processed via DDMS via a daily letter run.

The University is informed of all dishonoured direct debit payments or amended or cancelled instructions via BACS returns, which are currently provided electronically via Mailbox. The reason for the dishonour or cancellation must be recorded against the relevant instruction and against the relevant student's record on the Students System. Again there is a duplication of transaction processing.

Although direct debit claims are processed daily, the larger claims processed on the standard dates during the session are formatted accordingly for the MIS team to post directly to the Students System. The MIS team will also process the dishonours depending on the quantity. The automated posting of records has resulted in a huge decrease in manual transactions, which in turn has released a member of staff to perform other necessary functions. However, the imported data has to be formatted accordingly and this currently involves a manual entry of invoice numbers, which has resulted in problems applying the data to the Students System due to human error. This problem has however been addressed and should not occur in future sessions.

The flow of information between the Students System and the DDMS is currently insufficient and inefficient, however, MIS recently produced a report on the Students System which can be processed at any given time, to regularly export account details and address details to maintain the accuracy of the client side of the DDMS and to reduce manual updates and human input errors. This will be developed further so that most, if not all transactions are exported to reduce manual updates and the risk of error and duplication of procedures.

1.3.7 AStRA – Aberystwyth Student Records and Admissions

This is a new web based Students and Admissions System, which is currently being developed by the University's MIS section to improve functionality whilst continuing to provide the existing requirements of the current Students and Admissions applications [8].

AStRA was introduced for the following main reasons:

- The support for Sequent hardware is to cease in December 2004 therefore the current environment would no longer be supported.

- Certain tools used to develop and maintain the current systems will no longer be supported by Oracle.

- MIS and the University aim to provide a more user friendly interface with new functionality, for example, student photographs can be displayed and more flexibility in accessing, processing and reporting records. New tools have been utilised to address the current reporting issues.

- As the system is web based, with its 3-tier architecture, it is not platform specific therefore is more easily accessible for authorised users.

1.4 Proposed Developments

The University of Wales, Aberystwyth proposes to record all financial records including student finance on the single QL-x Finance System, which will improve overall performance and efficiency of its debt management and credit control functions. The proposal will provide a higher level of accuracy and reliability as it is intended that most functions will be system automated with minimal human intervention, which should reduce the risk of errors and inefficient debt management functions. It is hoped that the proposed developments will instigate future developments with regards to providing an improved and efficient level of customer service, in particular to students. The University aims to provide a facility for students to access their financial records via the web. It is therefore important for the records held on the systems to be current and accurate.

The objective of this paper is to explore and assess the feasibility of the University's proposal. This will involve examining current procedures and practises relating to processing student

fees and general invoices along with how the applications interface to clarify the essential and desired functions to either be replicated or developed. A questionnaire has been designed to establish other Universities' practices, the results of which will be examined carefully to verify whether UWA's proposal is valid and whether other practices could be adopted. It is possible for the proposals to be undertaken without further investigation to demonstrate they are technically feasible however they may not be the best way to proceed and administer financial records. The questionnaire is an important tool used to validate the proposal, as the results will confirm the feasibility based on other universities' practices and experiences.

The paper is structured in such a way that the University's current and proposed practices will be discussed in detail prior to the analysis of the questionnaire's results. Subsequent chapters will discuss the key decisions made as a consequence of the results and will formalise the actual requirements for the development.

2   Current Practices

UWA proposes to record and administer all financial data relating to students on a single existing system. The current practice is that the Students System maintains all information relating to students' academic and personal information as well as financial information such as tuition and accommodation fees along with relevant forms and reports producing data of a financial nature. The QL-x finance system on the other hand maintains all information relating to actual ledgers for accounting purposes. The single sales ledger is currently used to record the University's sundry debtors. Financial information from the Students System along with other external systems is passed into QL-x by means of journal transactions. The University's aim is for all debts to be managed via QL-x.

2.1 Debtor Categories

The University divides its debtors into three categories: student debtors, staff debtors and other sundry debtors[1]. Each category is administered and pursued in a different manner. Student debtors are currently pursued in a different manner to sundry debtors. This is due to many factors such as the different payment methods available to the different fee categories as well as the University's constitutional financial procedures, which limits the rigorousness of the credit control function. Sundry debtors can ultimately be referred to one of the University's debt collecting agencies and to the University's solicitors for legal action through the County Court. This action is only undertaken against student debtors when they are no longer registered as a student. Although similar proceedings can take place initially with all debtors, great care needs therefore to be taken when pursuing registered students.

The sundry and student debtor categories can be broken down further into sub categories. Sundry debtors can be members of staff, students or general debtors such as members of the public or companies. Student debtors can be tuition fee debtors, accommodation fee debtors and sundry debtors. Each sub category has its own payment terms, methods and requirements and as such is pursued differently. Also within the sub categories, the debtors can be segregated even further; for example, undergraduate and postgraduate debtors have somewhat different payment options. The undergraduate category can again be broken down further into those due to graduate at the end of the current session and those who are not. Student debtors who are due to graduate at the end of the current academic session are ultimately pursued in a different manner. It must also be mentioned at this point that staff can also be students and potential student debtors. However the tuition fees are usually waived and if they reside in halls of residence, this is usually as a warden, deputy warden or assistant warden and no accommodation fees are liable therefore no transactions are recorded against their account. They could incur charges for example library charges for a lost book, or software purchases, though these types of sundry debts could be processed on a separate sales ledger.

UWA aims to improve efficiency and effectiveness in the administration of the student credit control functions by standardizing many of the payment terms and options and by minimizing the number of different debtor categories.

2.2 Students System

The Students System records information regarding a student's academic status relating to the course details such as qualification, modules studied, title and code of course along with other details such as entry date, expected completion date, year of study, year of attendance, whether the student is registered etc. The system also records personal information such as gender, date of birth, the students' University e-mail address, addresses including home, term

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[1] The term 'sundry debtors' is used in accounting to refer to debtors who fall outside the main trading area of a company. In the case of universities, it normally refers to small purchases made by individuals, however, in UWA sundry debtors typically refers to non-tuition and non-accommodation debtors.

time, medical and direct debit contact address etc. All matters of a financial nature relating to tuition fees, accommodation fees and student loans are also processed on the Students System. By default users of the system see and query records relating to the current academic year however information relating to previous sessions can be queried.

2.2.1 Creating Records

Student records are created on the Students System when the admissions stage of their application has been completed successfully and they are allocated a unique nine-digit reference number, usually their UCAS number. The majority of the standing data is automatically transferred to the Students System from the Admissions application. However, during the lifetime of the records, there will be many transactions both to update the standing data and to record academic performance and other events. Occasionally, it is necessary for temporary reference numbers and subsequent accounts to be created in order to process accommodation fee transactions for a non-registered resident. These unique reference numbers are provided by the MIS section and the subsequent record is created by the accommodation office so that the resident can be recorded on the Halls Management System and the debt administered on the Students System.

2.2.2 Student Fees

The Students System maintains tables holding information relating to tuition fees and accommodation fees, the contents of which are updated prior to the beginning of each academic session. The tuition fee table consists of information on which students' annual fee invoices are based. The view of the table displays a list of fee flags from A0, full time home undergraduate student, to ZZ, a dummy fee flag (see Appendix D). Each fee flag designates a course specification such as full time or part time, home or overseas, undergraduate or postgraduate and is allocated an annual fee accordingly. Each student on the system is allocated a fee flag relating to the specific academic session depending on the course and is invoiced appropriately. The accommodation fee table works on the same principle with each hall having a unique code and a specified room type within a code, such as single or double, and is allocated an annual fee accordingly. A daily rate is also allocated to a particular room type and hall code for calculation purposes as a result of a movement in, out or between halls of residence, (see Appendix E).

2.2.3 Generating Debits

At the beginning of an academic session, annual tuition and accommodation transactions are automatically recorded against individual students' records. The timing of this exercise is crucial as the aim is to minimise the number of manual transactions and to raise accurate invoices. Sufficient time is therefore needed for the Academic Office to process all registration forms and to populate the relevant fields on the system and for the Residential Services staff to process the relevant resident information on the HMS so that the correct accommodation fee and tuition fee can be charged. The Finance Office on the other hand wishes to generate transactions as soon as possible in order to allocate advance payments received and to export the relevant information to the DDMS. The University has a responsibility to ensure certain legal requirements are fulfilled as a result of its involvement with the Direct Debit Scheme. Direct debit instructions must be initially set up and subsequently managed and the necessary notifications despatched to all parties concerned within strict timescales. Subsequent transactions are processed manually, for example if a student registers late or moves into a hall of residence part way through term. This is also true of any amendments to a student's financial record; for example, a student may move between halls, or may have inadvertently been allocated an incorrect fee flag or may withdraw from University.

2.2.4 Transactions

The Students System currently maintains 24 different transaction types relating to processing accommodation fees and 14 different tuition fee transaction types; for example, type 01

represents an invoice raised, type 02 represents a manual payment via cheque, cash or credit card, type 44 is a direct debit payment, 07 is a debit external journal and a 49 is a dishonoured direct debit payment. Credit transactions have an even number and debit transactions an odd number.

The Students System provides the Finance Office with a mechanism to calculate and update accommodation fees based on information provided from room movements recorded on the HMS. This form has reduced manual transactions and improved efficiency as the user directly updates the accommodation account due by applying credits and debits and creating a new transaction and a new balance.

2.2.5 Financial Management

Each tuition fee flag and hall code is allocated a nominal ledger code to ensure that all invoices generated for a particular fee flag or hall code are coded correctly for budgeting and financial reporting purposes. All related credit and debit transactions are also allocated a relevant nominal ledger code. All transactions posted to the Students System are reconciled monthly with all entries on the cash sheet relating to tuition and accommodation fee income received by the University. These transactions are then posted onto the QL-x finance system by means of journals to ensure that each nominal ledger code is debited or credited accordingly; for example, all tuition type 01's on the Students System are credited against the relevant nominal ledger code depending on the fee flag. Monies are debited from a relevant control account where income is allocated on the cash sheet, in this case the tuition fee control account and credited to the relevant code. This reflects the concept of double-entry bookkeeping, which is intrinsic to accounting.

2.2.6 Debt Management

The Finance Office uses the Students System to produce standard reports required for credit control purposes. Some of these reports are produced at regular intervals; others are produced only for specific occasions. For example, prior to the beginning of an academic session a specific report is produced to provide a list of students who plan to return for the next session and have debts owing to the University. Prior to graduation a specific report provides information relating to students who are due to graduate at the end of a session and have debts owing to the University. Many reports detail student debtors, which are processed regularly for debt management purposes. Other reports are used to maintain accurate records for example a report is regularly produced to display those students with a credit amount against an invoice, the credit is either refunded if appropriate or correctly allocated against another invoice.

Student debtors are pursued regularly and at key points during the session based on the information provided by many of the reports and the information held on the Students System. At the beginning of the academic session all students without valid direct debit details held on the system and with a private tuition and/or accommodation outstanding balance will be sent a system generated invoice for the full and immediate payment of the fees due. Subsequent debtors will be sent a series of letters requesting payment or a complete direct debit mandate by a deadline date, after which sanctions will be imposed, such as the withdrawal of the computer and library facilities and ultimately the cancellation of their registration. It is imperative that the information held on the Students System is accurate and current to ensure that only necessary correspondence is despatched to actual debtors.

2.2.7 Batch Input and Control

The Students System has dedicated forms and reports relating to data input for internal control purposes so that all transactions posted to the system reconcile accordingly. A large number of manual transactions are posted to the system however, due to the increase in the number of students and the development of the direct debit system, the Students System provides a facility for many transactions to be automatically applied to the students' accounts; for example, direct debit transactions and Student Loan Company transactions. In January

2003 11,017 transactions were posted to the Students System and approximately 6,000 of these were automated with the rest being processed manually. This is a typical example of the monthly transactions posted to the system.

2.2.8 Direct Debits

All tuition and hall direct debit details are held on the system such as the bank details of the account holder, the correspondence address and the payment frequency. This information is exported from the Students System to DDMS on a regular basis along with the relevant address details. All amendments to records are therefore updated accordingly; however many manual amendments are currently processed on both systems.

