

COMPUTERIZING UML: A PROTEAN SAGA

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Abstrak: Rancangan untuk mengkomputerkan PUM telah mengambil masa dua puluh tahun sebelum menjadi kenyataan. Usaha-usaha awal pada tahun-tahun tujuh puluhan ditujukan kepada kerja-kerja khusus seperti sirkulasi dan pengatalogan. Pengkomputeran proses-proses pengatalogan dibuat secara luar talian, ragam kelompok dan pemerosesan di luar. Pengkonseptualan pengkomputeran untuk semua proses perpustakaan pada asas terkamir, merangkaikan keseluruhan sistem perpustakaan Universiti, dengan komputer berdedikasi yang bertapak dalam Perpustakaan, hanya bermula pada tahun-tahun lapan puluhan. Ketiadaan peruntukan kewangan telah menyekat perlaksanaannya selama lebih satu dekad. Pada 1989, dengan peruntukan yang secukup daripada Kementerian Pendidikan, PUM berjaya mengeluarkan tender untuk satu sistem turnkey seperti yang diramalkan, dengan rangkaian penyelesaian luar mandatori kepada Perpustakaan Negara Malaysia dan MIMOS. Bagi kejayaan projek ini sehingga tahap ini, Perpustakaan berhutang budi kepada banyak agensi, pertubuhan dan orang-orang individu, tidak ketinggalan juga Jawatankuasa Kecil Mengenai Pengkomputeran Perpustakaan, yang telah berkhidmat kepada PUM selama sepuluh tahun.

Abstract: It has taken twenty years to realize UML's computerization plans. Initial plans in the 1970s were targetted at specific library tasks such as circulation and cataloguing. Solutions for the latter, when realized, were offline, batch mode and meant away processing. Conceptualization for computerization for all library processes on an integrated basis, linking up the total university library system, with dedicated computers sited within the Library, dated from the 1980s. Lack of funds prevented implementation for over a decade. In 1989, with adequate allocation from the Ministry of Education, UML was able to tender successfully for a turnkey system as envisaged, with mandatory external link solutions to the National Library of Malaysia and MIMOS. For the success of the project up to this point the Library remains indebted to many agencies, bodies and individuals, not least of all, its Sub-Committee on Library Computerization, which has served UML for ten years.

The history of computerizing the University of Malaya Library (UML) is a long and convoluted one. Over the twenty years of its implementation, it has seen many changes in terms of

- a) conceptualization and perspective;
- b) scope and function; and consequently,
- c) type, configuration, capability and cost of software, hardware and communications.

Salad Days

The Malaysian professional corps have felt the need for automation from very early days. The magic of automation has long attracted their attention and sustained their interest. Staff at UML have similarly felt the need to computerize the Library.

The first tentative move towards computerization was taken in 1972 when the Library Committee

made available \$7,000 to pay for the services of a Systems Analyst from the University's Computer Centre, to undertake a feasibility study for library automation. The study was to be conducted by a Systems Analyst, Mrs. Lee Sau Lan, who was soon after appointed as a Lecturer at the Computer Centre, became immersed in teaching, and nothing more was heard of the report. However, she had basically recommended that a Systems Analyst be placed in the Library, full-time, to implement plans for automation. Requests were made to the Centre to make available such a person. The Centre, which itself had only a skeletal staff, pleaded a lack of manpower resources. There the matter rested for a couple of years.

In 1974 input from universities in the form of requests for developmental grants was invited. The Librarian made a bid for computerization. He requested \$300,000 under the Third Malaysia Plan,

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1976-1980, for the purpose of automating the work processes of the Circulation Division. Details of the application were as follows:

Alat kelengkapan, alatulis permulaan, kerja memasang dan kerja proses permulaan: \$300,000

Kos perjalanan: \$ 21,000

Source: 'Rancangan Malaysia Ketiga, 1976-80', Letter of the Librarian, Mr Beda Lim to the Bursar, University of Malaya, dated 23 December 1974.

