

Computerisation of the University of Malaya Library (UML): Issues of Implementation

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Abstrak: Perpustakaan mula melaksanakan projek pengkomputerannya pada Januari 1991. Pelaksanaan sepenuhnya akan melalui 2 fasa. Fasa I meliputi pemasangan dan pengendalian sistem komputer VAX dan perisian perpustakaan ATLAS. Sebanyak 100 buah terminal akan dipasangkan dalam sistem Perpustakaan untuk dihubungkan kepada sistem komputer melalui rangkaian seluruh kampus. Fasa II akan melibatkan beberapa peningkatan kepada ingatan, storan dan peralatan sampingan lain supaya sistem komputer dapat menampung keperluan 300 terminal. Ini termasuk terminal tambahan di perpustakaan cawangan, dan juga di fakulti dan jabatan lain di kampus yang ingin berhubung dengan rangkaian perpustakaan ini. Fasa I yang sedang dijalankan dilaksanakan secara 'turnkey', dan dijangka siap pada hujung tahun 1991. Tiga bulan pertama dijadualkan untuk kerja persediaan tapak dan pembekalan perkakasan komputer, dan 3 bulan berikutnya untuk pemasangan perisian aplikasi, latihan, ujian dan penerimaan sistem. Sistem akan seterusnya ditinjau dari segi prestasi pengendaliannya dalam keadaan sebenar bagi tempoh 6 bulan hingga hujung tahun 1991. Setakat ini, semua kerja dijalankan mengikut jadual, kecuali sedikit kelewatan tentang kerja 'outdoor cabling' diakibatkan kekurangan kabel tertentu. Pelaksanaan perisian ATLAS akan mengutamakan kepada modul-modul yang akan membawa manfaat yang ketara kepada pengguna secara amnya. Untuk melaksanakan projek yang besar seperti ini, masalah pasti timbul, tetapi semua sudah diselesaikan secepat mungkin.

Abstract: The Library started implementing its computerized integrated library project in January 1991. The complete computerization of the Library is envisaged to take place in 2 phases. Phase I encompasses the installation and operation of the VAX computer and the ATLAS integrated library software. A total of 100 terminals distributed within the Library system will be connected to the main computer system in a campus-wide network. Phase II will involve some upgrading to the hardware configuration in terms of memory, disk storage, and other ancillary equipment to accommodate up to 300 concurrent users to the system. This includes the additional terminals for the branch libraries as well as the links from users in the various faculties, departments to the library network. Phase I which is currently in progress is being implemented on a turnkey basis, and is scheduled for completion by the end of 1991. The first three months have been scheduled for site preparation and delivery of the computer hardware, followed by three months of application software installation, training, testing and acceptance of the system. The system will be monitored in actual operation for the next 6 months till the end of 1991. Work has been going on according to schedule, save for an anticipated delay in the outdoor cabling work due to a shortage of the required cable. Implementation of the ATLAS software will focus on getting some modules to become operational as early as possible, to allow library users in general to enjoy tangible benefits from the computerization project. Problems in implementing a big project like this is inevitable, but to date all have been speedily resolved with the vendor.

So the contract is finally signed, and we can now see the light at the end of the tunnel. It has been a long, long wait for this moment. It has also been an exercise of patience, tempered with periods of anxieties and frustrations. But in reaching this moment, is it the end or the beginning of another ordeal?

Hardly had the ink on the contract dried, anxious librarians were asking as to when the computers would be moving in. There was a lot of preparatory work to be done before the first pieces of equipment rolled in. The whole project is to be implemented on a turn-key basis. Everything that is going to take place had all been time-tabled

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according to an agreed schedule. In the project the ATLAS (A Total Library Automation System) integrated library package developed by Data Research Associates, Inc. (DRA) of the United States, will be implemented to run on Digital Equipment Corporation (DEC) VAX 6410 minicomputer. All the libraries in the UML System will be linked up in a campus-wide network.