2.2.9 Address Maintenance

Although Residential Services maintains all student University accommodation addresses via the HMS, it is the responsibility of the Finance Office to update University residences term-time addresses and to process any amendments as per students' requests. The Academic Office maintains students' home and private term time addresses. It is each student's responsibility to ensure that the records held on the system are accurate. During the registration period at the beginning of an academic session, students are requested to amend their registration form if necessary so that any inaccurate details held on the system can be updated accordingly. Students' address and module details are regularly posted to the web and students are requested to submit any amendments for the relevant sections to update. Finance Office staff check term-time address amendments when they are received, both University residences and private addresses, and if accepted, they are posted to the student's record.

2.2.10 The Student Loan Company

The Students System is significantly involved with processing information for and from the Student Loan Company (SLC). Home and EU undergraduate students' records and postgraduate teacher training students are levied the full relevant annual tuition fee by default, however, students can apply for tuition fee assistance, which is means-tested, through their Local Education Authority (LEA) or the Department for Education and Skills (DfES) as well as for a Student Loan for maintenance purposes. The Students System is used to record whether a student has received their initial student loan cheque, which is important when processing short-term loans for those who have not yet received their cheque and for credit control purposes. When the LEA has processed the applications students are provided with a Financial Assessment Form, which states the split between the private and sponsored portion of the fees due. This information is currently manually posted to the Students System as a result of a submission of the form, which affects reports and credit control functions relating to fees due. Both private and sponsored elements of the fee are processed on a single invoice; however students are only pursued with regards to the privately funded portion of the fees due because the sponsored portion is paid over by the SLC. The SLC will only pay monies over when their records agree with the University's records relating to individual students. They therefore provide the University with a report detailing all relevant students including their course code, study year, sponsored and private amounts, status of the student with regards to being withdrawn or registered etc. The University must subsequently return the report with correct data based on what is currently held on the Students System. Occasionally the data extracted has been incorrect; for example the SLC may have been informed that a student has withdrawn when he or she is actually continuing their studies, or an incorrect course code may have been provided which would have implications with regards to a delay in receiving a payment and the time involved to resolve the matter. The University also receives regular reports from the SLC detailing amendments to the sponsored amounts due for payment usually due to reassessments. The University must also provide the SLC with information relating to course codes, titles and durations for the subsequent session. This information is passed on to LEA's, therefore it is imperative that it is correct as it could cause delays with applications and the release of funds for both the student and UWA.

2.2.11 Other Functions

Many residences are privately owned by independent companies rather than by the University, however, the University acts as an agent for these residences and as part of the agreement, funds collected for accommodation fees have to be accounted for and paid over to the relevant parties involved. All transactions relating to the specified hall codes must be segregated from the other codes therefore new invoice numbers are created for a movement to or from the specified hall codes. It is important for the records to be accurate as incorrect calculations could have financial implications. The University is responsible for calculating the amounts to be paid over based on the records maintained and the balances in the relevant nominal ledger codes and the relevant agreements between the University and the other parties and subsequently processing the necessary payments.

Other finance related functions performed via the Students System are the withdrawal of the University's networking facilities for student debtors and recording short-term loans taken and repaid by individuals. It is immediately evident that a student has an unpaid short-term loan or has had their computer and library facilities withdrawn via the main finance balances form on the system. The Students System also currently records all accommodation deposits paid by students, all relevant credit and debit transactions and the current balance held.

2.3 QL-x

QL-x holds all financial information relating to the general ledger, sales and purchase ledgers and departmental codes for budgeting and financial reporting purposes. Journals are processed to transfer the information from the Students System and the payroll system to QL-x. Similar to the Students System, QL-x can only be accessed by authorised personnel who have certain privileges depending on their user requirements.

The QL system is divided into a number of modules e.g. Students, Fixed Assets, e-Business Solutions, Accounts Receivable/Payable, General Ledger etc [16]. UWA uses the following modules for accounting purposes: Accounts Receivable/Payable, Cash Book, Sales Invoicing, Purchase Order Processing and General Ledger.

Accounts Receivable [17]

This module records all sundry debtor invoices owing to the University via individual customer accounts. For example this is used when departments send external invoices to customers and a record of the invoice must be posted against the relevant customer on the system with the relevant departmental nominal ledger codes being automatically credited.

Sales Invoicing [20]

This module is similar to the previous module in that invoices are recorded against a relevant customer on the system, however a physical invoice is created and dispatched. This module is used when departments request the Finance Office to process an invoice as they do not have the necessary paperwork to manually process the invoice or the relevant access to process the invoice directly onto QL-x.

Cash Book [18]

This module is used to record all cash income of any kind into the QL-x system.

General Ledger 19]

This module defines the necessary departmental codes and ledgers for accounting purposes.

The Accounts Receivable and Sales Invoicing modules will be examined further for the purposes of this paper as they deal with recording and administering debts.

As mentioned previously, student fee income is generated, recorded and administered via the Students System. All relevant transactions are subsequently transferred to the finance system via regular journals. Sundry debts are processed via the fully integrated QL-x system and the

necessary credit/debit transactions are automatically posted to the relevant nominal ledger codes from the various modules.

2.3.1 Creating Records

A customer on the single sales ledger must be allocated a unique customer account number. A general customer account number is automated by QL-x for all new customers. Account numbers for students and staff are based on their University e-mail address. Once an account has been created with a relevant correspondence address, transactions can be posted to it, such as an invoice and payments. Unfortunately problems do occur when duplicate accounts are created for the same customer, as there may be a change in address or contact. Also students and staff account numbers are often system generated as insufficient checks have been made by the creator which causes problems when analysing debtors to produce the relevant debtor correspondence.

2.3.2 Invoicing Procedures

Many departments have an official invoice book with which they produce manual invoices to dispatch to the customer, while other departments dispatch their own word-processed invoices. A copy of each invoice should automatically be forwarded to the Finance Office so that it is recorded as an accounts receivable (ACR) invoice transaction on the system. Problems can occur when a customer receives the invoice and pays before the relevant transaction has been processed on the system. If the customer already exists, then the payments can be processed and will appear on the monthly credits report so that the matter can be investigated and the payment correctly allocated once the relevant transaction is processed on the system. If the customer does not exist or has not been correctly identified, then the payment would be processed and credited to a suspense account until further notice resulting in inaccurate records for departmental budgeting purposes.

If a department does not produce its own invoices, a sales invoice (SIV) request should be forwarded to the Finance Office where a system-generated invoice will be processed and dispatched to the customer. Some departments have recently been granted enhanced privileges and access, which means that they are able to process SIV's directly onto the QL-x system themselves. Sales invoicing would help to remove the problem of processing unallocated payments. UWA aims to provide accurate and efficient invoicing procedures, which in many cases would be best achieved by devolving the work and responsibility to the departments.

2.3.3 Financial Management

With regard to departmental income, when a SIV or ACR transaction is recorded against a customer's account, the relevant departmental nominal ledger code is automatically credited. At this stage, departments are unaware of debtors and as long as the SIV and ACR requests have been processed correctly, the relevant codes will be credited accordingly for budgeting purposes. Departments are subsequently informed of their debtors, on a monthly basis, and are requested to provide authorisation to cancel or amend the debts listed. All uncollected debts and subsequent written off debts are coded back to the relevant departmental code. It is important for departments to have some involvement in pursuing the debtors and for them to be aware of the financial consequences of incorrect procedures relating to processing invoices and payments.

Problems can occur when customers pay the departments who subsequently dispatch the payments to the Finance Office via the internal receipting system. Many departments request the payment to be credited to their departmental code rather than against the debtors' account and with the volume of payments processed in this manner, it is extremely difficult for the Finance Office to check each individual payment to see whether there is a debt recorded on the system. When this happens the payment is posted directly to the relevant code resulting in a duplicate credit transaction and the customer's account still has a debt remaining, resulting in continued debt collection actions by the Finance Office and poor customer service. The

customer account number and invoice number if possible should be quoted with every payment processed by the departments in order for the payment to be processed and allocated efficiently and accurately.

2.3.4 Debt Management

System generated reminder letters are currently dispatched to sundry debtors, staff and student sundry debtors included. The payment terms are full payment 30 days from the invoice date. The first reminder letter is targeted at debts 30 days + overdue, the second letter is targeted at debts 60 days + overdue and the final letter is targeted at debts of 90 days + overdue. Debts remaining after this have personalised letters ultimately resulting in referral to the University's debt collection agency and the University's solicitors for legal action through the County Court. A record is made on the customer's account detailing each letter generated. If a customer has previously had a 30-day letter for a particular invoice, then a 60-day letter is produced, if not then the latter is produced.

Problems can occur when illogical, though not necessarily incorrect, or inaccurate information relating to the invoice date is posted to the system as the letters are produced based on the invoice date. For example if an invoice is processed on the system with a year old date, then only the final reminder letter is generated. Accounts receivable invoices do need to be backdated on occasion such as at the financial year-end when large numbers of ACR's need to be processed on the system by a set deadline however there are often delays sending the copies to the Finance Office as well as short term staffing problems to deal with the sudden surge in posting the invoices. It would be beneficial to introduce a safety mechanism whereby there would be a limit to how long an invoice can be backdated. This may produce another problem relating to VAT as the invoice date is the tax point. The proposal to encourage departments to process their own sales invoices should reduce this problem and it will be their responsibility to process the invoices accurately and periodically.

2.4 Overview

This chapter has discussed in detail the current credit control functions and practices relating to the administration of student and other debts. Current difficulties experienced with QL-x and the general administration of sundry debts have also been discussed. The issue of the administration of student debts is complex and this chapter has proved to be an essential exercise, which has highlighted fundamental issues needed to be addressed and overcome in order for the proposed developments to be successfully implemented.

The next chapter will discuss preliminary requirements and will describe possible approaches with regards to how the proposals could be implemented using QL-x and other existing systems.

3   Proposed Practices

3.1 Multiple Sales Ledgers

UWA currently maintains all the income generated on a single sales ledger on QL-x. However, the system currently has six purchase ledgers responsible for maintaining different categories of creditors; trade creditors, staff creditors, student creditors, student demonstrators, Direct Debit payments and staff payments with BACS. It would be beneficial for the system to maintain at least three different sales ledgers; sundry debtors, staff debtors and student debtors, each of which would have processes tailored to maintain the ledgers' and debtors' individual requirements.

3.1.1   Sundry Debtors Ledger

The sundry debtors ledger would maintain data relating to all sundry debtors such as the general public or companies etc. The unique customer account number would be system automated and each invoice and related transaction would be identified by the relevant departmental nominal ledger code or short name for reporting purposes. The standard system reminder letters would be automatically generated and dispatched for the relevant aged debts, i.e. 30 days, 60 days and 90 days. A series of individual letters are currently dispatched for debtors who have had the 90 days letter however these could also be system generated until the debt is ultimately assigned to the University's debt collecting agency or solicitor.

3.1.2   Staff Debtors Ledger

The staff debtors ledger would maintain all data relating to UWA employees' debts. The unique customer account number would be their payroll number. Staff university e-mail addresses are currently used as the customer account number. These are not however completely unique as they are recycled after a staff member leaves. As with the sundry debtors ledger, invoices and relevant transactions would be identified by the departmental nominal ledger code or short name for reporting purposes. System generated reminder letters would be produced as with the sundry debtors; however, they would need to be worded accordingly as they are ultimately pursued in a different manner to other debtors.

Also as mentioned in the previous chapter, a staff member can be a student; the type of debt incurred, however, would typically be a sundry debt. (See 2.1.1 for further information.)

3.1.3   Student Debtors Ledger

The student debtors ledger would maintain all student related debts such as tuition fees, accommodation fees, short term loans and student sundry debts. The unique customer account number would be the nine-digit student reference number. The current practise is to use their university e-mail address or, if it is not clear that the customer is a student, then a system automated number is provided. The transactions would need to be categorised accordingly for reporting purposes. Tuition fee invoices and related transactions would be tagged with the relevant fee flag, accommodation transactions would have the short hall name as a tag and the other sundry transactions would be identified by the relevant departmental code or short name as with the other ledgers. With regards to tuition fees, the separate sponsored and private elements would need to be addressed if both elements are recorded on each individual student record. Alternatively only the private element would be recorded on the student record and the sponsored elements would be recorded against the individual sponsor account or even a separate sponsored students ledger.

Students would be issued with regular statements showing completely the current state of their financial relationship with the University. This would make it much easier for students to understand their position. The tags appended to the individual transactions would need to be meaningful in order for the student to comprehend the statements. The statements would be dispatched to the student on a regular basis to a nominated address. QL-x supports four addresses; however further investigation is needed to see if each transaction can be allocated

an address to be included on a categorised statement or whether the account itself can maintain multiple addresses.