No supporting documents were submitted on specific cost estimates, but equipment and stationery needed were described:

- 'sebuah mesin besar' that is: 'data processing machine' and
- supporting equipment such as 'input devices' and 'read out viewers', and 'light sensitive pens'.
- Bar code labels were indicated as being needed.

This request was again not successful; and computerization plans waned for another five years. With the submission for requests under the Fourth Malaysia Plan, 1981-1985, the Library made a case for \$740,000 for the following configuration:

Perbelanjaan

1. Sistem data catatan dengan 8 cawangan stesen.	\$150,000
2. 2 Disk (250 megabyte)	\$210,000
3. 16 terminal)	
4. 4 pencetak)	\$380,000
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Jumlah:	\$740,000

Source: 'Perpustakaan Universiti Malaya: Keperluan Komputer dalam Rancangan Malaysia Keempat' submitted by the Librarian, Mr. Beda Lim in November 1979.

For the first time an 'online service' was envisaged and it was hoped that both administration of the Library as well as technical processes such as cataloguing, acquisition, serials administration, together with information retrieval and compilation of bibliographies, would be taken care of. For the first time, a computer network between the Main

Library and three branch libraries, the Medical, Law and Institute of Advanced Studies, was conceptualized. This was perhaps more of an expression of desire rather than feasibility, as it is rather unlikely that the above configuration, with machine power at that point in time, could have coped with these demands.

Perhaps the most significant development of the 70's was UML's participation in the MALMARC pilot project. In 1977, a UNESCO expert, Mr. Stephen Massil submitted a report which recommended amongst other things that:

The National Library, in co-operation with the libraries of the five Universities, should set up a Project to use MARC tapes for cooperative processing in Malaysia.

(S.W. Massil, 'Study of the Feasibility of Using Marc Tapes for Co-operative Processing', Restricted Technical Report RP/1975-76/4-221-2, Paris, Unesco, 1977, p.7).

Subsequently a UNESCO grant of US\$35,000 was made available to implement the MALMARC project as a pilot project. In 1977, the MALMARC pilot project was launched with USM as the node and UM, UKM, UPM, UTM and the National Library as participating libraries. With this step the cataloguing of materials in five institutions of higher learning and the National Library was tested under a joint cataloguing scheme with Malaysian MARC standardization. This project was to last a year, February 1978 to October 1979.

Unfortunately UML decided to withdraw from the MALMARC project after the pilot stage. The decision was made on the basis that:

- a) no money could be found to fund UML's participation in the ensuing MALMARC Consortium, and
- b) cataloguers felt that the process was slower than manual cataloguing.

The creation of bibliographic records in machine-readable format which is feasible under MALMARC but not feasible under any manual system seems to have been overlooked. With this decision, UML lost a few good years in data creation via the cataloguing process for the entire system. That this period of 1979-1981 coincided with a heavy period of large expansion in the library stocks made the event even more regrettable.

UML was to rejoin MALMARC only in September 1981 for the beginning of 1982. Participation from MALMARC was to continue until the Consortium ended in late 1990.

The 1980's: Towards Integrated Computer Applications to Library Processes

Where the 1970's were marked by tentative and partial computer solutions to library processes, the 1980's saw UML conceptualizing library computerization on a larger and more integrated scale. By then, computer technology itself had advanced; the availability to the local market of integrated library software packages was apparent. The success of the MALMARC project at USM provided a sound basis for optimism, confidence, and expertise. The early 1980's were marked by a few fundamental developments to computerization, which were to prove vital for UML.

1. **Integration and independence.** Moves were made for computerization, on an integrated basis, of all technical processes of the Library. Information retrieval and open access catalogues were planned. Suitable equipment were not only conceptualized to be dedicated totally to the library project, but were also planned to be located entirely in the Library.