The Exhibition

The signing of the agreement for the purchase of an integrated library system, is a milestone event in the history of UML. All the efforts made in the last 15 years or so is soon to bear fruit. The event too was eagerly awaited by the successful vendor to whom the tender was awarded. Their successful bid for the tender was not merely another sale, but the importance lies in the fact that this was going to be the first installation of the ATLAS software in the country. Moreover, the University of Malaya Library is the oldest and largest academic library in the country and, the system that was going to be implemented with 100 terminals is by far the single largest computerized library system in the country.

The Library was equally glad the tender award had been finalised. Besides the news carried in the newspaper, the Library intended to keep the users informed of the changes about to take place with computerization, and more importantly what benefits it will bring them. Towards this end, the Library set up a committee to plan for an exhibition on the computerization project. The committee went about its task in earnest and had an exhibition ready by the end of February 1991. The exhibition traces the history of computerization in UML, gives information on the hardware, software and networking components of the library system. The exhibits also include the implementation schedules and books on library computerization. The exhibition will run for the duration of the implementation of the library system until it is fully operational by the end of 1991.

Phases of Implementation

Computerization of UML system can be divided into two main phases as follows:

Phase I - Establishment of a complete integrated library system comprising the installation of the hardware and application software with 100 terminals hooked up.

Phase II - additional terminals to be linked (up to 300 in all); memory upgrade and additional disk storage.

Phase I

The first phase of the implementation is basically to establish an operational integrated library system to handle most of the important day-to-day work processes within the UML system. All the hardware and the software to facilitate this would have been installed within this phase. A total of 95 terminals as well as 5 microcomputers which can be used in terminal emulation mode, would be hooked up to the computer system. Initially, all these terminals and microcomputers will be distributed within the library system only, comprising the Main Library and all its branch libraries. External links to the National Library of Malaysia and the Malaysian Institute for Microelectronics System (MIMOS), which are two mandatory requirements, will also be established within this phase.

This first phase of our computerization which is currently in progress can itself be divided into the following sub-phases:

- 1) site preparation
- 2) delivery of equipment and installation of the system software
- 3) installation of the application softwares
- 4) downloading the bibliographic databases and training
- 5) testing and commissioning of the system
- 6) system monitoring

Site preparation and delivery of equipment were scheduled to be completed over a three-month period. Installation of the application software and downloading of the bibliographic database for testing were scheduled for the next three months, with full acceptance and commissioning of the complete system at the end of that period should all tests be successfully carried out in accordance to the agreed specifications. A six-month period of monitoring follows from the Acceptance Date in which the system will be observed as to its performance in an actual 'live' environment. It was coincidental that the agreement to the tender award was signed at the end of December 1990. It allows for ease of monitoring the implementation schedules which should be as follows:

By March 1991 - site preparation and delivery of hardware equipment would have been completed

By June 1991 - the application software would have been installed, the bibliographic records downloaded and testing of the library integrated system would have been completed and commissioned

By December 1991 - Barring any hitches, the system would have been monitored with regards to its performance in actual operation, and the vendor would be deemed to have successfully executed the terms of the agreement.

Refer also to the chart as shown in Fig. 1. Come the end of 1991, and barring any unforeseen delays, a fully functional integrated library system would be in operation.