Student debtors are approached in a different manner to other debtors and there are many requirements that must be addressed in order to fulfil debt management reporting functions and credit control functions.

Students who are not recorded as a valid registered student on the system are pursued in a different manner and more rigorously and it would be beneficial for the system to support a flag to state the registration status of the student. If a student permanently withdraws or becomes a non-registered student the debt could be transferred to the sundry debtors ledger to be pursued accordingly. If a student temporarily withdraws it is possible they may return; however, while they are not currently registered, they can be pursued in the same manner as a sundry debtor. Further investigation is needed to see whether non-registered students' debts should be transferred to another ledger or whether it is feasible and manageable for the debt to remain on the students debtors ledger.

It would also be beneficial for the system to append another tag on each transaction, to denote whether a valid direct debit instruction is currently held for a student as certain action is taken at key periods for students without a relevant mandate. This tag would need to be updated as the status can change on a regular basis. These same tags would provide the necessary information for reporting and credit control purposes.

3.2 Generating Accounts and Invoices

3.2.1 Creating Student Debtor Accounts

All current valid student records i.e. active records, on the Students System would need relevant accounts on QL-x which would be created *en masse* via an export file containing standing data and other required data at an opportune time, such as prior to the beginning of an academic session. Existing debts for student records created on QL-x should also be exported as relevant transactions as it is envisaged that AStRA will not provide the necessary functionality to pursue and record debts. It would also be a good opportunity to only transfer registered or temporary withdrawn students' debts to the student debtors ledger on QL-x whilst non-registered debtors would be transferred to the sundry debtors ledger for relevant action.

New and subsequent student debtor accounts would be automatically created via daily exports from the Students System to QL-x. Currently when an admissions application has been completed successfully the applicant's record is transferred to the Students System automatically *en masse* prior to the beginning of a session. A daily report could be simultaneously created to export the relevant new records to the students' debtors ledger. A safety mechanism would be needed to ensure only one valid account is created via the export file to avoid duplication. Duplicate student records can currently be created however with different reference numbers, one with a complete valid student reference number and the other a temporary number. The records with temporary numbers are currently created by the University's Accommodation Office in order for them to process applications for all residences; however internal controls must be enforced to avoid duplication, as there are implications when creating a duplicate record on the system. The temporary records are currently monitored by the Finance Office who informs the MIS section of any duplicates in order for the records to be merged. QL-x does not support this functionality therefore duplicate records could be held on the system. It may be beneficial for the control to return to the Finance Office, who originally created these temporary records. Temporary records would only be created on request once thorough checks have been performed for an existing record. Alternatively, the checks could be made the other way around in that prior to the creation of new valid references, the system would check to see whether a record already exists. This would cause problems as the temporary references do not always hold the

student's full details, for example, the full name or correct date of birth, and the checks would succeed only if the records were identical.

3.2.2 Creating Invoices and Miscellaneous Transactions

Tuition Fees

At the beginning of an academic session, once all relevant accounts have been created on QL-x, transactions will need to be created and exported based on the fee flag held on the Students System. A mechanism will be needed to tag a student's record on the Students System so that a duplicate transaction is not created and subsequently exported. It is necessary for more than one transaction to be created for a student, for example, a resit fee, which will have a different flag. However, it may be necessary to credit an original transaction and generate another within the same fee flag. Subsequent transactions are currently manually generated based on a report detailing all those who are registered however who do not have a transaction for the current session. This facility would remain a requirement and it would be beneficial if a similar report could automatically create a relevant formatted file for exporting. This may need to be checked before posting the file to the system as many of the fee flags have different requirements.

Because of withdrawals, changes in fee allocation etc credit and debit transactions arise throughout the session. Withdrawals from the University are processed via the Academic Office. The Finance Office however currently manually processes credit transactions as a result of a manual notification. To automatically handle credit notes, a transaction could be generated when specified fields on the Students System are populated; for example, when the withdrawal date field of a student's record is populated, the system would calculate the pro rata fees due for the session and generate the credit transaction. The same data could also be used as a prompt to amend or cancel any direct debit instructions. It may be necessary to process permanent and temporary withdrawals differently as students who permanently withdraw could have their accounts marked as 'closed' or 'suspended' so that further transactions cannot be processed against it. This could be problematic as students may remain in University accommodation or incur a sundry debt, which would involve generating transactions against a closed account.

Accommodation Fees

Accommodation fee invoices are generated based on information relating to residents held on the Halls Management System.

At the beginning of an Academic Session invoices are currently automatically generated by the MIS section based on the 'key issued date' field on the movements record of the resident in the HMS. When the key issued date is populated, the term address along with relevant hall code and fee type is updated on both the HMS and the Students System. Invoices are created based on the short hall code and the relevant fee type held in the accommodation fee table on the Students System resulting in the relevant annual fee is generated. A large number of credit and debit transactions are processed due to the large number of movements in, out and between halls and the vast range of accommodation fee types and related charges.

The Students System already provides a basic mechanism to calculate the fees due for all residents based on their movement records and the accommodation fees table. As all the relevant information is held on the HMS it may be worth investigating the possibility for this mechanism to be processed via the HMS to record the annual fee raised along with any subsequent credit or debit based on movements on the HMS and as such the system would automatically generate the relevant transactions for export purposes. These export files could also be used to amend the relevant direct debit instructions.

Sundry Debts

Sundry debt invoices for students would be processed in the same manner as on the sundry debtors ledger. Thorough checks would be needed to ensure that ACR and SIV's are

processed correctly against a student's record. All departments would need to clarify the status of each customer on their ACR or SIV request so that the invoices are processed appropriately on the correct sales ledger. The Finance Office is responsible for creating new accounts on QL-x and departments responsible for processing their own SIV's request new accounts to be created as necessary. The customer account number created will signify the relevant ledger to where the invoice should be posted. Accounts receivable transactions are recorded on QL-x therefore they will need to be categorised accordingly.

3.3 Overview

This chapter is a functional description of the proposed implementation of the developments and has endeavoured to address the issues introduced in the previous chapter.

The following chapter investigates other Universities' practices via a questionnaire; the result of which will either validate the proposals discussed or will instigate a different approach.

4   The Questionnaire

4.1 Methodology

In order to assess the feasibility of the proposed approach discussed in the previous chapters, a questionnaire was designed to establish and evaluate other Universities' practices and to compare them with UWA's proposal.

The questionnaire was originally designed to elicit specific information relating to the systems used. UWA had not yet decided whether to replicate current procedures and practices via the AStRA and QL-x systems or to approach the re-developments from a completely new direction so as to re-consider existing procedures from basic credit control functions to how the debts are administered. The questionnaire was therefore redesigned to include more general information relating to financial issues rather than specific technical information as UWA may adopt new practices used by other parties if applicable. The questionnaire was therefore targeted at the Universities' Finance Offices rather than the Information Services sections.

A copy of the questionnaire and covering letter was e-mailed to the Executive Office of the British Universities Finance Directors Group (BUFDG), the representative body for finance staff in UK higher education, who subsequently forwarded the letter and questionnaire electronically to 143 BUFDG Jiscmail subscribers. The majority of the replies were electronically received although many were manually completed and submitted.

4.2 Response and Analysis

Responses were received from a total of 27 institutions. All of them were fairly comprehensive and hence useful. The number of responses received was not enough to constitute a statistically valid representative sample; however, the number of responses was quite adequate to meet the aims of the questionnaire. In what follows, therefore, we have made no attempt to analyse the results statistically. We have simply indicated the range of responses to each question.

1. What are the payment options with regards to the payment of the following fees?

Tuition Fees

There are many tuition fee payment methods offered by the institutions. Different options are offered depending on the fee type such as undergraduate or postgraduate or whether the students are home or overseas students. A general overview of the options offered is summarised below:

The majority request full payment of the annual fee at the beginning or prior to the beginning of an academic session however instalments are often offered. Some request full payment within the first month of the session; this is particularly aimed at sponsored (not SLC) students.

A large number of institutions request part payment of the fees due prior to the beginning of the session or during enrolment. The part payment ranges from 25% to 60% of the annual fee depending on the students' status. The balance of the fees can be paid in instalments via a range of methods such as cash, cheque, credit/debit card, continuous credit card, direct debit, standing order, bank transfer etc again depending on the students' status. A small number of institutions request a deposit from home/EU students. If a student has not yet been assessed then they are still required to pay the deposit or part payment however this will be refunded if it transpires the students is assessed to be fully sponsored or to pay less than the original sum paid.

Direct debit is not a compulsory instalment payment option offered however it is the preferred method by many institutions. Some institutions do not offer this method or only offer the facility to certain categories of students. The instalments range from 2 semesterly or 3 termly

instalments to a maximum of 7 monthly instalments. Many offer different instalments for undergraduate and postgraduate students.

Discounts for prompt payment of annual tuition fees are offered by some institutions at a typical rate of 2.5%.

Some institutions levy an administrative charge for payment in instalments for overseas students.

On the whole, overseas students are treated differently to home students; the higher fee levels would be a contributory factor. Also on the whole postgraduate students have more lenient or flexible payment options compared to undergraduate students.

Accommodation Fees

Accommodation fee payment options are similar to the tuition fee options.

The majority of the institutions request payment in full at the beginning of the academic session though instalments are offered usually in 3 termly instalments though not necessarily via direct debit as instalments via credit / debit card, cash, cheque, standing order, bank transfer etc is also offered.

Direct debit instalments are again not compulsory in the majority of institutions and these instalments range from 3 termly instalments to a maximum of 8 monthly instalments.

Many institutions offer a prompt payment discount for the payment of the full annual fee at the beginning of the session. One institution offers a discount for paying via the Internet.

The majority of students' accommodation fees are collected in the same manner no matter what the students' status is, however, postgraduate students tend to have more payment options and overseas students are occasionally treated differently.

A small number of institutions are not involved with the actual collection of accommodation fees as this function is factored out to an independent company.

General and other fees

The larger majority of the institutions, approximately 65% have payment terms of 30 days from the date of the invoice, with 30% having payment terms of 28 days from the date of the invoice. A small percentage stated that invoices were due on receipt of an invoice and one institution stated payment terms of 14 days from the date of the invoice. The remainder either have no sundry debts, or at least no relevant information was provided.

2. With regards to tuition fee undergraduate home and EU full time fees, do you process two separate invoices for each of the private and sponsored elements?

A large percentage of institutions, over 80%, process two separate invoices for the private and sponsored elements of the tuition fees. Of this percentage the majority record the separate elements on each individual student's account although many record the sponsored element on a separate global SLC/sponsor account. A few institutions also have a separate sales ledger for the SLC income.

This question and the next question are not particularly relevant to many Scottish institutions where they have a majority of Scottish students who have their tuition fees paid by the Students Awards Agency for Scotland.

3. How are undergraduate tuition fee re-assessments processed on your system/s? For example do you cancel the existing invoice and issue a new invoice or is there a mechanism to indicate the change?

The majority of the institutions cancel the original invoice and reissue invoices upon a re-assessment, whether they process single or separate invoices for the private and sponsored elements. Many process credit and debit transactions however this tended to be on the single invoice. The majority of the transactions are processed manually although many are

automated and post the relevant credit and debit transactions on the relevant sales ledgers simultaneously, however this occurred with those institutions with a separate SLC sales ledger.

It was mentioned on many questionnaires that students are not necessarily sent physical invoices with re-assessments as this tended to lead to much confusion on their part.

4. Do you have a separate students system, for recording student records and student finance and a separate financial system or are transactions processed via a single integrated system?

Approximately 18% of the institutions have a single integrated student and finance system with the majority having at least 2 separate systems to process student records and student finance. Many also have a separate accommodation system.

5. Were the systems developed in-house or are they commercial applications?

Over 50% have commercial applications for both student records and a financial system with the majority of the remaining 50% having a commercial financial system and an in-house student system. A small percentage of the institutions have both in-house student and financial systems.

6. If you have a commercial application, please provide further details.

A large number of different commercial applications are used; some are listed below:

- Synergy by Logicline/Impaq
- Hemis and Emis by Capita
- Nucleus by Bull
- Promix by Ross Systems
- SITS
- SCT Banner 2000
- Quercus Plys by Campus IT
- CODA
- Dolphin
- SAP
- CedAr
- Sage
- Agresso Finance System
- QL-s
- QL-f
- QL-x
- Oracle Financials

SITS and Capita are applications used by numerous institutions and they tend to be used in conjunction with each other. One institution states that the two companies have a collaboration agreement and the systems can therefore be seen as integrated to some extent. SITS (Strategic Information Technology Service) is a company based in Hessle, East Yorkshire, which specialises in software solutions for the administration of student records. Capita Education Services is based in Bedford and provides financial software solutions for many companies and industries including the Education Sector.

