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# **Integrating libraries across continents: A case of Aga Khan University's nine libraries in five countries**

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## ***INTRODUCTION***

The Aga Khan University (AKU) is perhaps the only university throughout the developing world that is serving through eleven campuses spread across eight countries and three continents. It has a network of nine libraries, although small in size, in five countries in three regions (South Asia, East Africa, and the UK). The university has recently implemented a library management system to integrate all libraries using single shared database.

The purpose of this study is to share Aga Khan University Libraries' process of Integrated Library System (ILS) selection, project initiation and planning, system implementation including installation to data conversion and migration to training, and impact on skill development of library staff. Following a one-year selection effort, Symphony was chosen as the new system for AKU libraries. This study also describes the challenges faced by staff and the mitigation strategies. A comprehensive review of selection to go-live efforts is described including system and client configuration, functional testing and problem reporting. Training and lessons learned is also part of this study.

After successful implementation of the system, nine AKU libraries are sharing their resources from different geographical locations i.e. Pakistan, Kenya, Tanzania, Uganda and the UK. There is a single search interface to see library holdings of each or all AKU libraries. Eventually it is very helpful for resource sharing and interlibrary loan process. Users of AKU are very happy to see a new user-friendly interface. They are enjoying the empowerment to renew and hold their books remotely through web-based secured login. Also they are able to receive alerts for overdue and new arrivals in their respective fields. With the implementation of this new system, the internal processing activities of libraries are improved and library staff across continents is following same processes and helping each other. They are also learning new standards adopted in this system.

## ***Methodology***

Qualitative research method (case study) through direct observation and interviews was adopted for this study.

### ***Originality/value of paper***

This may be a unique experience of implementing a single server-based integrated library system in multiple locations that are spread over five countries. Keeping in view the complexity of geographical locations, multilingual collections, different time zones, and diversity of staff involved, one can consider it a unique occurrence in the field of library and information science.

### ***Abstract:***

The Aga Khan University (AKU) is perhaps the only university throughout the developing world that is serving through eleven campuses spread across eight countries and three continents. It has a network of eight libraries, although small in size, in four developing countries in two regions (South Asia and East Africa). The university has recently implemented a library management system to integrate all eight libraries in four countries using single shared database. The purpose of this paper is to share our experience of implementing this industry standard state-of-the-art library system. The geographical location of AKU libraries and multilingual collections makes this experience more significant. Keeping in view the complexity of geographical locations, multilingual collections, different time zones, and diversity of staff involved, one can consider it a unique occurrence in the field of library and information science.

Keywords: Library and information science; Integrated library systems; Library management systems; Symphony; Pakistan; Developing countries

## INTRODUCTION

This study describes the Aga Khan University's process of Integrated Library System (ILS) selection, project initiation and planning, system implementation including installation to data conversion and migration to training, and presentation of this new system to staff, faculty, students, and the public. Following a one-year selection effort, Symphony was chosen as the new system for AKU libraries. It also describes the challenges faced by staff and the mitigation strategies. A comprehensive review of selection to go-live efforts is described including system and client configuration, functional testing and problem reporting. Training and lessons learned have also been reported in this article.

### Aga Khan University

Chartered from Government of Pakistan in 1983, Aga Khan University (AKU) is a private, autonomous university that promotes human welfare through research, teaching and community service. Based on the principles of quality, access, impact and relevance, the University has campuses and programs in Afghanistan, East Africa, Egypt, Pakistan, Syria and the United Kingdom. Its facilities include teaching hospitals, Nursing Schools and Medical Colleges, Institutes for Educational Development, an Examination Board and an Institute for the Study of Muslim Civilisations. Faculties of Arts and Sciences in Karachi, Pakistan and in Arusha, Tanzania are in the planning phase.

### Aga Khan University Library Network

AKU – University Librarian's Office

In pursuance of one of the recommendations made by Dr. Ernie Ingles, who has been a consultant to AKU in 2004, the Office of the University Librarian was established in 2008 (Ingles, 2005). This office is responsible for the overall management and development of Libraries and Learning Resources throughout the University's international campuses. The objective of the Office of the University Librarian is to facilitate the creation of a network of AKU Libraries which, while maintaining their individual specificities, can share resources and services throughout all the campuses.