2. **Sub-Committee on Computer Services in the Library** (hereafter called the 'Sub-Committee'. See Appendix I). As computer science expertise was lacking within the ranks of the library staff, and the fact that library computerization for UML on the scale envisaged would mean knowledge of hardware, software and communications, the Library, with the blessing of the Library Committee, established in 1982 a Sub-Committee to advise it on all matters related to computerization. To the relief of the Library, Professor Lee Poh Aun, Professor of Mathematics, and then the Head of the Mathematics Department, who had wide-ranging experience and interest in computer applications, consented to be the Chairman. Input from the Faculty of Engineering and the Computer Centre were sought, and to the gratitude of the Library, were given. At that point in time, it was thought that the Sub-Committee would have a lifespan of a few years in an advisory role, giving their expertise

to planning and implementation, which then seemed imminent. Little were the members to know that their services would be constantly called upon, in literally hundreds of meetings - over the next ten years!

3. **MALMARC rejoined.** In late 1981, UML rejoined the MALMARC consortium; with 1 January 1982 as the effective date. By the time UML's system is commissioned in 1991, some 100,000 machine-readable records created under MALMARC participation will be available for consultation.

Tender exercises

UML has been one of those unfortunate libraries which have had to undergo two massive Tender exercises (both of which were anything but tender!) and innumerable requests for minor funding in-between the two exercises, most of which were unsuccessful.

The year 1984 saw the first slice of welcome news: \$300,000 had been approved for library computerization under the Fourth Malaysia Plan. The Sub-Committee immediately met to draw up a comprehensive and detailed set of specifications for a Tender exercise. The specifications were approved by Malaysian Administrative Modernisation and Manpower Planning Unit of the Prime Minister's Department (MAMPU); the Tender was advertised; demonstrations of hardware and software were held with all tendering vendors; and the Tender was evaluated by August 1985. Unfortunately, Library expectations of their funding far exceeded the realities of the market as provided by the vendors. No viable solution was possible within the allocation. Sadly, the Tender was allowed to lapse; and the Library was back to the drawing board.

Interim period 1986-1987

While waiting for more manna to fall, UML pressed forward with its plans, feeding on hope and sustained by the surprisingly tenacious and infectious enthusiasm of its Sub-Committee members! This was despite the clear message from University authorities that:

- a) no funds would be available from the University of Malaya
- b) no funds were also available from outside the University to help the project along.

UML thus made do with the purchase of a few microcomputers. These were obtained from funding generated by the Library itself: through sale of library publications, photocopies, microfiche and microfilm. Even sums from the lowly scrap paper sales were not spared, but were added as drops of financial support to the Library's 'Sundry Account' which was to be sole source of funding towards the purchase of PCs and printers.

If such purchases were not impressive, they at least served a very useful purpose. They provided the professional staff with the necessary tools for experimentation with different software packages, and experience in database creation. As important, they afforded different categories of general staff: clerks, typists and others, with hands-on computer knowledge. Hence, experience with input and output of data; executing relevant computer commands; and intensive use of basic software packages such as Wordstar, dBase and CDS/ISIS over a period of time have served to make the library staff less fearful of machines and more willing to learn newer and more advanced functions. By the time UML commissions its CPU for overall computing, the staff would have had almost six years of training at these independent micro stations.

1988-1990

The realization of modern computerization for UML rests entirely on one historic meeting between YB Datuk Seri Anwar Ibrahim, then the Minister for Education, Malaysia, with Heads of all local institutions of higher learning to which all the Librarians were also invited to attend. The meeting was called by the Minister on 22 August 1988 to coordinate the use of libraries in local institutions of higher learning.

The historic decision taken by the Meeting emanated from the Chair and in essence stressed the need for wider computer applications in all these academic libraries, including networking with each other, with the National Library and with the Malaysian Institute for Microelectronic Systems in the Prime Minister's Department (MIMOS).

The Acting Vice-Chancellor, Prof. Khairuddin Yusoff, acted upon this decision, and in a letter of 4 November 1988 requested the Ministry of Education's help. The Ministry responded magnificently. On 17 January 1989, the Ministry approved the application for automation by the Library, University of Malaya, the oldest academic library in the country, and the most backward in terms of computerization, being the only academic library to have had many plans, but no machines worth talking about!