Two other institutions currently have a similar QL financial system to UWA however one of these also has QL-s, the Students application to run in conjunction with QL-x, which removes the necessity for imports as the systems are fully integrated.

7. If you have separate systems, by what method and frequency is the relevant information imported into the financial system?

The majority of the institutions with separate systems process imports between the systems on a fairly regular basis either daily (overnight) or weekly. Many of these are automated however most are processed manually. Some institutions import on an infrequent *ad hoc* basis as required.

8. If payment by direct debit is an option with regards to the payment of tuition and accommodation fees, is the direct debit system independent or integrated in another system?

Almost 50% of the institutions have their direct debit system integrated in the financial system. Approximately 30% have a separate direct debit system; however many mention possible re-developments with their existing system with an aim to integrate it within their financial application. A small number only offer direct debit as an accommodation fee payment option and as such the direct debit system is either integrated within the accommodation application or is a separate system. A small number do not offer direct debit as a payments option therefore the question is irrelevant.

9. By what method and how often are student debts pursued?

There are a large variety of debt collection methods used by the institutions, the majority tended to be via monthly or termly standard reminder letters. Many of these letters are automated by the relevant applications. Many institutions also use e-mail and the telephone to attempt to contact the debtors while some attempt face-to-face contact and in one case text messaging is used.

Sanctions are imposed on continued non-payment of a debt such as the withdrawal of networking facilities, the withdrawal of University sports facilities and possible exclusion. Although many institutions impose a small surcharge for dishonoured payments one institution charges £35 per dishonoured payment

10. Do you send a regular statement to students and if so does it include all financial transactions or are individual statements sent per fee type?

Forty-seven percent of the institutions do not send statements to students. 53% send statements at varying frequencies such as monthly, termly and quarterly or upon request. These statements vary in content from including all financial transactions to individual statements per fee type. One institution sends regular statements for accommodation fees but only on request for tuition fees. Another institution only sends statements to those who are not paying by direct debit as direct debit payers are catered for via their direct debit system.

11. Are the letters/statements processed via the system/s or is the information exported into another application for processing, for example, into a Microsoft Excel file to process a mail merge document?

Over 50% of the correspondence is system generated whereas the remainder produce correspondence via mail merge or separate applications, for example, via Access or Sage or via in-house report writers and a mail merge facility.

12. Are the letters/statements addressed to the student or are they addressed to the person paying the fees?

Ninety-five percent address correspondence to the student as they are considered to be the debtor. A large number of institutions are concerned with the implications of the Data Protection Act. The correspondence is often sent to both the home and the term addresses. Many mark letters sent to the home address as 'Urgent' or in one case 'Urgent – Accommodation Fees' or similar wording so that although addressed to the student a parent

may open such an important looking document and resolve the matter. A small percentage of the institutions send correspondence to the payer only.

All direct debit correspondence is addressed to the account holder by the institutions, which is a requirement of the Direct Debit Scheme.

13. If you have a single integrated system, are tuition and accommodation income recorded on separate sales ledgers or is all income recorded on a single sales ledger?

Approximately 53% of the institutions have a single sales ledger for all student income and a separate ledger for non-student income. It has been mentioned previously that a small number of institutions have a separate sales ledger for SLC income also. One institution previously processed tuition and accommodation fees on separate sales ledgers however as they experienced many problems they now have a single sales ledger. 24% have separate sales ledgers for tuition and accommodation income however one of these will soon be merging the ledgers into a single sales ledger. The remainder did not answer the question sufficiently or the response was ambiguous therefore I was unable to categorise them accordingly.

14. Do you have a facility for students to access their financial records via a web page and if so are students able to access all transactions or a single balance?

Almost 90% do not have this facility at present however the majority are either investigating the possibility or would like to have this facility in the future. Those who do offer this facility provide access to all relevant transactions rather than a single balance.

15. Are residents required to pay a deposit to secure their University accommodation and if so how much?

Over 75% of the institutions request a deposit to secure a place in University accommodation and these range from £50 to £290 depending on the resident type and accommodation type i.e. undergraduate, postgraduate, family flat etc however the majority request £100 which is considered insufficient in one institution who are looking to increase the provision. On the whole the deposit is refundable less charges however some institutions deduct any deposit paid from either the first or the final term's fees. The remainder do not request a deposit or have not stated an amount.

16. How is the deposit recorded on the system/s?

The deposit paid is recorded in many ways as follows: directly against a students account where it is either included in the accommodation invoice or as a separate transaction; recorded on a separate accommodation system; recorded on the financial system directly to a control account or separate suspense account rather than on the sales ledger and recorded on both the financial system and onto the students account.

17. With regards to processing tuition and accommodation income such as invoicing, collecting and allocating the fees, would you change any of your current procedures? If so, please expand.

Many of the institutions would like to introduce direct debits as a payment option and some of those who already offer this option would like to make this the compulsory instalment payment option. Many would like to have improved reporting facilities with better provisions for users to improve overall performance and efficiency. Many would also like to introduce e-payments and a wider use of the web. Many of the institutions with separate applications would like to work towards a single integrated system with system-generated correspondence.

Approximately 35% of the institutions are happy with their current procedures and have not provided any proposed or desired developments.

4.3 Interesting Ideas

The responses to the questionnaires introduced many interesting ideas some of which might be useful to UWA.   Some institutions offer continuous credit card payments as an instalment payment option, which in theory sounds an effective collection method however it would be interesting to see how it works in practice. It would be cumbersome administering and processing a large number of credit card transactions manually. UWA's direct debit system has a facility for recording credit card details therefore it may be possible for transactions to be processed electronically *en masse* via the application.

One institution uses MICR (Magnetic Ink Character Recognition) on accommodation invoices. This is a line of magnetic ink on the credit slip section of the invoice, which contains the cheque number, account and sort code information for payments to be credited directly to the institution's account. This may be beneficial if a large quantity of residents paid their accommodation fees manually, however at UWA the majority of accommodation fees are paid by direct debit with the remainder paid in person in the Cashier's Office or in the relevant residence at the beginning of the academic session.

The same institution utilises the £35 surcharge for dishonoured payments also the same surcharge is levied if they are not notified by the students of any reassessments. In the past UWA has levied minimal charges for dishonoured cheques however, to date no charges are levied for dishonoured direct debit payments. Fee payment documentation for the 2003/04 Academic Session has now been amended to include a notice for possible charges being levied for dishonoured direct debit payments or misuse of the direct debit system.

Many institutions have an integrated direct debit and financial system. However, some have experienced difficulties with multiple bank accounts for the payment of the different fee types. UWA has flexible direct debit payment instructions and can cater for multiple bank accounts for the separate fee types and at present it is seen as a valuable functionality to be continued with any developments.

The standard reminder letters to student debtors tend to have a cyclic pattern with each recurrence being more strongly worded. Many institutions initially produce a series of 2 or 3 standard reminders from the Finance Office and possibly signed by the head of the section or the Director of Finance with the subsequent stronger letters being sent from the registry or from the institutions' solicitors. UWA follows a similar practice; however letters from the solicitors are only sent when a debtor is no longer a registered student and after the debt-collecting agency have failed.

One institution puts the onus on to the students, that is, they are informed of the fee at the beginning of the session and are only contacted if there is an amendment in the fee due or if they default on their agreed payment plan.   From experience this does not work at UWA as students, and occasionally sponsors, need to be reminded and often continually invoiced for the fee due.

Interest is charged for payment in instalments for overseas students only in one particular institution. In UWA if we were to adopt this practice, all categories would be targeted as we have standardised procedures so that all tuition fee categories have the same payment options to improve the administration of the fees and to improve overall efficiency.

Discounts are offered for the full payment of accommodation fees and/or tuition fees in many institutions. UWA previously offered a prompt payment discount for accommodation fees, which was subsequently offered with direct debit instalments also. However, as it did not appear to affect students' payment methods or the level of debts it is no longer offered. UWA has the same philosophy with regard to not offering discounts for tuition fees. However, should a student/sponsor wish to pay the fees for the full course at the beginning of the course then usually UWA would charge the current annual fee for the subsequent sessions and not insist on the annual increase.

Sanctions imposed by the majority of the institutions are standard, such as withdrawing computer and library facilities or excluding students from the University; however some institutions impose the more severe sanctions earlier in the session than others. An interesting sanction, which may be investigated further by UWA, is the withdrawal of sports centre facilities for student debtors.

Finally, it would be very beneficial for each student to be interviewed at registration by a member of the Finance Office staff directly involved with student fees. At present, only students collecting an SLC cheque are interviewed. Problems occur because many of these staff, who are based in other sections of the Finance Office and are not directly involved with student fees, do not fully realise the importance of establishing all the facts relating to student fees with the individual students. It is not possible to avoid this problem because of the short period over which all students have to be interviewed. Postgraduate students currently see Finance Office staff when they have problems or queries or following reminder letters after registration. PGCE postgraduate students are individually interviewed during their registration; this does not however resolve all issues.

4.4 Overview

The main purpose of the survey was to validate the University's plan for administering student debts. If it had transpired that other Universities generally adopted different practices or that a similar approach was not successful, the University's plans would have had to be reconsidered. The survey has demonstrated that many other institutions adopt an approach similar to that proposed. The University can therefore proceed with the plan to administer all student debts via QL-x.

A subsidiary purpose of the survey was to ascertain whether the University's practices in administering student debts were consistent with those of other institutions and whether there was anything to be learned from their practices. A number of differences in detail have been noted but the major point is that UWA offers a much more flexible regime than do most other institutions. Since this flexibility has a significant cost in staff time and does not seem to be appreciated by the students, it is envisaged that it will be replaced by a much more restrictive regime. This, in turn, may make it possible to replace the separate, dedicated direct debit system in use, with a system integrated into QL. This will lead to further savings in effort.

5 Main Elements of the New System

5.1 Key Decisions

The results of the questionnaire validated many aspects of the University's proposal and have resulted in the following key decisions, the practicalities of which will be discussed in more detail as part of the functional specification:

5.1.1 Generating Records and Transactions

AStRA will record all information relating to a student's personal, admissions and academic status and certain financial information such as bank accounts for direct debit instructions, sponsor, tuition fee flag, hall code and room type for residents in university accommodation. All information relating to a student's tuition and accommodation fees due for a particular academic session will be generated by AStRA based on the specified fee flags and hall codes, and exported to QL-x including system generated invoice numbers.

It was originally decided that there would be no need to record any financial information on AStRA as all student debts were to be administered solely via QL-x. It has now been decided that although all student debts will be administered and pursued via QL-x, there is a need for some financial records to be held on AStRA for audit purposes and for debt management purposes. All system generated transactions from the initial invoice transaction through to credit notes are to be generated by AStRA and will be held on each student's record via a basic financial records facility. Transactions will be posted to AStRA in real time rather than as part of a daily routine. These system generated transactions, for example tuition and accommodation invoice transactions, credit notes and debit notes, will be exported into QL-x on a daily basis; it is therefore necessary to have an audit trail to validate each transaction generated, as there is no requirement for a batch control function with automated imports.

5.1.2 A Single Debtors System with Multiple Sales Ledgers

All student debts will be recorded and administered via QL-x. Tuition and accommodation fee transactions will regularly be exported from AStRA to QL-x. Student sundry debts will be posted directly to QL-x.

QL-x will maintain three separate sales ledgers to administer the three different debtor categories: staff debtors, student debtors and sundry debtors.

5.1.3 Student Loan Company

Only the private element of home/European undergraduate and teacher training tuition fees will be recorded and administered on a student's account in the student debtors ledger in QL-x. The sponsored element will be administered via a separate global Student Loan Company account. However, UWA will continue to record both elements on a single invoice number.

There is an element of uncertainty here since it is unclear how current government proposals will evolve.

5.1.4 Fee Payment Options

UWA will continue to offer the current payment terms and options with regards to tuition and accommodation fees, including the instalment options, however with less flexibility.

DDMS will continue to be used in the short term, to support multiple bank accounts and to provide the letter maintenance functionality required. The instalments offered, however, will be more restrictive to improve credit control procedures.

5.1.5 Statements

Regular statements will be sent to students to provide them with a full financial history for the session and to improve customer service.