### Aga Khan University Libraries

Aga Khan University Libraries provide strong support to students, faculty and researchers for their study, teaching and research through its network of nine libraries. Table-1 lists the AKU libraries around the world:

**Table 1: AKU Libraries**

Sr.	Name of AKU Library	City	Country
1	Faculty of Health Science (FHS)	Karachi	Pakistan
2	Institute for Educational Development (IED)	Karachi	Pakistan
3	IED Professional Development Centre (IED-PDCN)	Gilgit	Pakistan
4	IED Professional Development Centre (IED-PDCC)	Chitral	Pakistan
5	Faculty of Health Science (FHS)	Nairobi	Kenya
6	Faculty of Health Science (FHS)	Dar es Salaam	Tanzania

7	Institute for Educational Development (IED)	Dar es Salaam	Tanzania
8	Faculty of Health Science (FHS)	Kampala	Uganda
9	Institute for the Study of Muslim Civilization (ISMC)	London	United Kingdom

The collections include books, current journals, back files of print journals, educational reports, audio/visual aids, theses and dissertations and digital media. AKU libraries also provide access to online journals, books and other resources. The total print collection comes to 135,000 including archive of print journals.

## RATIONALE

The Aga Khan University Libraries were in the need to replace its old legacy system(s) with a state-of-the-art integrated library system in order to enhance library services as well as to facilitate internal processing activities. This new proposed system supposed to offer more flexibility and functionality than the system(s) that were previously in use. AKU libraries had been using a variety of software at individual libraries' levels. Some libraries were using in-house developed software built on Informix and FoxBASE, while others were using small off-the-shelf products. Table 2 shows the list of software AKU libraries were using.

**Table 2: Systems previously used in AKU Libraries**

Sr.	Name of AKU Library	Type of system	System in use
1	Faculty of Health Science (FHS), Karachi-Pakistan	In-house developed	Informix-based
2	Institute for Educational Development (IED), Karachi-Pakistan	In-house developed	Informix-based
3	IED Professional Development Centre, Gilgit, Pakistan	In-house developed	FoxBASE-based
4	IED Professional Development Centre, Chitral, Pakistan	In-house developed	FoxBASE-based
5	Faculty of Health Science (FHS), Nairobi-Kenya	Off-the-shelf	Libsoft
6	Faculty of Health Science (FHS), Dar es Salaam-Tanzania	Off-the-shelf	Libsoft
7	Institute for Educational Development (IED), Dar es Salaam-Tanzania	Off-the-shelf	Libsoft
8	Faculty of Health Science (FHS), Kampala-Uganda	Off-the-shelf	Libsoft
9	Institute for the Study of Muslim Civilization, London-UK	Off-the-shelf	Liberty2

Also different libraries were cataloguing their materials according to their own understanding; hence no bibliographic standards were followed. Libraries in East Africa were, to some extent, using tags but they were not MARC compliant. There was no comprehensive integrated online public access catalogue (OPAC) of AKU libraries.

In 2009, the university decided to acquire an ILS and to migrate all AKU libraries to this new system. A project charter was written and got approved from the concerned authorities for the whole process, from planning to selection to implementation and go-live (AKU, ILS Steering Committee, 2009).

## **PROJECT OBJECTIVES**

The following were major objectives of the project:

- To integrate all AKU libraries
- To provide the users access to the libraries' available resources, by providing a single, web-based, user friendly search interface to all AKU users
- To minimize the duplication in purchase of materials by the entities of AKU
- To have AKU-wide standard practices in place in terms of library operations, processes and services
- To be compliant with international library standards
- To empower the users; they will be able to interact with the system through secure login
- To have a base system for more innovative services and resources i.e. RFID system, ERMS, discovery platforms, etc.

The Project was divided into two phases:

- Project planning and initiation
- Project implementation

Since ISMC library, London already had an older version of Symphony in place, it was agreed that this library will not be part of this implementation project. But this library will upgrade its ILS to the latest version, and the metadata of this library will be imported into main ILS for searching purposes.

## **PROJECT PLANNING AND INITIATION**

This phase was started in September 2009 and was completed in December 2010. In this phase, initial planning and background work was carried out. A comprehensive 32-page Request For Proposal (RFP) were developed and sent to potential ILS vendors (AKU, ILS Working Committee, 2009). A project charter was written and got approved from the concerned authorities to govern the project. A list of major stakeholders, project technical and functional scope, project deliverables, dependencies, milestones with timelines, critical success factors, potential issues and risks, and acceptance criteria were defined in the project charter. Project committees and teams were constituted and project manager was appointed for smooth running of the project, from planning to selection to implementation and go-live of the project.