The Sub-Committee once again swung into action. A new set of Tender specifications were drawn up to reflect expanded needs and the new technology available as at 1989; and basic guidelines and procedures established for subsequent evaluation of the Tender. By the beginning of February 1989 the 40-page 'Specs' were ready; and on 16 February 1989 the Tender was advertised. On 6 March, an open briefing was held for all likely and interested vendors who met the Sub-Committee, the Library, the Estate Office and Bursary officers to clarify various aspects of the Tender and its specifications. The principal point made by the University was that the Tender was for a **turn-key system**: the successful Tender must offer an integrated solution to all library processes on a turnkey basis. The Tender closed on 22 March 1989; and demonstrations by all eight tendering vendors were held between 13 April to 18 May 1989, which were attended by library professional staff and Sub-Committee members. Subsequently, the Sub-Committee devolved into a Tenders Evaluation Committee (hereafter called 'the Committee'). For this part of the exercise, an invitation was extended to the Bursar, whose representative was able to render invaluable advice on financial procedures. The Director of the Computer Centre also kindly accepted the invitation to serve and was able to impart professional expertise.

Evaluation of the Tender was basically split into three parts:

- i) Evaluation of the software (which carried the heaviest weightage), was done by the Library professional corps.
- ii) Evaluation of hardware, and
- iii) Evaluation of communications solutions offered by the vendors were done by those members of the Committee who had the relevant expertise.

Evaluation of the Tender was undertaken purely as a technical exercise and the Committee did not take financial implications as a consideration to weigh in favour of or against any vendor. The 'Report of the Tenders Evaluation Committee, Library, University of Malaya' was submitted to the University authorities in August 1989. In between the Committee had to seek clarifications from vendors, who often had to refer back to their principals abroad; work out criteria for evaluation; and prepare the Report. MAMPU's approval was obtained in June 1989.

The configuration and capability of the System is described below. It is sufficient here to note one significant difference between UML's Tender Specifications and those of other libraries. UML made it a mandatory condition for the successful vendor to provide satisfactory linkage solutions with two external agencies: the National Library of Malaysia and MIMOS as the latter is designated the nation's future coordinator for networking research databases and information.

The University authorities gave the matter priority consideration. By the end of August 1989 the Tender Board had considered, met and awarded the Tender; and a Letter of Intent issued to Computer Base Sdn. Bhd. to acquire the ATLAS software package and the Digital VAX 6410. By November 1989, all further negotiations had been undertaken and the Tender was awarded on 9 November 1989. In preparation for the tasks ahead, the Library formally established its Automation Unit in October 1989, with Mr. Teh Kang Hai, who had *de facto* been working as the Secretary to the Sub-Committee and the Committee since 1982 with total professionalism and dedication, as the Head of the Unit, without any form of remuneration.

Into the 1990s

If the Library thought that the first year of the new decade would see UML automated, it was again disappointed. Once again, echoing its chequered history, UML ran into more delays. Chief amongst the problems was a series of protracted discussions over the nitty-gritty of each and every clause of the Sales and Purchase Agreement.

By this time, the long-suffering Sub-Committee on library computerization (to advise on computerization), alias the Tenders Evaluation Committee (to evaluate the Tenders exercise), alias the Ten-

ders Negotiation Committee (to get the best deal for the Library), was charged with the ensuing task of ensuring that a Sales and Purchase Agreement would be drawn up which would best protect the future interests of the Library. For this part of the exercise, the Committee and the University lawyer performed yeoman service.

Endless meetings and innumerable drafts later, UML faced further delays while awaiting the outcome of a corporate takeover involving one of the vendor-parties. All these events served to delay the exercise by a whole year. Finally, on 26 December 1990, at a simple 20-minute signing ceremony, the Acting Vice-Chancellor, Dr. Hj. Mohamed Taib Osman signed the Sales and Purchase Agreement on behalf of the University, witnessed by Tunku Shamsul Bahrin, a member of the University Council, as is required by the financial procedures of the University. Sub-Committee/Committee members who were able to attend included the Chairman, Professor Lee Poh Aun; Associate Professor Dr. K. Arichandran, Mr. Jimmy Chong of the Computer Centre; Mr. Hubert Kok, the Acting Bursar; Mr. Teh Kang Hai, Head of the UML's Automation Unit; and the Librarian.