5.2 Functional Specification

5.2.1 Creating Accounts

Each current and proposed future student record in AStRA, i.e. those students due to continue with their studies not those who have completed their studies, will have an account created on QL-x during the initial account creation exercise prior to the beginning of the 2004/05 session. Each subsequent new account will be created on AStRA when the admissions process has been successfully completed and these will be automatically created on QL-x via the daily export files.

Approximately 7000 new accounts will be created for all current and prospective students by the beginning of 2004/05 academic session after which approximately 2500 new accounts will be created each year with a similar number of accounts being archived or deleted as appropriate. There will be approximately 10000 student accounts on the student sales ledger at any given time.

The student accounts on QL-x will need to retain certain data fields from AStRA as 'standing information' (see the first column below) and the necessary master file data will be exported into the corresponding data fields in QL-x (see the second column below). The final column lists the actual name of the QL-x data field for information.

Data Field - AStRA		Data Field – QL-x	QL-x Data Field Name
Student reference number	➡	Account Code	ACPMAST.REF_ID
Student full name	➡	Account Name	ACPMAST.NAME
Student term address	➡	Address Code 1 – Postal	000000000T
Student home address	➡	Address Code 2 - Receipt	000000000H
Student departmental address	➡	Address Code 3 - Statement	000000000D
Sponsor address	➡	Address Code 4 - Registered	000000000S
Student e-mail and status [1]	➡	E-mail Address	ACPMAST.EMAIL_ID
Department Code	➡	Short ID	ACPMAST.SHORT_ID
Hall direct debit status	➡	Area Code	ACPMAST.AREA_ID
Tuition direct debit status	➡	Territory Code	ACPMAST.TERRITORY_ID
Registration status	➡	Category Code	ACPMAST.CATEGORY_ID
Expected completion date	➡	Country Code	ACPMAST.COUNTRY_ID

Any new account or amendments to master file data will be updated as part of the daily export routine to QL-x.

5.2.2 Creating Tuition Transactions

Tuition debit transactions will be created in AStRA based on a student's registration status at any point of the academic session. The majority of annual tuition debit transactions will occur when the majority of the students register with the University. Some students register at other times during the session, for example, for the second semester only, however these students are allocated a relevant fee flag for the specific course and period and a relevant fee will be levied accordingly.

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[1] If the University e-mail account states 'locked' the student's University network facilities have been withdrawn for financial reasons.

The Academic Office will manually process a student's registration status on AStRA and update the registration field. When a student's registration is confirmed, the tuition fee debit transaction will be generated automatically and posted to the system. The initial transactions will be exported to QL-x *en masse* at the beginning of the session and subsequent transactions will be exported via the daily export files.

AStRA will perform certain checks against students' records to check that all relevant debit invoice transactions have been generated. It will ensure that a duplicate invoice is not generated but it will also generate invoices for more than one fee flag if necessary. If the original fee flag is changed resulting in a new fee flag and new invoice transaction being generated with a new invoice number, a credit note will be generated for the initial invoice. It would be beneficial for a report to be automated to list these cases for audit purposes. The system will also deal with students who are exempt from paying fees or who have their tuition fees waived. The relevant fee flag will denote these students; therefore it is not necessary to generate an invoice transaction with a nil value.

Ad hoc fees will be processed manually as there is no fixed fee in the tuition fee table. AStRA will produce a report of those with the relevant fee flag for manual processing.

Credit Transactions

Annual tuition fees are based on thirty weeks of a session. If a student withdraws at a given date then the fees due for the session will be calculated *pro rata*. AStRA will have a facility to calculate tuition fees due and automate relevant credit transactions based on his or her withdrawal date processed by the Academic Office on the system. Students with the home and European undergraduate A0 fee flag however do need to be administered carefully as calculations are based on the private portion of the fees due. The SLC will pay over the sponsored portion due to all students registered on 1st December of each year. If an A0 student withdraws prior to 1st December, they will be responsible for the *pro rata* fee due for the private element.

Student Loan Company

All home and European full time undergraduate students and teacher training students may apply for tuition fee assistance from the DfES or their Local Education Authority. Initially their fees for a given session will be recorded on AStRA as fully private. The private and sponsored elements of the annual fee will be amended as necessary upon receipt of a financial assessment form from the student. This form will specify the private and sponsored elements for a given session. The majority of the forms are processed on the system prior to the beginning of the session and prior to the invoice transactions being generated. However, many forms or re-assessments will be processed after the initial invoice transaction has been generated and exported to QL-x.

5.2.3   Creating Accommodation Transactions

As with tuition fees, the initial annual accommodation debit transaction will be generated at the beginning of the session based on a resident's hall code and fee type. When the key issued date field for a resident is populated on the Halls Management System a debit transaction for the annual fee for the specific hall code and fee type will be posted to the appropriate record on AStRA. These transactions will be automatically posted to the students' records on AStRA on a daily basis and subsequently exported to QL-x.

The halls' staff currently update the key issued date field on the HMS over a period of a week at the beginning of an academic session. UWA will continue with the current practice whereby the MIS section generate the annual debit transaction automatically at the end of the first week of session based on where the resident is at that time. This was adopted to reduce the number of transactions and complex calculations as a result of the large quantity of movements in, out and between halls during the first few days of a session.

Credit/Debit Transactions

Subsequent credit and debit transactions will be automatically generated based on the resident's movement record processed by the halls. If a resident moves out of the residence then a credit transaction would be generated against the original invoice number and posted to the student's financial record based on the 'charge to' date populated on the HMS. AStRA will have a mechanism to calculate the initial invoice transactions along with any credit or debit notes based on an embedded facility.

Each hall code is allocated a total number of days based on either a sessional or a termly calendar and with each move in, out or between halls, relevant transactions are generated and posted to the financial record. The system will need to be able to compare hall codes and fee types as often a resident will move within the same hall and same room type therefore although there is a change of term address, the actual fee due remains the same. It is not necessary to generate credit and debit transactions in this case. With each change of hall code, it will be necessary to credit the existing invoice transaction and generate a new debit transaction with a new invoice number for the new hall code. This is necessary for debt management purposes especially for the University managed properties for ensuring the relevant transactions have been generated accordingly and that the correct monies are paid over to the owner of the properties.

5.2.4   Creating Sundry Debt Transactions

Student sundry debts will be posted directly to the student debtors ledger. Departments will either request the Finance Office to generate a relevant invoice transaction via an online invoice request form or process the transaction on the system themselves, depending on their privileges. It is important that departments are aware that the debtors must be categorised as students, staff or general debtors so that they can be processed accordingly in the correct ledger and administered and pursued appropriately.

5.2.5   Recording Transactions on QL-x

It is necessary for certain information to be recorded at transaction level and QL-x has a standard set of fields such as 'Outstanding value' and 'Allocation status' which are used by default. However it has a large number of additional fields that can be utilised via the Setup Grid facility if required. The standard field names can be given more meaningful titles to improve user functionality. The transactions will be exported to QL-x as sales invoices rather than accounts receivable transactions; which will include text descriptions of the transactions so that a user can generate a meaningful paper invoice from the system at will. (See 2.3 for further information on ACR's and SIV's). The transaction data from AStRA (see first column below) will be recorded in the corresponding fields at transaction level in QL-x (see the second column) as illustrated below:

AStRA Transaction Data	QL-x Transaction Data	Examples
Tuition / Accommodation invoice number	Invoice	Prefixed with 'H', 'T' and year e.g. 'H03-994863'
Fee flag / Hall Short Code	Reference 1	A0, 'PENB' for Penbryn Hall
Transaction type	Reference 2	Credit note, invoice, direct debit payment
Transaction description	Reference 3	Hall Fee or Tuition Fee
Transaction amount	Gross Value	£1125
General Ledger Code	GL Account	XA38.500.901

Manual payments will be processed by the Cashier's Office directly against a student's account and will have a relevant transaction type to identify the payment type. These should be allocated against a relevant invoice transaction accordingly however there is an unallocated

cash reporting facility, which will enable a user to manually allocate payments when necessary. Manual dishonoured payments will be processed in the same manner.

5.2.6 Data Transfer

The majority of the master file and current transaction data will be exported from AStRA to QL-x *en masse* prior to the beginning of the 2004/05 academic session. Subsequent master file and transaction data, both new and amended, will be exported to QL-x on a daily basis via an automated overnight export routine. Separate export files will be created and processed for the master file data and different transaction data.

It is necessary for validation checks to be performed to ensure the data export is processed correctly. Certain information may need to be converted prior to export or additional information may need to be appended therefore UWA has decided to process the necessary export files via an appropriate media such as an XML file. QL-x can have a document control centre facility to validate export data and transactions; however, Microsoft BizTalk is a more flexible tool which uses XML to export certain data in set formats and is the preferred method of data transfer. XML files can specify strict rules relating to individual attributes such as where certain data can go when exported and in what format. XML also removes incompatibility problems, as it is not platform specific. UWA currently exports data to QL-x via the QL-f system however as this is no longer supported UWA has decided to incorporate BizTalk into their export procedures.

Direct Debit Records and Transactions

AStRA will record all direct debit information such as bank account details for each fee type to be paid, direct debit correspondence addresses, frequency etc. To fulfil direct debit obligations of transmitting details held within a strict timescale via BACS, AStRA will validate bank sort code and account numbers, identifying incorrect details at point of entry within the academic year. All relevant direct debit information along with the fees to be paid will be automatically exported to DDMS on a daily basis using existing and new export files.

Direct debit records will have an identifier to denote its status, for example whether the instruction is valid / active or if it has been cancelled or suspended. This identifier will be exported to QL-x for debt management purposes. Many direct debit instructions are cancelled and reinstated numerous times during a session in what appears to be misuse of the system also there are numerous repeated dishonoured payments. This information will be exported from DDMS to AStRA where the direct debit details will be invalidated with a 'S' for suspended or 'C' for cancelled, which in turn will be exported to QL-x against the relevant direct debit status field.

Direct debit payments and dishonours will be automatically exported directly to QL-x via an XML file however the issue of automatically allocating the transactions must be addressed. With the large number of direct debit payments and related dishonours, it is necessary for the transactions to be automatically allocated against the relevant transaction on QL-x to avoid manual updates. The transactions can be allocated if there is common ground for example the same invoice number in the export field and the transaction. This is to be looked at further by Distinction, the supplier of QL-x, as there may be complications due to the possible large number of transactions and different invoice numbers recorded. Allocations can be reversed which will address the issue of dishonoured payments.

5.2.7 Address Maintenance

QL-x has the facility to record four addresses on each ledger, each with its own unique code. Student term and home addresses will be exported from AStRA to QL-x; however academic department and sponsor address will also be recorded for reporting purposes.

Any amendments to student addresses on AStRA will be exported daily to QL-x. AStRA will have a facility as part of its export routine to check student term addresses so that if there is

no term address held then it will default to the home address and no null values will be exported.

Students' term addresses will also be exported to the student creditor ledger but with a different address identifier. This will ensure all cheque payments due to a student are sent to the current and correct term address, (see 2.2.9 for further information on student addresses).

5.2.8   Debt Management

Each category of student debt will be administered individually and appropriately. It is necessary for transaction types to be categorised as hall, tuition and sundry debt so that they can be pursued in a different manner. Due to the volume of student debtors it is necessary for each category to be administered by different staff members or groups of staff who specialise in each category.

QL-x has a debt management workbench facility, which enables the user to produce reports and correspondence based on certain criteria and transactions held on account level and transactions level. For example, it is possible to produce a report listing all those accounts with a registration status '6' which would list all students permanently withdrawn or based on a specified 'expected completion date' to list students due to graduate, or a specific fee flag or hall code etc.

Letter Maintenance

The letter maintenance function available enables the user to generate specific letters and append letter codes to the customer's account. Individual sales ledgers can have different stationery definitions for the correspondence. Each category of debt will have individual letters, which will be generated and appended to the accounts based on the filters and criteria specified. It is also possible to generate letters for the total debt on an individual's account, which is useful at key periods such as prior to graduation. A letter code and date is appended to the account with each letter or document sent to a student, so that there is a full history of correspondence sent. Unfortunately QL-x is currently unable to append a letter tag to each individual relevant transaction only to the account however if the letter codes are meaningful, in conjunction with the date it is sent, the student's account history can be quite easily analysed.

QL-x also has a facility to record instalment transactions either via preset templates or new templates can be created. This option may be useful for those with direct debit instructions so that statements can list the amounts and dates of the claims and relevant transactions.