Site Preparation

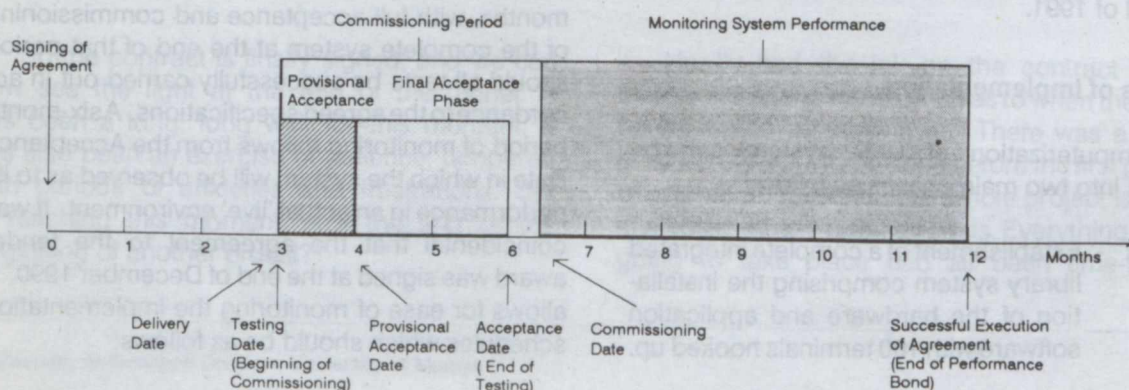
This phase of implementation pertains to the preparation of the computer room, laying of the Ethernet cable within the Main Library, indoor cabling works within the Library system to hook-up all the terminals servers, modems, multiplexers and the terminals. This phase also encompasses the outdoor cabling work which required the laying of 0.9mm data communication cable around the campus to facilitate communication between the computer system in the Main Library to all the other branch libraries.

Preparation of the computer room and laying of the Ethernet backbone as well as other indoor cabling works were undertaken by Digital Equipment (Malaysia), the supplier of the Digital hardware system. This gave added confidence to the Library, because of Digital Equipment's reputation, not only in the performance of their VAX computer system but also their strengths in computer networking. Work began in January and was completed on schedule by the end of February.

While the work was in progress, there was no drastic interruption to the normal library activities. Save for the first few days when part of the walls in the designated computer room had to be broken down, the noise and dust resulting from the activities of the workers were at an acceptable level. In this aspect, a pre-site preparation meeting with the vendor and their contractor had proven to be very useful. At the meeting the contractor was asked to cooperate by trying to minimise the level of noise and dust pollution while carrying out their work. The Library was particularly concerned also because the students were preparing for their final examination and the Library was fully occupied during this period.

At the same meeting the vendor and their contractors also had the opportunity to meet with personnels of various departments of the University to which they would have liaison. The University Chief Security Officer briefed them on the protocols for the workers to follow while in the university premises. The University's civil and electrical engineers were present to advise on standard work protocols to ensure, for example proper place for keeping building materials, disposal of construction wastes etc. The electrical engineer advised on standard procedures required for electrical wiring, laying of cable trunking and

Fig. 1. University of Malaya Library Computerization Implementation Critical Path



placement of switch boxes. At the same time the vendor was able to communicate to the electrical engineer the power supply requirements of the computer system and the need to pull a 60 Amp submain supply line for the computer system.

Although this is a turn-key project, the University's Estate Office lent their staff to supervise the initial stage in the site preparation of the computer room. This had been done to ensure that the contractor's workers carry out their work in accordance with agreed procedures with regards to the disposal of waste, taking care to salvage usable items like doors, wood panels and glass panes to be returned to the Estate Office.

Regular meetings were held with the vendors to allow each side to voice any problems that might have arisen as work progressed. There has been no serious problems and whatever issues brought out were quickly resolved.

Delivery of Equipment

The VAX computer and all its ancillary equipment were delivered well ahead of schedule. There was no doubt that the supplier, Digital Equipment (M) Sdn. Bhd., was all ready to move as soon as the contract was signed. In fact the machine was ready to be flown in from the United States at very short notice, but owing to the unforeseen delay in the negotiation over the contract, the equipment had in fact been kept in store until the official order was made.

The computer was switched on for the first time on the first week of March and has been in operation since. The VMS operating system was installed and the disk drives, tape drives and printers had been configured. The Ethernet cable was tapped at appropriate points for connection to the terminal servers. This made it possible for some terminals to be hooked up. Currently some terminals in the Cataloguing Unit, the Acquisition Unit and Automation Division in the Main Library have been hooked up to the computer system.