One of the most important decisions for the library manager is the selection of a library management system (Calvert, 2006). After a comprehensive study and homework, the committee selected Symphony, a product of SirsiDynix, as ILS for AKU libraries, as this system was closely matching with the needs of AKU libraries. Price of this system was also within the AKU budgetary provisions. After negotiation with the sales representatives of SirsiDynix, and vetting from AKU legal department, the project was granted to Arabic Advanced Systems (AAS) in December 2010. AKU nominated its systems librarian as project manager, whereas AAS appointed its technical manager as project manager.

## **PROJECT IMPLEMENTATION**

Once the project signed off, a project implementation plan (AKU, ILS Implementation Plan, 2010) was agreed and signed off between project managers of AKU and AAS. An online kick-

off meeting was held in first week of January 2011 and the project implementation was formally started.

### **Training site preparation**

According to the project plan, the AKU technical team had to prepare a site and to hand it over to the vendor for remote installation of the system. Required hardware was setup and configured by AKU technical team within one week. Microsoft Windows was installed as a system platform and Microsoft SQL was installed as a database. The IT infrastructure implementation used state-of-the-art failover clustering and virtualization technologies. A two-node failover database cluster was formed and application server was installed in a virtual environment with failover support. The virtual environment was created inside this cluster for efficient utilization of IT resources. A secure remote session was created for vendor interactions and application website was published for access over Internet. The hardware was commissioned at central data centre of AKU principal campus in Karachi, Pakistan. After this setup, the servers were handed over to the vendor for remote installation of Symphony. Libraries always prefer to migrate to the latest version/release of the system (Khurshid, 2010), so vendor was asked to install the then latest version of Symphony i.e. version 3.4.0.

### **Remote installation of the system**

Once hardware was handed over to the vendor, they started remote installation on the servers and get its job done within the timelines (30 days). That was included installation and configuration of Symphony database, Symphony application and customization, and Symphony e-library installation and customization. AAS provided Symphony client to AKU project manager for installation on client machines at AKU libraries. Also a sample set of data was provided by the vendor for testing purposes. AKU installed the client in libraries in Pakistan and East Africa and tested the sample data and found the functions of the system satisfactory.

### **Data conversion and migration**

One of the most critical tasks was provision of AKU data to vendor for uploading into the new system. The required format for metadata was MARC21. But since no AKU library was using fully MARC system, this could become the major bottleneck. A timely strategy was designed to handle this problem in the project initiation phase. According to this strategy, AKU libraries were requested to download full MARC data of existing records from libraries around the world using Z39.50 tools. Library of Congress, National Library of Medicine, University of Alberta, Harvard University, Oxford University, and some regional libraries were bench-marked for record downloading through copycat. MarcEdit, a freely available software, developed by Terry Reese, was used for this purpose. This tool searches and extracts MARC data from selected libraries using Z39.50 protocol. This is really a wonderful tool, but it doesn't search multiple libraries simultaneously. To overcome this limitation, another tool Copycat was used. Initially the trial version of this tool was used for evaluation, and later this tool was purchased from a US based company Surpass.

Under this strategy for AKU Pakistan libraries, around 31% MARC records were downloaded from different libraries around the world before the implementation started. This was an effective

strategy and no problem was encountered at the stage of implementation. Rest of the 69% records were mapped to MARC tags so that each book in the library would be searchable with major access points. Table-3 shows the bibliographic data for AKU-Pakistan libraries. It was decided that this mapped data will be purified and converted into full MARC data within two years.

**Table 3: AKU libraries-Pakistan - data migrated**

AKU - Pakistan	Total Collection	Copycatted data	Mapped data	%age copycat MARC records
FHS, Karachi	22,000	9,595	12,405	43.61
IED, Karachi	24,291	8,534	15,757	35.13
PDCN, Gilgit	15,690	6,312	9,378	40.23
PDCC, Chitral	8,372	425	7,947	5.08
<b>TOTAL AKU-Pakistan</b>	<b>70,353</b>	<b>24,866</b>	<b>45,487</b>	<b>31.01</b>

For AKU East Africa libraries, since they have been using small library software Libsoft, the data was extracted in MARC tags and imported in the new system. So no copycat strategy was adopted for this data. Table-4 indicates the data imported to the new system.

**Table 4: AKU libraries-East Africa - data migrated**

AKU – East Africa	Total Collection	Copycatted data	Mapped data	%age of full MARC records
FHS, Nairobi, Kenya	7,359	0	7,359	-
FHS, Dar, Tanzania	3,166	0	3,166	-
IED, Dar, Tanzania	3,005	0	3,005	-
FHS, Kampala, Uganda	4,168	0	4,168	-
<b>TOTAL AKU-East Africa</b>	<b>17,698</b>	<b>0</b>	<b>17,698</b>	<b>-</b>

The data was handed over to the vendor in MARC files (\*.mrc). The vendor tested this data and found perfect for uploading into the system. The data uploading was completed with one month's targeted timeline. AKU libraries tested this uploaded data for one week and found it satisfactory. So an acceptance message was sent to the vendor as a sign-off. After data uploading, the system was operational and ready to use.