All correspondence will be in both Welsh and English to fulfil the University's bilingual policy.

5.2.9   Access Control

Access to information relating to students' financial circumstances will be controlled separately to other information. AStRA will hold all personal, admissions and academic data and basic financial information. Academic departments and other specified departments within the University's Registry would have limited access to students' financial information. QL-x will hold the full financial record of a student and only authorised personnel will be able to access the data in the student debtors ledger. Also, by maintaining three separate debtors ledgers it is possible to refine certain user access even further.

5.3 Overview

This chapter has described how the proposals discussed in chapter 3 and verified in chapter 4 will be implemented to fulfil the requirements of the developments. Please see Appendix F, which portrays the proposed system interfaces. The next chapter will briefly discuss the testing strategies, which will be undertaken to ensure QL-x records and administers student debts as required.

6 Implementation Considerations

6.1 Testing Specification

The software or systems lifecycle has many phases and strategies, which include planning, system definition, requirements, design, implementation, testing and maintenance. Due to the nature of this paper many of the phases have not been implemented in their traditional sense however it has been necessary to undertake similar phases to identify the requirements for the proposal.

In the previous chapters I have discussed and assessed the University's practices along with the practices of other institutions and identified the system requirements. The planning, system definition and requirements phases have been addressed. The previous chapter discussed how these requirements would be implemented. This chapter will discuss the testing strategies needed to ensure the requirements have been fulfilled from both a systems analysis and accounting stance.

6.2 Testing Strategies

The purpose of implementing testing strategies is to show faults or errors and to see if a system appears to be working according to the specifications. Different strategies can be used on their own or together depending on the nature of the tests. Also different strategies can be used for different parts of a system. Testing strategies are traditionally implemented methodically and incrementally with each developmental stage.

The purpose of this chapter is to discuss the feasibility of utilising an existing system to perform credit control functions currently undertaken by another system. A new application is not being designed and implemented. In one respect the proposal has been approached in reverse in that requirements have been identified with the view of being recorded and managed in an existing product rather than designing a new system based on the system specification and requirements.

As QL-x exists and is already used for recording and managing sundry debts, many of the traditional testing functions and strategies are not appropriate but the bottom-up analysis strategy was implemented to some extent. The testing process itself has many phases such as unit, module and system testing, which will have been used by the developers of the packages but which are more appropriate in the present situation.

The dynamic testing methodology tests the dynamic behaviour, efficiency, reliability and maintainability of the data and system and the interaction with other systems. Data or test data is used to find errors, faults or inadequacies in the system output. This testing strategy will be applied for both AStRA and QL-x, in particular the system outputs for data transfer, which are to be XML files. The QL-x output needs to be reliable for debt management and analysis purpose and the AStRA output needs to be correct and complete prior to updating QL-x.

6.2.1 Systems Analysis Testing

This methodology will address the data requirements and data transfer between systems. This can be divided into functional and non-functional testing as detailed below:

Functional Testing

Functional testing will address issues such as specific requirements that are necessary for the system to perform the required tasks.

Ledgers - create new separate students and staff debtors ledgers with specific parameters and individual general ledger information.

Address maintenance - export and maintain addresses with designated address codes for each ledger (see 5.2.7).

Account maintenance - export and maintain necessary student details via the account maintenance facility (see 5.2.1).

Transaction maintenance - export and maintain tuition and accommodation transactions on transaction level (see 5.2.4).

Letter/statement maintenance - create specific debtor letters for each situation and a statement template and ensure these are produced as and when required.

Debt management facility - create debtor report templates for each situation and category of debt and generate accordingly.

XML data transfer - create separate XML files for master file and transaction data transfer between systems.

SLC data transfer - need to ensure the sponsored and private elements are recorded and pursued correctly, especially as a result of reassessments.

Non-functional Testing

Non-functional testing will address issues relating to the overall performance of the system.

Data validation and verification testing - this should be addressed with the XML data transfer routine (see 5.2.6).

Automatic allocation of transactions - how does the system automatically allocate large numbers of payments? (See 5.2.6).

Volume testing - how will the system react to large numbers of transactions and records being created and maintained? Will its performance be affected?

User maintenance - how many users will the system support at any given time? Will this affect running multiple reports concurrently?

Data transfer - how do the systems interact and is the data transfer function reliable?

6.2.2   Accountancy Testing

This methodology needs to ensure that all the accounting requirements are fulfilled. We know the current sales ledger performs as required and simultaneously processes double entry book keeping transactions; we do not therefore need to re-test the basic functions. Many of the functional and non-functional issues to be tested are similar to that of the systems analysis testing methodology however with a different requirement.

Functional Testing

Ledgers - create new separate students and staff debtors ledgers with specific parameters and individual general ledger information.

General Ledger Codes - it is important for the correct general ledger code to be exported with each transaction for accounting and reporting purposes.

Debt management - as with the systems analysis testing. From the accountancy angle, however, it is important for the reports to be robust and accurate and to report invalid data as they can be used for credit control functions and for reporting functions.

Letter / statement maintenance - again similar to the systems analysis testing however it is important for the letters and statements to be accurate and to be generated as required for credit control purposes.

Transactions - it is important for the correct fees to be generated in AStRA and exported accordingly. The data exported also needs to have meaningful tags for reporting and statement purposes.

Manual reconciliation - will there be a requirement for the manual monthly reconciliation between the cashbook entries for control accounts and batches posted manually?

Direct Debit reconciliation - will there be a requirement for a manual reconciliation between direct debit transactions posted to QL-x and those processed on DDMS?

6.3 Testing Overview

A traditional testing process involves many phases, these being description of the phases, requirements traceability, systematic list of tests and a recording phase. It is important to plan the testing phase extensively to ensure a thorough check of the system and its requirements. This will involve having requirement traceability to check the list of requirements and elements to be tested.

As AStRA is currently being developed it is not possible to carry out definitive tests with specific results. This is also true of the data transfer facility between the systems as QL-x does not currently have a secure import facility and the XML files to be used are currently being developed. The final test-recording phase is vital to systematically record results however it is not possible to include this in the paper due to the systems being incomplete and currently being developed.

Systems naturally evolve to deal with ever changing requirements. QL-x and how it interfaces with other systems will be monitored to ensure it continues to perform as required. Student debtor requirements and procedures are constantly changing and QL-x and the other systems will need to be able to deal with any future developments. The government's White Paper proposal regarding the possibility of top up tuition fees from 2006 will affect AStRA and QL-x as well as the University's tuition fee procedures in general and both systems will need to address any issues and developments that arise.

7   Critical Evaluation

Student finance is intrinsically complex due to the nature of the different categories of debt and how they are administered. The majority of the debit transactions relating to accommodation and tuition fees are generated at a key period of an academic session, usually the beginning of the session. The fees, however, may not be due for full payment until a specific deadline or they may be payable in instalments. The different categories of debt have different payment options and terms and it is therefore necessary for a system to deal with these issues.

Traditional accounting systems, such as QL-x, are generally more suited to administer commercial debts generated periodically rather than in a single concentrated effort, similar to UWA's sundry debts, which are processed and pursued periodically. An accounting system processes and administers transactions within monthly financial periods. The credit control procedures are based on administering aged debts and all transactions and functions are tied in with a financial period. As tuition and accommodation transactions have different payment terms, they do not fit neatly into a given financial period and cannot be treated in the same way as commercial debtors. The credit control functions therefore need to deal with these issues.

Ideally UWA's student finance would be administered via a suitable system to meet the various requirements of the different categories of debt. A possibly suitable system would be a system that administers credit cards or home shopping accounts. These systems enable an account to be created with an agreed credit limit. Debit and credit transactions can be processed against the account within this limit and the system does not allow credits above this limit. These systems also dispatch monthly statements detailing all transactions, with a minimum balance to be paid by a monthly deadline. Failure to remit the payment by the deadline may incur charges and may affect the credit rating of the account holder.

As a result of the questionnaire and survey into the practices of other institutions, it was decided that UWA would utilise its existing QL-x finance system to administer all student debts. It is envisaged that all student debts could be administered via a single system to improve current practices in particular the efficiency and accuracy of the data and to improve customer service. We were somewhat forced into using the facilities available within QL-x to administer tuition and accommodation debts and to fulfil the required credit control functions. This may not be best practice and under different circumstances we may have purchased or developed a more suitable system, however, we have revised current procedures to ensure the necessary functions are undertaken sufficiently.

An alternative solution to the problem of administering UWA's student debts would have been to utilise QL's student module, QL-s, which records all student admissions and academic data [22]. This is fully integrated with QL-x and would have removed the necessity for XML data transfer files between the systems, however, there would still be a need for an interface between the HMS and QL-x to generate and administer accommodation fees.

UWA did not see the purchase of QL-s as an option, as apart from the large cost both in money and effort, the existing system is well established and is maintained by a long-standing reliable team who thoroughly understand UWA's requirements and more than adequately provide amendments and additional functionality as and when deemed necessary. The current system is being developed and AStRA will provide improved user functionality and will refine the existing procedures and processes.

7.1 Remaining Issues

The majority of the issues raised during this project have been addressed and resolved or seem to have disappeared or are no longer seen as issues. A number of matters, however, remain to be resolved as part of future developments.

7.1.1 Student Loan Company

Although this has been addressed to some extent, the University is currently involved in new developments with the SLC, which will include readdressing certain procedures and practices. The BACSFirst initiative is a project which aims to improve efficiency and accuracy of information transferred between institutions and the SLC. The project aims to remove the first manual payment of the student loan to participating students. The SLC will provide information relating to proposed students prior to the beginning of an academic session and upon confirmation of their attendance at UWA, probably via electronic means, the students' payments will be released and paid directly into their designated bank accounts via BACS. This will improve the efficiency of the student payments if managed correctly, as UWA has no desire to delay student payments, which can ultimately affect the payment of fees. Also the initial reports produced by the SLC will provide sponsorship information at a much earlier stage thereby reducing the number of amendments as a result of assessments being posted to the system after the annual debit transaction has been generated. This will remove the requirement of processing the manual financial assessments forms to establish the sponsor/private elements.

This has been tested in other institutions that took part in a pilot scheme over the past two years; any obvious anomalies should therefore have been addressed. UWA is keen to develop new procedures that will improve the credit control functions and services provided and is aiming to adopt the new procedures in advance of next session so that any problems with data transfer will be addressed.

7.1.2 Miscellaneous Fees

The developments proposed and discussed have been targeted at sessional annual tuition and accommodation fees. UWA does however have other categories of fees that do not fit neatly into the plans as of yet, however, the current practices need to be reviewed and updated and this is the opportune time to undertake any necessary changes.

Distance Learning Fees

Distance Learning tuition fees are generated during the year depending on when the course start date is, for example some courses begin in April some in June. The fees are currently manually generated by the Finance Office but are administered by both the Finance Office and the relevant department depending on the preferred payment option. Annual fees and direct debit instalments are generated and maintained by the Finance Office and the department instigates and maintains modular fees.

Rented Properties

The University lets certain properties and the accommodation fees for these are based on a full calendar year from 1st August to 31st July. The fees are collected on a monthly basis and many residents pay by direct debit.

Summer Vacation Accommodation Fees

Summer accommodation fees are generated by the Finance Office based on information processed on the HMS for certain hall codes. The residents and fees generated are on a more casual basis than the sessional fee. A large number of residents move in and out at irregular periods during the summer months; it would therefore be difficult to automatically calculate the fees due without processing a large number of credit and debit transactions. An increased number of temporary accounts are also generated for this period of residency and this results in problems with duplicate records. The issue of temporary numbers also needs to be addressed and is currently being discussed with the relevant parties. (See 2.2.1 and 3.3.1 for further information).

7.1.3 Processing Direct Debits

In this dissertation I have discussed current practices with regards to processing direct debits and have discussed why UWA will continue to use DDMS in the short term. Discussions are however, currently underway with a view to using the QL-x Direct Debit module. This will involve visiting other institutions currently using the system and meeting with Distinction for further investigation.

UWA initially wished to continue with its extremely flexible payment option; however as mentioned at the end of chapter 4, a stricter regime will be adopted for the next session. The QL-x module may be able to provide the necessary requirements, in particular the letter maintenance facility and if it does meet the requirements data transfer problems between AStRA and DDMS and QL-x and DDMS and the problem of automatic allocation for payments will no longer be an issue. Utilising this module will save much effort both administrative and technical. Another institution has recently been involved with Beta testing the module, which has instigated developments. Initial investigations have been positive. Please see Appendix G, which portrays the proposed system interfaces without the DDMS application.