Concluding Remarks

In the early 1970's, computerization was envisaged as a piece-meal solution tackling one or the other process. Solutions were offline, batch-mode, and envisaged as using computers located outside the Library: at the University's Computer Centre, or at other locations. In part this situation was determined by the state of technology; influenced and guided by solutions adopted by other libraries; and restricted by the availability of funds and machine models available in the Malaysian market at that time. However, in part, a certain lack of foresight and courage within the Library was also evident, thus opportunities were not maximized.

By the time UML's vision expanded, so had the financial responsibilities of the Government. Education at all levels had to be increasingly supported; economic pessimism consequent to the 1974/75 and 1985 recessions prevailed; and UM's halcyon days for funding were over as it had long ceased to monopolize the higher education scene. This was the period coinciding with UML's plans to automate all processes within the Library on an integrated basis and network all branches, providing online-access for the total system.

The late 1980s marked a more mature period of planning, supported by better communications solutions and computer technology. Thus computerization for the future was planned not only on an integrated basis and networking all seven branch libraries, but also to link up with eighteen Academies/Centres/Faculties/Institute; eight student hostels; and all administrative departments on campus: altogether a feasibility for 100 terminals in the first phase; 300 in the second.

Finally, links with external agencies such as the National Library and MIMOS is mandated. Through MIMOS via networks such as JARING (Joint Academic and Research Integrated Networking Project) UML will eventually be linked in one way or another with all major research points within the nation.

No documentation can capture the vast amount of work that has gone into UML's computerization project; or reflect truly the agony and stress, the

frustration and disappointment throughout the project, or the joy and jubilation and sweet relief at the signing of the Final Agreement. To arrive at this point, the Library has enjoyed the kindness and cooperation of many. They have given freely of their time and ungrudgingly of their expertise. They have borne with us all manner of setbacks and delays with patience and good humour, as the Chairman's opening remarks testify. We are totally in their debt; and to all of them, we say a heartfelt '*Terima kasih; kecil tapak tangan nyiru kami tadahkan*'.

Much more work now needs to be done. Ahead too, will certainly lie further sloughs of despond. The Library is ready to accept those challenges, for no staff surely should be better prepared. And why should we not be? Our Sub-Committee/Committee members have reavowed their readiness to help - only this time it will be to help the Library implement the project! Some people just never learn!

Appendix I

Subcommittee on Library Computer Services (As established in April 1982)

Chairman: Professor Lee Poh Aun (Head, Department of Mathematics)
Members: Mrs. Khoo Siew Mun (Chief Librarian)*
Dr. Mashkuri Haji Yaacob (Faculty of Engineering)
Assoc. Prof. Ang Ha Ming (Faculty of Engineering)
Assoc. Prof. Lim Jit Chow (Faculty of Engineering)
Raja Noor Ainon Raja Zainal Abidin (Computer Centre)
Mr. Jimmy Chong How Liang (Computer Centre)
Dr. Nah Soo Hoe (Institute of Advanced Studies)

Note: * Also acted as Secretary to the Subcommittee

Subcommittee on Library Computer Services* (As at submission of the Tender Evaluation Report on 9 August 1989)

Chairman: Professor Lee Poh Aun (Professor of Mathematics)
Members: Mrs. Khoo Siew Mun (Chief Librarian)
Assoc. Prof. Dr. Mashkuri Haji Yaacob (Director, Computer Centre)
Assoc. Prof. K. Arichandran (Faculty of Engineering)
Mr. Hubert Kok (Deputy Bursar)
Mr. Jimmy Chong (Computer Centre)
Mr. Yew Kok Meng (Computer Centre)
Secretary: Mr. Teh Kang Hai (Head, Automation Unit, UML)

Note: * This Subcommittee also served as the Tenders Evaluation Committee