### **Onsite training of library staff**

As agreed in project implementation plan, the vendor was responsible to provide on-site training to AKU library staff. This was divided into two phases. In first phase, the vendor had to send the trainer to Karachi to give training to AKU Pakistan staff. For this purpose, a training site was prepared at Faculty of Health Sciences Library (FHSL) Karachi, Pakistan and library staff from other AKU-Pakistani libraries was invited to FHSL Karachi. Two library staff from IED-PDCN Gilgit, a small city in northern part of Pakistan on Karakorum Highway, at some 1500 kilometre from Karachi and some 8000 feet above sea level, reached Karachi. Another library staff member from IED-PDCC Chitral, a small town at 8500 feet above sea level travelled to Karachi to attend this training session. This was a 5-days intensive training of purchased modules of the system. After this training in Karachi, AKU libraries Pakistan started a pilot run in the presence of the trainer. Being a part of agreement, the vendor had to send the trainer to Karachi for training plus

5-days post-training fine tuning of the system. So during this pilot run, the trainer (who was also a key person for implementation from vendor side) did the necessary post-data uploading fine tuning of the newly installed system.

In second phase of training, the vendor sent a trainer to FHS Nairobi, Kenya to provide training to AKU-East Africa library staff. So library heads from FHS Dar es Salaam, Tanzania, IED Dar es Salaam, Tanzania, and from FHS Kampala, Uganda were invited to come to Nairobi for this training. This was another 5-days intensive training for AKU-East Africa library staff.

Once the onsite training and test run was over for both Pakistan and East Africa, the project acceptance was granted to the vendor for completion of successful project within the given timelines.

### **Go-live and post go live scenario**

In the project charter, the go-live date was estimated to May 30, 2011. All the project deliverables were accomplished till April 15, 2011. So the project was complete before its deadline. But this time margin was used to further critical testing of the system to avoid and foresee any unseen problem. However no unusual behaviour was faced. The libraries (both from Pakistan and East Africa) found the system quite stable and showed their satisfaction. So in third week of May, all library heads gave a signoff and system went live on May 30, 2011. The Online Public Access Catalogue of AKU was launched on the same day naming it as SAFARI (Search Access Find And Retrieve Information). This is single platform for all AKU libraries and accessible at <http://safari.aku.edu>.

As a precautionary measure, a 7 day time was fixed for post go-live monitoring. The technical staff was held standby and alerted for any unseen situation. This test run was successful and no discrepancies were seen in this testing phase and project was signed off.

## **MAJOR CHALLENGES AND MITIGATIONS**

At the stage of planning and initiation, some potential issues and challenges were identified. After discussions with technical and functional teams, a mitigation strategy formulated to address these issues.

### **Geographical diversification**

This was a big issue that was discussed while planning for this project, as AKU libraries are spread over five countries in three continents, and in three different time zones. Since ISMC library London was technically out of this project scope, so there were no more questions about this. The difference between Pakistan and East Africa was still there. The recommended mitigation for this issue was that the system will implemented in two phases. At the time of implementation, it was felt that since the database for Pakistan and East Africa libraries was the same, we could avoid division of phases. So taking all stakeholders on board, it was decided that the system will be implemented in the same timings in both regions.

Since all library would be sharing one database, and hardware would commissioned in main campus at Karachi, Pakistan, what if the server was down or the internet outage between two regions would interrupted for longer time. In this case libraries in Pakistan would not suffer, but libraries in East Africa would badly suffer. The circulation module will not work hence the transaction wouldn't be performed. Also the OPAC would not be available to end-user. The vendor told that the system provides a facility for offline transactions, so this utility will cover the

short time service outage between the two regions. After discussions with technical teams and with AKU-IT department, it was decided to have a backup server at AKU-Nairobi campus to cover this risk. So the matter was discussed with the vendor and there was an agreement to have a read-only backup server in Nairobi. That server would not be a live server, but serve as a passive backup server. The cataloguing data would be exported to this server through a script so that the end-users of East Africa would be able to use OPAC.