7.1.4 System Hardware

In the first chapter I introduced current systems and hardware profiles and the recent installation of new Dell servers. During the lifetime of this project, however, the Dell servers failed and the procurement of suitable alternatives was underway. This has now been addressed and new Sun servers will now be installed to improve the MIS systems' performance and functionality. The hardware profiles detailed in Appendix A will be similar with the Sun servers.

7.2 Personal Perspectives

I am employed as team leader of Income Services, a section of the Finance Office, responsible for the administration of student debts. This project has therefore been of great interest to me on a personal and professional level. My main objectives during the project have been to assess the feasibility of the proposal so that student records and debts can be recorded and administered efficiently, effectively and in an accurate robust manner whilst providing improved credit control functionality for the office and providing an improved customer service. This paper, therefore, has a two-dimensional aspect in that it will hopefully fulfil both my academic and vocational requirements.

Software development problems often occur due to the inaccurate understanding of user needs and the inability of a system to deal with the actual user requirements. This is not the case with this paper as I have in depth practical knowledge of the current practices, procedures, systems, users, the requirements and practical resolutions to many existing problems. This unique insight has been of great value and my inherent involvement helped establish requirements and problems at an early stage. This has also been somewhat of a hindrance in that I became preoccupied with certain problem areas involving individual personnel performing certain tasks. I often found it difficult to approach the project objectively in order to establish the requirements.

Creating the questionnaire was a more difficult task than I had expected, as I had to design the questions in such a way as to encourage institutions to take part in the survey. I tried to ensure the questions were not too complex and gave examples for the institutions to follow suit. Many of the questions were not specifically related to this project; however I thought it was an ideal opportunity to gain further information for my own personal interest and use as part of my daily working responsibilities.

I originally intended to send hard copies of the questionnaire and covering letter to the institutions however, with the help of the Executive Officer of the British Universities Finance Directors Group (BUFDG); it was e-mailed to the institutions. The questionnaire and

letter should have been designed more carefully to accommodate electronic replies. It should have been created as a template whereby responses to each question could have been input in the allocated space without affecting the layout of the form also a request for a signature is unnecessary. In retrospect a contact e-mail address should also have been included on the questionnaire itself rather than only on the letter as the BUFDG Jiscmail subscribers are the Universities' Directors of Finance who, on many occasions, forwarded the questionnaire to the relevant staff member to complete and return without the complementary letter.

The questionnaire and its results were referred to at a BUFDG Student Debt Seminar held in Manchester University in November 2003. The full results were circulated to institutions via the BUFDG e-mail and again to institutions' delegates attending the seminar.

This project is not just an evaluation exercise as what has been discussed is actually taking place in the University. Developments are currently underway to implement the proposal as discussed in the paper and UWA decided on certain actions as a direct result of the findings of the questionnaire and the matters discussed.

As mentioned in the previous chapter, the testing phase is not yet complete. There is as yet no final product to test and to evaluate; in particular the practical implementation of the requirements, and whether they actually work, or whether some elements are impractical and need to be reviewed. It is envisaged that initial tests will be carried out in March 2004 with a large volume of student test data being exported into QL-x' test environment via the XML files, with a view to implementing parallel running of the systems during the summer of 2004.
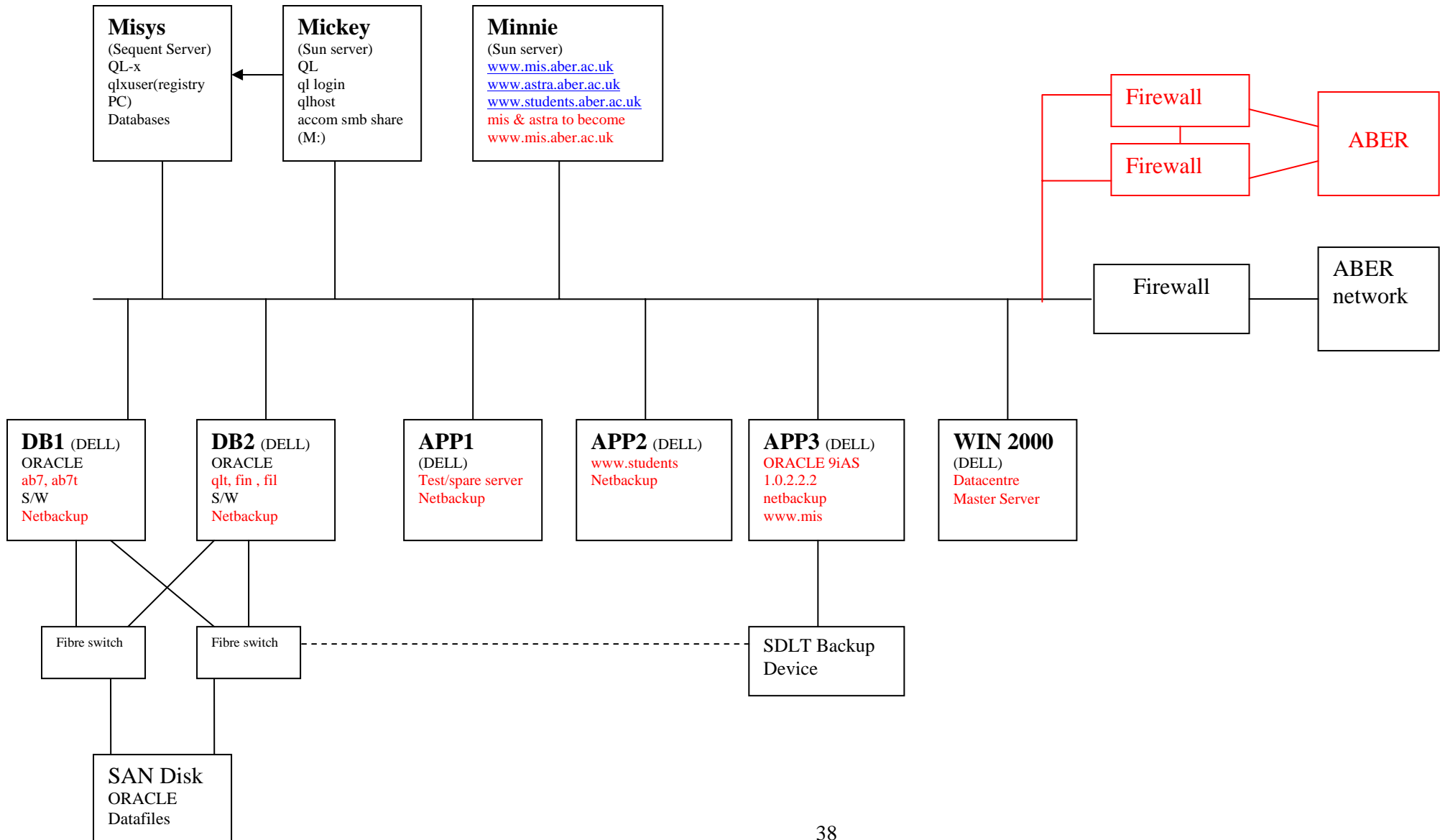
7.3 Conclusion

I am confident, that with the thorough understanding of the systems and procedures with regards to student credit control functions and having an awareness of potential risks combined with the tighter payment regimes to be enforced for the 2004/05 academic session, the proposal will succeed. The questionnaire established that UWA's practices and aspirations are very similar to those of other institutions and although many of the current practices will continue, many new concepts will be explored based on the information provided. UWA wishes to continue to offer semi-flexible payment options and methods whilst aiming to maintain accurate and efficient credit control and debt management functions. UWA also wishes to achieve and maintain high standards in performance and efficiency and in the overall service provided. These aims will be achieved by implementing the proposal and by adopting new practises to evolve with future developments and to deal with the dynamic nature of student fees.

Appendix A

Current MIS Hardware Profiles
**Prospective developments**

Misys
(Sequent Server)
QL-x
qlxuser(registry
PC)
Databases

Mickey
(Sun server)
QL
ql login
qlhost
accom smb share
(M:)

Minnie
(Sun server)
www.mis.aber.ac.uk
www.astra.aber.ac.uk
www.students.aber.ac.uk
mis & astra to become
www.mis.aber.ac.uk

Firewall

Firewall

ABER

Firewall

ABER
network

DB1 (DELL)
ORACLE
ab7, ab7t
S/W
Netbackup

DB2 (DELL)
ORACLE
qlt, fin , fil
S/W
Netbackup

APP1
(DELL)
Test/spare server
Netbackup

APP2 (DELL)
www.students
Netbackup

APP3 (DELL)
ORACLE 9iAS
1.0.2.2.2
netbackup
www.mis

WIN 2000
(DELL)
Datacentre
Master Server

Fibre switch

Fibre switch

SDLT Backup
Device

SAN Disk
ORACLE
Datafiles

Appendix B

MIS Databases

Name	Status	Application
ab7	live	Students, Admissions, Card System, Accom, Study Schemes, Modules
ab7t	test	Students, Admissions, Card System, Accom, Study Schemes, Modules
fin	live	QL / QL-x
qlt	test	QL / QL-x
fil	live	QL / QL-x (new code structure)
cyl	live	Cyborg (Staff/Payroll)
cyt	test	Cyborg (Staff/Payroll)

Appendix C

**Current MIS Applications
Data Transfer Diagram**
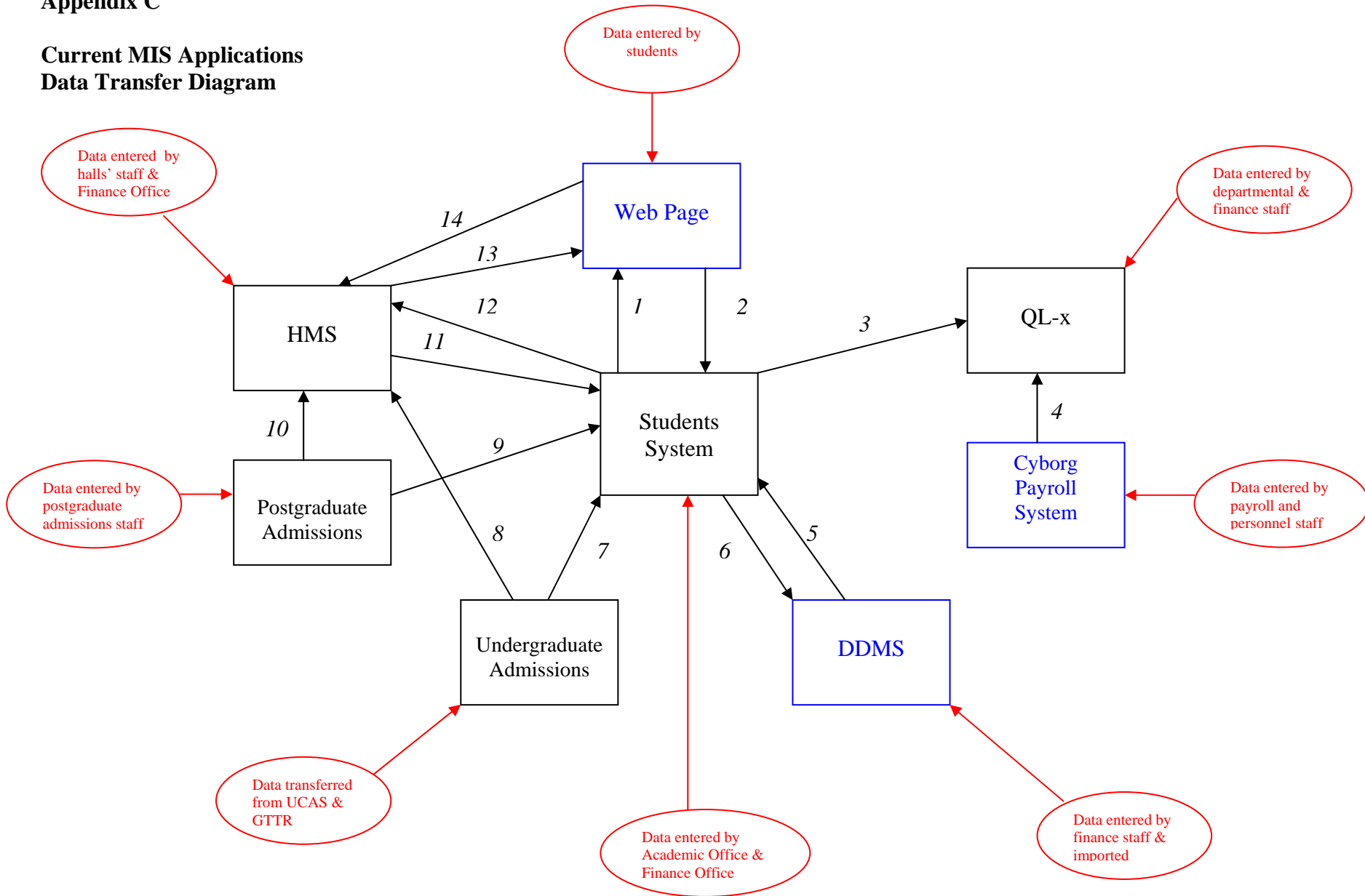
Red denotes who inputs or transfers data to each system
Blue denotes non MIS applications
Black denotes the MIS applications and the data transferred between all systems