Application Software

Soon after the computer system went 'live', the application software was installed, by the second week of March, and downloading of UML bibliographic records from the MALMARC (Malaysian MARC) database was successfully completed two weeks later. A total of 98,120

records were downloaded. A smaller file containing records for serials from the PERPUNET database was also merged into the ATLAS database. Tapes containing the name authority records in the MALMARC database have been received and will be downloaded.

Since a few terminals have been hooked up to the main computer system, the cataloguing and acquisition librarians have been able to get 'hands-on' experience using the ATLAS software package and creating records in a demonstration database. Staff from other divisions within the Main Library too would be able to do likewise as soon as more terminal servers and terminals are hooked up. However, hands-on training at the vendor's premises have also been arranged so that librarians can familiarize themselves with the use of the ATLAS software, and have the benefit of assistance from the vendor's supporting staff. Formal training on the use of the ATLAS software has also been scheduled, and will be conducted on-site.

While we envisage that all modules would be operational by the end of the year, there is some degree of prioritisation as to which module becomes operational first. The Cataloguing module should definitely take precedence, to allow for the creation of the bibliographic databases, as well as to facilitate retrospective conversion of the card catalogue. At this point in time, the Cataloguing module has been the most studied and tried out and thus the best understood amongst the modules. Even well before the installation of the ATLAS software, the Chief Cataloguer has been untiring in her efforts to make a comparison between the new method of inputting in the LCMARC format as opposed to the MALMARC format with which all our cataloguers are more familiar. Those areas where input conventions differ have been noted, and new input forms have been designed to incorporate those differences. Briefings had been given to all cataloguers from the whole library system on the major differences and the new conventions to be observed for input. With this it is hoped that the transition from MALMARC to LCMARC or ATLAS MARC would be a less painful experience. However problems remain that still need to be resolved.

The Circulation module is considered with some priority for implementation. A major constraint to the full implementation of the circulation module, is that only about one-sixth of the Library's bibliographic records is in machine-readable format,

and those already in that format need to be inventoried. However, this will not deter us from bringing the circulation module into operation as soon as is feasible, while at the same time efforts are being made to convert the card catalogues as soon as possible. The effort to implement the module is facilitated as the Main Library collections have been completely bar-coded since 1989. To date, the testing of the circulation module has been hampered by the problems encountered in setting up the complete circulation policy file. This task is almost completed, and it is hoped that the module can be tested before the end of May 1991.

The Library plans to make the OPAC (Online public access catalogue) module accessible to the users as soon as possible. This should not be too much of a problem as the information in OPAC is very much dependent on the information captured at the stages of cataloguing and acquisition. But it has been given a somewhat high priority for implementation, because together with the circulation module, implementation of these two modules are the ones most likely to have direct benefits to the users. The circulation module allows for faster check-out, check-in, ease of reservation and query on loan-related information. The OPAC also allows ease of querying the catalogue and gives the user more information about the status of a book.

The Library will be sensitive to the needs of the users in its implementation schedule, and wishes the users to enjoy some tangible benefits from computerisation. Computerisation must not be seen as benefiting the librarians only, but it should have immediate positive impact to the library users as well, in terms of better and more efficient service.

Testing and Monitoring the Library System

Testing of the Library system concerns testing both the VAX computer hardware and the ATLAS software components running in unison, as well as testing the integrity of the library network as a whole and also the mandatory links to the National Library of Malaysia and MIMOS (if the latter two links are possible by then). Emphasis will be on the response time of the system when performing circulation transactions, both when the system is configured for 100 and then 300 concurrent users. A standard benchmark test or some other suitable test protocols to be mutually worked out with the vendor will be used.

The 6-month period of system monitoring following the successful installation and testing of the complete system will give the Library an opportunity to monitor both the hardware and software performance. It is hoped that by the end of the period of monitoring, we would have gone through varying experiences and situations working on an actual 'live' system, to be able to detect any hardware defects, software bugs and any other serious deficiencies in the system as a whole.