### Change management:

One of the most significant aspects of the ILS implementation has been the change in the library's approach to procedures and services (Feng, 1983). Keeping in view this potential bottleneck, a strategy was designed and it was make sure to mentally prepare all library staff for this change. So they were involved in every policy and procedure change. This strategy worked very well and all library staff participated in changing policies and procedures and they felt ownership and responsibility and became part of this change process happily.

### Multilingual materials:

Since AKU is operating in different countries, so the libraries owned materials in other than English. In AKU Pakistan libraries, a significant number of items were in Urdu and some local languages. Table 5 provides detail of non-English material.

AKU - Pakistan	Urdu	Other	Total
FHS, Karachi	210	31	241
IED, Karachi	2,741	235	2,976
PDCN, Gilgit	1,950	65	1,970
PDCC, Chitral	750	36	750
<b>TOTAL</b>	<b>5,651</b>	<b>367</b>	<b>6,018</b>

To catalog non-English books, AKU libraries planned to provide training of cataloging in dual script (English and local languages) to its staff. Library of Congress (LOC) office Islamabad was contacted and requested to provide training to AKU staff for this purpose. The LOC office accepted our request and we sent four librarians for this training. Now staff is doing Romanization according to the ALA-LC Romanization Tables, and making dual scripts entries in the catalogue. Below screenshot is showing OPAC display of dual script entries:

4. <input type="checkbox"/> Select	<b>Nikle tirī talāsh men</b> نکلے تیری تلاش میں / مُستتصر حُسن تارڑ Tārar, Mustanşir Ḥusain تارڑ، مُستتصر حُسن 910.4 MUS  3 copies available at PDCN Library, Gilgit-Pakistan and PDCC Library, Chitral-Pakistan	
5. <input type="checkbox"/> Select	<b>Kḥānah badosh : safar nāmah</b> خاتہ بدوش : سفرنامہ / مُستتصر حُسن تارڑ Tārar, Mustanşir Ḥusain تارڑ، مُستتصر حُسن 910.4 MUS  2 copies available at PDCN Library, Gilgit-Pakistan	
6. <input type="checkbox"/> Select	<b>Kālāsh : Vādī-yi Kāfiristān kā ḡarāmā'ī safarnāmah</b> کالاش : وادی کافرستان کا ڈرامائی سفرنامہ / مُستتصر حُسن تارڑ Tārar, Mustanşir Ḥusain تارڑ، مُستتصر حُسن 891.4392 MUS  1 copy available at PDCN Library, Gilgit-Pakistan in Standard shelving location	
7. <input type="checkbox"/> Select	<b>Citrāl dāstān : Gilgit, Vādī-i Gūpas</b> چترال داستان : گلگت، وادی گوپس / مُستتصر حُسن تارڑ Tārar, Mustanşir Ḥusain تارڑ، مُستتصر حُسن	

## LESSON LEARNED

Although this project was started after a careful review of available resources, however the following lessons were learned during this project implementation:

- Required hardware should be available in hand before the kick-off meeting with the implementation vendor. This helps avoid any delays in timelines.
- Contract agreement (between the institution and the vendor) should be submitted to Legal Office for vetting well in time due to its technicality.
- Finance department should be taken on board, as payment plan including tax issues are part of the agreement. All this should be part of planning phase.
- Institutions should avoid 100% advance payment to vendor. Breakup of total payment into four equal instalments on some agreed deliverables has been a good experience.
- Taking all libraries on board well before time and keep them involve in every step of the project has been a great success. This works well as change management tool.
- Proper documentation of each and every step is very important to keep track of all activities involved.

## CONCLUSION

Aga Khan University is perhaps the first university in developing world that is serving in eight countries and has network of eight libraries in four developing countries in two regions (South Asia and East Africa). It was really a difficult task to integrate these libraries using single shared database keeping in view the geographical locations and multilingual collections.

The project implementation was started in first week of January and went live on 30th May, 2011. Symphony was chosen after a comprehensive review of major international library systems. Symphony is a product of SirsiDynix (<http://www.sirsidynix.com>), one of the world leaders in library automation industry, and has presence in thousands of libraries all over the world. The implementation vendor for this project was Arabian Advanced System (AAS), Beirut office.

The AKU libraries' catalogue search page, called SAFARI (Search Access Find And Retrieve Information), is accessible at <http://safari.aku.edu>. The new system integrates all AKU libraries' holdings into a single, state-of-the-art database that conforms to international standards common to major academic libraries.

A lot of hard work went on to get the project implemented within given timelines and all project management principles were undergone. This work was accomplished by a well integrated team of librarians and IT staff at Aga Khan University.

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