40

Appendix C continued

Data Transfer Labels

1.   Changes of personal details such as correspondence address etc

2.   Registration information, examination results, personal details held

3.   Tuition and accommodation fee income and expenditure

4.   Salary information, including employer's NI etc

5.   Direct debit payments made, dishonoured payments, status of instructions etc

6.   Bank account details, correspondence details, payment schedules, deposit refunds etc

7.   Undergraduate applicants' records when complete

8.   Undergraduate applicants' records from application stage to completion stage

9.   Postgraduate and distance learning applicants' records when complete

10.   Postgraduate applicants' records from application stage to completion stage

11.   Resident information such as hall address, hall fee invoicing information etc

12.   Accommodation fee direct debit status, deposit balance etc

13.   Private accommodation information and on-line application forms

14.   Submitted application forms for residences

Appendix D

Sample from Tuition Fee Table

This displays a sample of tuition fee flags with their descriptions and the corresponding fee, general ledger code and mode of study.

Appendix E

Sample from Accommodation Fee Table

This is a sample of the hall fee table. The hall 'Cwrt Mawr' is displayed with the different termly fees due and the corresponding daily rates.

Appendix F

**Proposed System Functions
Data Transfer Diagram**

Data entered by students

Data entered by halls' staff & Finance Office

Data entered by departmental & finance staff

Web Page

14

13

12

11

3

HMS

QL-x

1   *2*

4

AStRA

5

6

Cyborg Payroll System

Data entered by payroll and personnel staff

Data entered by Academic Office &Finance Office
Data transferred from UCAS & GTTR
Data entered by postgraduate admisiissions

8   *7*

10   *9*

DDMS

Data entered by finance staff & imported

Red denotes who inputs or transfers data to each system
Blue denotes non MIS applications
Black denotes the MIS applications and the data transferred between all systems
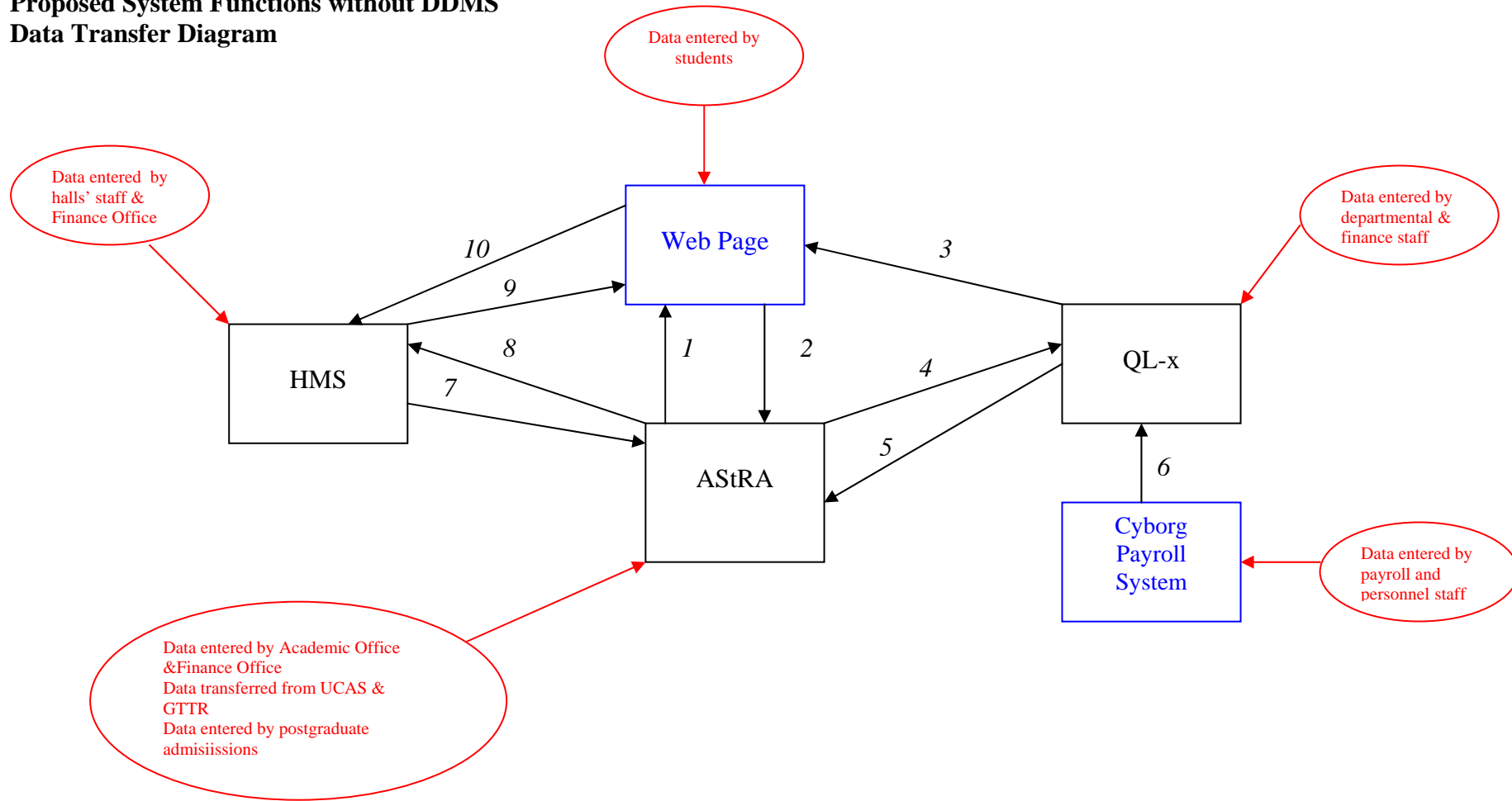
44

Appendix F continued

Data Transfer Labels

1.   Registration information, examination results, personal details held

2.   Changes of personal details such as correspondence address etc

3.   Students' financial history and status

4.   Students financial records such as fee flag, hall, fee charges, university e-mail status, addresses, direct debit status, transactions, student full name, reference number etc

5.   Student debtor information for debt management functions, e.g. for imposing sanctions such as withdrawing computer facilities and flagging debtors prior to registration etc

6.   Salary information, including employer's NI etc

7.   Credit balances for BACS refunds

8.   Direct debit payments made, dishonoured payments

9.   Status of direct debit instructions

10.   Bank account details, correspondence details, payment schedules, deposit refunds etc

11.   Resident information such as hall address, hall fee invoicing information etc

12.   Accommodation fee direct debit status, deposit balance etc

13.   Private accommodation information and on-line application forms

14.   Submitted application forms for residences

**Proposed System Functions without DDMS
Data Transfer Diagram**

Data entered by
students

Data entered by
halls' staff &
Finance Office

Web Page

Data entered by
departmental &
finance staff

10

9

3

HMS

8

1   2

QL-x

7

4

5

AStRA

6

Data entered by Academic Office
&Finance Office
Data transferred from UCAS &
GTTR
Data entered by postgraduate
admisiissions

Cyborg
Payroll
System

Data entered by
payroll and
personnel staff

Red denotes who inputs or transfers data to each system
Blue denotes non MIS applications
Black denotes the MIS applications and the data transferred between all systems

Appendix G continued

Data Transfer Labels

1.   Registration information, examination results, personal details held

2.   Changes of personal details such as correspondence address etc

3.   Students' financial history and status

4.   Students financial records such as fee flag, hall, fee charges, university e-mail status, addresses, direct debit status, transactions, student full name, reference number etc

5.   Student debtor information for debt management functions, e.g. for imposing sanctions such as withdrawing computer facilities and flagging debtors prior to registration etc

6.   Salary information, including employer's NI etc

7.   Resident information such as hall address, hall fee invoicing information etc

8.   Accommodation fee direct debit status, deposit balance etc

9.   Private accommodation information and on-line application forms

10.   Submitted application forms for residences

Bibliography

The techniques used in this project are commonplace in commercial information systems developments and the application area is on in which the fundamental principles are long established. The reader who is unfamiliar with either of these will find them well described in any of the many standard texts.

The following bibliography consists exclusively of website addresses because these are the only places where information about the product in use and the context of the application is to be found. I have annotated the web site addresses to explain the relevance of each.

[1] *http://www.inf.aber.ac.uk/mis*

MIS homepage.

[2] *http://www.inf.aber.ac.uk/mis/about*

Provides background information relating to MIS.

[3] *http://www.inf.aber.ac.uk/mis/news*

Provides current news and information regarding MIS services and applications.

[4] *http://www.inf.aber.ac.uk/mis/requirements*

Provides the hardware and software requirements of the MIS applications.

[5] *http://www.inf.aber.ac.uk/mis/user_guides*

Provides information on how to become a user of the MIS applications etc.

[6] *http://www.inf.aber.ac.uk/mis/curent_systems*

Lists the current MIS systems and provides a brief introduction to each system.

[7] *http://www.inf.aber.ac.uk/mis/academic.asp*

This is where students can access and update their personal information held on the system and can view examination results.

[8] *http://www.astra.aber.ac.uk*

Provides information relating to AStRA however it is only accessible to authorised personnel.

[9] *http://www.mis.aber.ac.uk/user_guides*

Provides information relating to MIS applications user guides. Again this is only accessible to authorised personnel.

[10] *http://www.inf.aber.ac.uk/mis/LECT_CS10810.html*

Provides some information regarding the history of MIS, the MAC initiative and subsequent developments.

[11] *http://www.aber.ac.uk~ccuwww/mac/Restrict/stud_tables.html*

Lists all Student System data tables and their definitions.

[12] *http://www.inf.aber.ac.uk/news/may98.asp*

This is a Newsletter from May 1998, which provides background information relating to the history of MIS and its applications.

[13] *http://www.inf.aber.ac.uk/central/strategicplan/asp*

Provides information relating to the development of the University's Information Services department from 1997 to 2005

[14] *http://www.inf.aber.ac.uk/stats/*

Provides statistical information regarding the usage of UWA's central systems.

[15] *http://www.distinction-systems.co.uk*

This is Distinction's home page. Distinction is the software company who supplies QL.

[16] *http://www.distinction-systems.co.uk/docs/pdf/QLF%*

Provides general information relating to Distinction's financial package and related modules.

[17] *http://www.distinction-systems.co.uk/docs/pdf/QLF_general/Accounts%*

Provides information regarding QL's Accounts Receivable module.

[18] *http://www.distinction-systems.co.uk/docs/pdf/QLF_general/cash%*

Provides information regarding QL's Cash Book module.

[19] *http://www.distinction-systems.co.uk/docs/pdf/QLF_general/General%*

Provides information regarding QL's General Ledger module.

[20] *http://www.distinction-systems.co.uk/docs/pdf/QLF_general/Sales%*

Provides information regarding QL's Sales Invoicing module.

[21] *http://www.distinction-systems.co.uk/Education*

Provides information relating to Distinction's academic package and related modules.

[22] *http://www.distinction-systems.co.uk/docs/pdf/QLS_general/QLS%20HE%*

Provides information regarding QLS, the Students package and modules.

[23] *http://www.distinction-systems.co.uk/education/Higher%Education/QLS%20HE%20Information*

Again provides information regarding QLS

[24] http://www.abm-ltd.co.uk

This provides general information regarding Albion Business Machines

[25] http://www.abm-ltd.co.uk/products/ddms

This provides information regarding the Direct Debit system DDMS

[26] University Grants Committee (1989) Reports on the Management and Administrative Computing Initiative, Volume 1, Management Overview.