Phase II

The second phase envisages some upgrading in the real memory, disk storage and the installation of additional terminals or microcomputers to be linked up to the Library system. In the tender, the vendors had been told to propose a hardware configuration which should be sufficient to cater to 300 concurrent users in all, with minimal or no upgrading to the start-up configuration of the computer system. This means that there should be no adverse degradation in response time whether the system is configured for 100 users initially or 300 users eventually. In the negotiation with the vendor UML had been quite adamant about this, but the vendor is confident that the hardware will deliver given the sizeable memory of 128-MB which has been configured for the Library computer system.

Although the Library does not envisage any substantial upgrading to the system for the next few years or so, it will be realistic to prepare for some upgrading in view of the expanded network to accommodate 300 concurrent users or more eventually. It is hard to imagine how the network will grow and what the demands are going to be like for direct links to the library system from those departments outside of the library system. We expect the growth to be fast, because the Library network is the first really 'big network' that allows staff in many departments for the first time to establish a link to a computer outside of their own department. If not for anything else, it may just be for the mere joy of being able to query the Library catalogues and databases from the comfort of their own rooms or offices, to allow the computer to do the walking, so to speak. Besides the link to the faculties and departments, there will be additional terminals in each of the branch libraries to cater to their needs in both the workroom processes as well as the service points. There is therefore the need for extra modems and multiplexers or even additional

terminal servers. The Library has already addressed all these issues and had made an application for money under the 6th Malaysia Plan to fund such purchases.

The various faculties and departments have already been informed of the feasibility of a link to the library system in the near future, and have been advised to request for funds to acquire the necessary equipment like a terminal or microcomputer, a modem as well as a terminal emulation software to facilitate the link. Already queries have come in from some departments regarding these requirements. The Library, working with the vendor, will advise them on the appropriate equipment in due course. Most departments already possess microcomputers which can be used in the VAX VT320 terminal emulation mode with the use of the Kermit communication software, together with a modem and the telephone line. The only constraint to this link now is probably the shortage of direct telephone lines in the Library to allow many users to dial into the library system simultaneously. The Library has applied for an additional telephone line to test this link feasibility, and at the same time to use it for remote diagnosis of the VAX computer systems by the vendor, as well as to allow us to do electronic mail, be it to another computer installation locally or to an overseas installation like the ATLAS principal in America. More lines will be applied for when the system becomes fully operational.

Vendor Support

An important issue in the implementation of a turnkey library package such as this, is the level of vendor support and the competency of their support personnel in the software. The ATLAS library package is the first to be installed in this country. However, six libraries in Singapore are using it, and support to those installations comes from the vendor's principal office in Singapore. The vendor's personnel in Malaysia supporting UML are relatively new to the package, but the three library specialists, including one senior consultant specially assigned to work on UML project have shown a keen interest to learn and ensure

smooth implementation. Backup support will come from their more experienced colleagues in Singapore who will be involved in the formal training as well. Overall, the Library is satisfied with the commitment of the vendor, and the close cooperation between their support staff and UML librarians augurs well for the Library project.

Problems and Delays

In implementing any big computerisation project, problems and some resulting delay are inevitable. We have our fair share of problems, but none which can be said to be insurmountable. All have been speedily resolved with the vendors. An anticipated delay in our implementation schedule is the problem with the external cabling works. The vendor informed UML in March that there has been some problems sourcing the 0.9mm cables required for the outdoor cabling to link the branch libraries and the Main Library. Supply is reportedly said to be available only in July of this year, which would result in some delay to the schedule for the testing.

Conclusion

By and large the implementation of the UML computerisation project has progressed rather smoothly. Site preparation, cabling works, delivery of equipment and installation of both system and application softwares have gone on as scheduled. The main problem, as mentioned, lies in the current shortage of the 0.9mm data communication cable for the outdoor cabling. Save for one or two months of delay to the original schedule, ILMU (Integrated Library Universiti Malaya) which means *Knowledge* in Malay, and which is the name given to the Library system, is expected to be fully operational by the end of 1991. This will make it the largest fully integrated library system in the whole country. It is also exciting to know that, for the moment, the network infrastructure laid for the library system is also the largest computer network in the university campus.